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COAL AGE

With Which is Consolidated The Colliery Engineer

DEVOTED TO COAL MINING AND COAL MERCHANDISING

EXTRACTION METHODS, EQUIPMENT AND MINING NEWS
MARKET REPORTS, PRICES AND STATISTICS
OF THE COAL INDUSTRY

ISSUED WEEKLY

VOLUME XXIII

January 1 to June 30, 1923

McGRAW-HILL COMPANY, INC.
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January 1 to June 30, 1923

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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

Volume 23 NEW YORK, THURSDAY, JANUARY 4, 1923 Number 1

"How to Run Coal"

UNDER this alluring caption the Nationalization Research Committee of the United Mine Workers has issued a booklet of "Suggestions for a plan of public ownership, public control, and democratic management in the coal industry." The report is signed by John Brophy, William Mitch and C. J. Golden. It is not stated who composed the paper, but the inference is that some of the more liberal-minded "intellectuals" who inhabit the country's metropolis lent a helping hand.

This is stated to be a plan on which the mine workers can build sentiment for the nationalization of the coal industry. It is frankly stated that the "term nationalization and the term socialization meant the same thing." The booklet is intended for distribution among the mine workers of the country; it is calculated to arouse their interest in and desire for nationalization of the coal industry. The reader is told that "the prime cause of labor disputes is removed by nationalization in the elimination of the profit motive"; and it is announced that the miners' program is one with that of the railroad workers for the nationalization of the railroads of this country.

Now it will be remarked at once that Mr. Brophy is willing to go much further than Mr. Lewis. Last April, before the Committee on Labor of the House, Mr. Lewis said that the mine workers "believe in the nationalization of the coal mines, to be accomplished in a perfectly legal and proper way . . ." He supplemented this formal prepared statement, when asked by the chairman, Representative Nolan, what he meant by "nationalization," by saying: "That is a matter for determination. It is merely suggested as being a more feasible suggestion than any other. I think that government ownership is an impossibility under present circumstances. The people of the country are not in a position to acquire title to the mining deposits of the country or the developed mining properties. It would constitute a tremendous financial burden on the country." This burden is estimated in the committee report signed by Mr. Brophy as follows: "Four and a half billion dollars for the coal industry and the coal of the United States is a liberal estimate." The *New York Times* comments that this cost is the least of the objections to nationalization.

In other words, "nationalization" of the coal industry is yet a nebulous idea with the United Mine Workers; it is something some of them at least, spurred on by free-thinking "parlor socialists," believe leads them to their Utopia. What do they say will be gained if the government buys from the owners all the coal mines and all the coal lands and lets the workers and others run them? The answer is found perhaps in a list of questions addressed to the mine worker found at the end of the pamphlet. "How much control do you want over your job?"; "Without nationalization, how do you propose to cure slack work?" are some of them. The inference, of course, is that if the properties are taken away from the capitalists who own them, the workers can have full control and can eliminate slack work time.

It is not true that the operators have made no proposal to correct the ills of the coal industry. They have said that if the union will agree to, or be made to acquiesce in, arbitration, national strikes will be thus prevented, the excess development that hangs over the industry will in time be absorbed or eliminated and the industry be permitted to function normally. Neither is it true that this proposal of the miners is thought out and through. In fact they have reasoned backward, saying that nationalization is the panacea for all the troubles of the miner and that it will cure high prices and insure regularity of supply to the consumer, and then they have started to define nationalization and to work out a plan to do those things. They are aping the British miners. They are groping for the pot of gold at the end of the rainbow, the aggregate profits of the industry. The very thinking, the talking and the groping of these men, be they parts of the United Mine Workers or others who are interested theorists, are a part of the milling around of labor the world over, seeking the millennium, trying to solve in their way the great problem of industrial relations.

There is not the slightest possibility that the country will adopt nationalization of the coal industry with any great rush. For those who fear it it is nothing to be afraid of—yet. The answers to most of the arguments and statements in the "How to Run Coal" booklet are obvious, if the reader will think straight. The trouble is that most of those in whose hands the pamphlet will be placed are not trained in straight thinking and are therefore the more likely to be misled. The subject is worthy of the best and most serious thinking of the coal industry. "How to Run Coal" deserves study; it is not lightly to be cast aside.

Mr. Spens Retires

LOOKING back to the activity that preceded and accompanied the passage by the Congress of the act creating the Federal Fuel Distributer, from which position Conrad E. Spens has just retired, and casting up the fruits of his administration of that act leads to the observation that dire predictions oft come to naught and that there is a world of common sense yet to be tapped.

With no real authority, confronted by skepticism from the operators and wholesalers and having but a "we wish you well" from the consumers, Mr. Spens left his work as vice president in charge of traffic of the Burlington railroad and tackled the job of distributing the coal of the country at a fair price. He exceeded all expectations. His tact, his knowledge of human nature and, yes, of politics, and his wholesome

personality put the job over. Those who when he started were the first and the loudest in saying that whatever he did would be unconstitutional and should and would be attacked are now praising him.

It is taking nothing from his glory to say that the strategy controlling his methods was laid down in advance by Mr. Hoover. Mr. Spens carried out the plans; he lined up producer, jobber, railroad and consumer. He obtained that measure of co-operation needed to make the coal industry function in a logical, reasonable manner at a time when all was set for a panic and another price scandal. There has been no more felicitous "control" of the coal industry than that of Conrad E. Spens.

Name Them!

GLIBLY do the newspapers and the men on the street talk about "coal barons." There is but one answer to their aspersion and this is simply: "Please name them." The request never fails to have the desired effect; they are never named. If you talk of lumber barons, the name of Weyerhaeuser, one of the richest men in America, comes readily to the tongue. If the talk drifts to steel barons, up come such names as Carnegie, Schwab, Frick, Hanna and Corey. Of railroad barons none is now left, but nevertheless the names of Harriman, Hill, Huntington, Vanderbilt, Gould and Crocker are not forgotten. Of automobile barons there are Ford, Couzens, Dodge and Willys and many others. The Rockefellers and Doheny head a long list of oil barons. Notable shoe barons are Endicott Johnson and Douglas. Try out the list for banker, dry goods, packing, sugar, copper, journalist, magazine and other barons and you will find that your memory in no way is remiss. But for coal barons you must search the directory, and most of those that will be named will not be barons in their own right but by virtue of the aggregations of other people's capital which they are investing and managing. There are no real coal barons.

But surely coal is a source of much profit. Anyone around the bituminous coal regions can tell you of men, little removed from penury, who in a few months have become among the more wealthy of the people in the small communities in which they live. And with this reflection it must then be borne home forcibly on those who really think the subject through that in the coal industry it is not true that the "first million dollars are the hardest." Exceptions perhaps are those who make profit on royalties and the buying and selling of coal lands, and even they do not become really wealthy as measurements of wealth are made in other industries. In the actual operation of coal mines the start is far easier than the finish.

The small operator who opens his property just when coal becomes scarce is the man who makes the profits. His investment is small, his coal is near at hand and spot prices are high. He is likely to become rapidly well-to-do.

His big neighbor finds himself loaded down with contracts taken at a low figure. He has estimated his power to fill orders on the basis not of his probable car supply but of his mine capacity. When coal becomes scarce his rivals multiply and they share his cars. He might get enough to have a little coal to sell on the spot market if cars came as regularly as they did when orders were few, but they do not. Meantime his customers are coming forward for the maximum tonnage contemplated in their contracts.

He finds his men ready to strike, unwilling to work steadily, and still more ready to drift away from him. His smaller rivals will pay any wages. They are in business only for the nonce. They do not fear the after-effects of excessive liberality and they have no contracts. They can pay any wage necessary, for the spot price warrants it. Without enough men, with insufficient cars, loaded to the guards with low-priced contracts, he passes through the time of plethora without any great profit and as he has a large investment, a heavy debt, much expense for upkeep and taxes on a large land-acreage, he must continue to work his mine in the gray, uncertain light of the morning after. Truly the second million dollars come the hardest.

But wait! We do recall a coal baron, the late Francis S. Peabody, of Illinois. While he lived he was always a capitalist and not a mere servant of some large corporation. When he died he was found to be worth $2,500,000. Everybody must have been surprised that this man, the leading figure among Middle Western coal owners, was worth so little. Men who have cut a much narrower swath than he have been worth many times as much. Yet as a coal baron, in point of wealth, he took a high place.

Let us compare his wealth with that of the Ford Motor Co. This giant aggregation started from nothing in 1903. To that, little but profits were added, and see what the record shows. The capitalization soon rose to $2,000,000. In September, 1910, Ford declared a dividend of 100 per cent cash; in June, 1913, of 500 per cent cash, and in 1914 of 100 per cent. In 1915 the dividend paid was not reported, but in 1916 it was 60 per cent and in 1919 the dividend was 200 per cent. In that same year as a result of the suit of the Dodge Bros. against the Ford Motor Co. that corporation had to pay out a further dividend of $19,276,385.

With all these dividends the Ford Motor Co.'s total assets at last reports were $409,820,152; its surplus was $289,935,296; its cash and debts receivable totaled $148,615,334.

On one act of candor the public may be congratulated —and it is a fact that shows that the people know the truth but have not as yet grouped what is known in detail into a broad generalization—and that is that you almost never hear of "coal kings." There are oil kings, steel kings, sugar kings and kings of finance but a barony is the highest title which a coal man ever receives from the grateful (?) public. The people with all their irritation know well that no coal man ever arrives at great wealth. If the press knew of a coal king it would not overlook him. The only person who ever got that title in the American press was a Welshman, Baron Rhondda, and whether he was really entitled to the distinction is a question.

CONSIDERATION OF THE AMENDMENTS to the Coal Commission Act by the Interstate and Foreign Commerce Committee of the House of Representatives was scheduled to begin during the week of Jan. 1. No opposition to the amendments is expected and prompt enactment is predicted.

AS THE RANKING MEMBER of the Interstate Commerce Commission, B. H. Meyer will act as chairman of the Commission during 1923. The chairmanship rotates among the members from year to year in order of seniority of service.

Remodeled Valley No. 2 Operation of the Nineveh Coal Co.

By Charles N. Martin*
Seward, Pa.



Double Rooms Reduce Labor of Coal Loading—Solid-End Cars Used with Self-Dumping Cages Having Revolving Cradle—Improved Hoisting Cycle Saves Time and Lowers Power Consumption

DEVELOPED to serve a 40,000-kw. plant of the Penn Public Service Corporation on the bank of the Conemaugh River just on the outskirts of Seward Borough, Westmoreland County, Pennsylvania, the remodeled mine of the Nineveh Coal Co. exhibits well what can be done to adjust an old and inefficient mine to present-day needs. The power plant, which serves this field and the mining districts of adjoining counties, has been in operation about one year.

The mine is located on the main line of the Pennsylvania R.R. not far from the common meeting point of Indiana, Westmoreland and Cambria counties, in a large coal field which is practically undeveloped.

The seam of coal being worked by the Nineveh Coal Co. is the "B," or "Miller," bed, which in this field has an average thickness of 44 in. The bed is opened by a shaft at a point where the coal is 135 ft. below the surface. The former system of working the mine was by single-neck rooms each having a pillar which was drawn from one road only. This was not producing results in proportion to the energy that the miners expended. The management of the Nineveh Coal Co. conceived the idea that two-neck rooms with each pillar drawn from two roads would be more efficient and would prove more economical in the cutting and loading of the coal. The increased output per miner that resulted and the greater satisfaction of the miners, which is the outcome of the better earnings arising therefrom, have proved the wisdom of making this change in method.

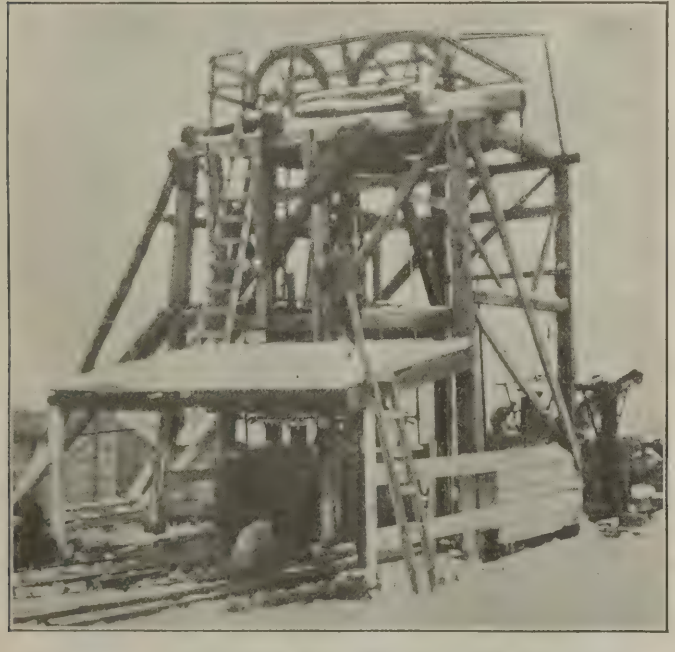


FIG. 1—OLD NINEVEH HEADFRAME NOW REPLACED

The Nineveh coal field, like many another below water level in central Pennsylvania, was long overlooked and in this case the pioneering efforts were not on any elaborate scale but they served to exhibit the value of the area they uncovered.

*Superintendent, Valley No. 2 Mine.

The coal is undercut by shortwall mining machines with 6-ft. cutter bars, the coal being blasted by permissible explosives fired by electric detonators. Thus breakage is reduced to a minimum and the miners are afforded maximum safety. All main roads are equipped with 40-lb. rails and the coal is hauled over them by electric locomotives.

Cars Are Wide and Low, Having Solid Ends

Composite steel-and-wood solid-end cars are used instead of the old-style equipment. The maximum height of these cars above the rail is 28 in. They have a capacity of 1½ tons. Cars of this type are well fitted to the requirements of this seam as with them and with steel ties in the rooms it is unnecessary to lift bottom in the working places. The miner has about 12 in. of height above the car in which to load his coal. This could not be obtained without some such arrangement.

The rooms are driven sufficiently off the strike and up the pitch to make the gradient 1 per cent in favor of the load, thus rendering it easy to move the cars into and out of the rooms. The maximum grades on entries are about 5 per cent in favor of the loads, a grade on which large trips readily can be transported. These grades also afford good drainage gradients to one central point where three horizontal-split double-suction single-stage centrifugal pumps have been installed, each having a capacity of 750 gallons per minute.

A new 8-ft. straight-flow fan has been installed on the old airshaft. It has a capacity of 50,000 cu.ft. of

air per minute at 1¼-in. water gage and a speed of 250 r.p.m. It is driven by a 20-hp. motor. The airshaft has been retimbered and a new staircase installed by which the men can enter and leave the mine. The airshaft is located near the main hoisting shaft and runs vertically downward for 75 ft., but then slopes off for 130 ft. to the coal seam.

Solidcar self-dumping cages which hoist and dump solid-body cars have been installed in the main hoisting



FIG. 2—CAGE AND HEADFRAME

Note the hopper below the cage into which the car dumps as it approaches and reaches the upper landing. By the opening of the gate of the hopper the coal is discharged gently into the weigh basket in the tipple. This shows the cage at a point below the dumping position.

shaft by the Car-Dumper & Equipment Co., of Chicago, Ill. The many obvious advantages of the solid-body car have been well known to operators of shaft mines for some time, but until the development of the Solidcar self-dumping cage the only shaft mines that had been able to avail themselves of the advantages of this type of car were those which were large enough to use skip hoists with a rotary car dumper at the shaft bottom. The management of the Nineveh Coal Co. felt that with a solid-body car they would have a lower first cost, a stronger car, lower car maintenance and less road-cleaning expense.

The self-dumping cage overturns the car slowly and easily, the overturning commencing some distance below the final dumping point, and as a result the coal is discharged from the car with so short a fall and so light a shock that the coal in dumping, for all practical purposes, is not broken or degraded. As the car is rotated around its center of gravity little power is required for dumping, and as none of the weight of the empty car or cage is taken off the rope at the head of the shaft the peak load on the hoist is considerably reduced.

Entering the cage at the bottom of the shaft the car is engaged by keepers and rests on a cradle which is mounted inside a hopper, to which the bail and hoisting rope are attached and which has a hinged discharge gate at the lower end. This cradle is built in the form of a hoisting platform, making the cage suitable for hoisting cars, men or material.

The cradle is pivoted on heavy trunnion shafts which pass through the hopper at each side and which have the dumping arms and rollers fastened to their outside ends. This rotating cradle is pivoted at a point which is a little to one side of the center of gravity of the loaded car in the cradle, making it easy to overturn at the head of the shaft. During hoisting the cradle is locked in the horizontal position. The hinged chute at the bottom of the cage also is locked in the closed position by direct connection to the overturning arms.

As the cage approaches the dumping point the guides unlock both the gate and the cradle in which the car stands, and the rollers on the overturning arms under the main dumping guides turn the cradle over in an easy rotation until the car finally reaches the overturned position at the end of a 135-deg. rotation.

It is because the hopper is under the car to receive the coal that the dumping guide can be made so long and with such an easy curvature as to give an overturning movement that is gradual and smooth. This arrangement eliminates any excessive strain or jar in the dumping operation and spills the coal out of the car into the hopper slowly. Breakage is prevented by a dumping shield, so placed that the larger lumps of coal cannot fall into the hopper until a bed of slack has formed.

After the gate is unlocked by the overturning action of the cradle it is held closed by the action of the



FIG. 3—CHUTE FOR LOCAL COAL; CAGE ON RIGHT

A loaded car is ascending in the cage and thus far has not reached the point of overturning. The chute for local coal can be opened and shut from the ground.

dumping rails at the side of the shaft until it reaches the dumping point. The coal discharged into the hopper is held back by the gate until the dumping point is reached. Here mechanical devices allow the gate to open. At this instant the car has become divested of all its coal and the whole load in the hopper immediately flows across the open gate to the weigh hopper in one continuous sliding motion without any vertical fall whatever.

When the cage stands in the dumping position the entire weight of the cage and car is kept on the rope, giving a maximum counterbalance to assist in starting the next loaded cage from the bottom of the shaft. This

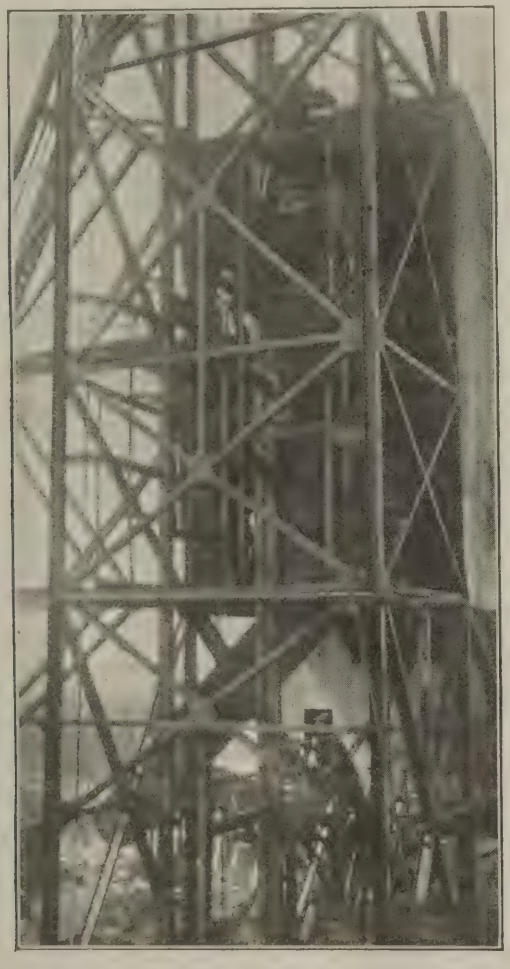


FIG. 4—HEADFRAME WITH CRADLE DUMPING

The cradle is standing perpendicular, the cage having arrived almost at the end of the dumping cycle. The chute for local coal sales also can be seen on the left of the illustration.

feature materially reduces the maximum peak load on the hoist, allowing the use of a smaller engine.

These cages are not operated with a slack rope. The dumping guides are so gradual that the hoisting engineer brings the cages into the guides at a fairly high speed and then throws on the brake, retarding the movement uniformly, until the cage finally comes to rest with the car in the overturned position. The loaded car is fully discharged by the time the empty car in the other compartment reaches the landing at the shaft bottom. This results in a smooth hoisting cycle, for it is not necessary for the engineer to bring the engine to a stop before going into the dump. It also shortens the hoisting cycle, for the car is dumped at a fairly high speed.

Another feature of these cages which tends to increase capacity is the positive and regular discharge

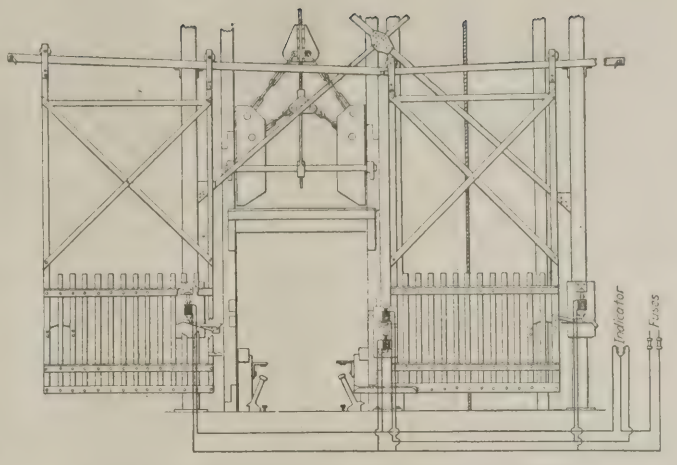


FIG. 5—CAGE GATES AT SURFACE LANDING

The gate can be opened only when the cage is at the landing and not then unless the emergency brake also is applied. The gate will remain open until the emergency brake is released; then it will close and lock.

at the dumping point without any chance of failure or any possibility of missing the dump. The dumping is progressive and positive, being performed by guides, and does not depend upon the engagement of a crane as with an endgate car.

A double reduction hoist equipped with automatic overwind, overspeed and emergency stop devices, driven by a 75-hp. alternating-current motor, raises and lowers the cages.

The new tipple was designed by C. E. Cowan, of Greensburg, Pa., the consulting engineer of the company, assisted by V. R. Velander, chief engineer for the Marion Machine Foundry & Supply Co., of Scottdale, Pa., which furnished the steel work and equipment. The tipple is of steel and is covered with corrugated galvanized iron. Liberal window surface and skylights have been provided to light all places where men have to work.

Coal Weighed in Basket After It Is Dumped

The coal passes from the cages over a dump chute to the weigh basket, where it is weighed by dial and beam scales, the weights being tabulated. When a counterweighted brake on the weigh-basket mechanism is released, the coal by its weight opens the door on the bottom of the basket, allowing the coal to pass to a receiving chute connected to the reciprocating feeder, where it is fed uniformly onto the apron conveyor. This conveyor is made up of ¼-in. steel-plate double-beaded flights 3 ft. long. These are mounted on steel thimble roller chain.

The rollers have cored oil cellars and are provided with wiching ring and push-plug oilers, making them self-lubricating. The coal is carried about 90 ft. on this conveyor, whereupon it passes to a chute discharging onto the shaker screen. Only one shaker is installed, the screen being of the double-deck type with a collecting hopper.

The lump and slack are separated in passing over the screen and are loaded onto the picking table through a specially designed discharge nose. The collecting hopper is provided with rack-and-pinion roller slide gate, which permits of full or partial opening, so that either any part of the slack can be loaded as desired or the slack can be passed over a discharge chute for loading on the slack track.

The picking table and loading boom unit is made up of ¼-in. steel plate single-beaded flights 5 ft. long

which are mounted on two strands of steel thimble roller chain, the specifications being similar to those for the apron conveyor. A mechanical boom hoist, gear-driven from the countershaft on the picking-table drive and controlled from the trimmer's platform, raises or lowers the boom, as desired. The discharge end of the loading boom is provided with a simple but effective device for reducing coal breakage to a minimum when topping the car.

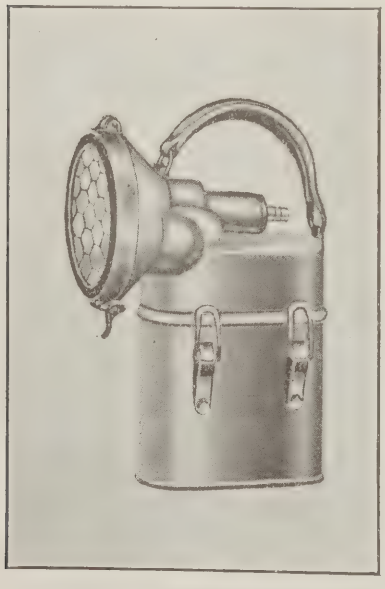
Provision was made in the tipple for dumping slate by bypassing it through a flat door controlled by a lever on the weigh-house floor. It falls into a slate chute having a capacity of approximately 10 tons, the lower end of which is fitted with an undercut gate operated by means of gear segments and pinions mounted on a shaft, to which also is attached a pocket sheave wheel. This sheave wheel is operated by a chain of sufficient length that the undercut gate can be opened or closed from the ground level. The new equipment has a maximum capacity of 250 tons per hour.

A Lamp Suitable for Use in Coal Mines Which Burns Without Attention

IN TRAVELING around mines need often is felt for a lamp that will burn brightly and without mess or need of attention, one also that can be stood up without difficulty on the top of a loaded car or in some other more or less uneven place so as to give a ready light for writing or note taking.

Such a lamp is the Excellight, manufactured by the National Marine Lamp Co., at Forestville, Conn. It is a portable lantern the current for which is generated by two No. 6 dry cells contained in an aluminum casing. It has an adjustable focus that permits either a spread of light or a concentrated ray to be thrown. A push-button switch is conveniently arranged so that it can be instantly manipulated by the finger and thumb of the hand carrying the lantern.

No arrangement is provided for the extinguishment of the filament should the glass in front of the electric light be broken by a blow or fall or if the bulb itself also should become broken. It is not therefore a fool-proof lamp or even an accident-proof lamp in gas in such a degree as are the lamps approved by the U. S. Bureau of Mines. The glass, however, in front of the lamp is $\frac{3}{8}$ in. thick and reinforced with wire. Such a lamp would be well suited for use around powder houses and stables above, and perhaps below ground, though underground as a rule permanent lighting is provided. It would serve well also for the men employed on hay and powder cars, especially when special and covered wagons are not used. For firebosses, who need to come out to places of perfect safety when their flame safety lamps are accidentally extinguished, the type of lamp which will fit the pocket is preferable. It would be better still, of course, in every case to give firebosses, whose open lights may be extinguished, a lamp of the type approved by the U. S. Bureau of Mines.



ELECTRIC LAMP FOR NON-GASEOUS MINES

The lamp has two dry cells and an aluminum casing. The glass in front of the lamp is thick and reinforced by wire.

Mechanical Engineers Adopt a Decalogue

ADOPTION of a code of ethics, governing its membership of approximately 20,000, is announced by the American Society of Mechanical Engineers. Ultimately, it is expected, this code, prepared by a joint committee of the national engineering societies, will apply to the entire engineering profession, embracing more than 200,000 professional engineers. It runs as follows:

1. The engineer will carry on his professional work in a spirit of fairness to employees and contractors, fidelity to clients and employers, loyalty to his country and devotion to high ideals of courtesy and personal honor.

2. He will refrain from associating himself with or allowing the use of his name by an enterprise of questionable character.

3. He will advertise only in a dignified manner, being careful to avoid misleading statements.

4. He will regard as confidential any information obtained by him as to the business affairs and technical methods or processes of a client or employer.

5. He will inform a client or employer of any business connections, interest or affiliations which might influence his judgment or impair the disinterested quality of his services.

6. He will refrain from using any improper or questionable methods of soliciting professional work and will decline to pay or to accept commissions for securing such work.

7. He will accept compensation, financial or otherwise, for a particular service, from one source only, except with the full knowledge and consent of all interested parties.

8. He will not use unfair means to win professional advancement or to injure the chances of another engineer to secure and hold employment.

9. He will co-operate in upbuilding the engineering profession by exchanging general information and experience with his fellow engineers and students of engineering and also by contributing to work of engineering societies, schools of applied science and the technical press.

10. He will interest himself in the public welfare, in behalf of which he will be ready to apply his special knowledge, skill and training for the use and benefit of mankind.

The code was drawn up by a joint committee including representatives of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the American Society of Heating and Ventilating Engineers. Only the mechanical engineers have ratified it as yet, possibly because the others have not had a meeting at which the matter could be introduced. The representatives of the mining engineers are J. Parke Channing and Philip W. Henry, of New York.

Longwall Retreat with Face and Main Conveyors and Many Air Splits Giving Positive Ventilation

With This Arrangement a Single Panel May Be Made a Source of Production for a Sizeable Mine—Separate Well-Directed Split Ventilates Every Four Hundred Feet of Face

By F. C. Cornet*
New York City

RAPIDITY in extraction enables the coal operator to realize rapidly on the capital invested not only in the coal itself but also in the preparatory and development work by which this coal is made recoverable with profit. It is with this idea in view that the plans here presented have been formulated. They provide for the recovery of all the coal and for an increase in tonnage that can be recovered during a given time with a given expenditure on equipment.

Referring to Fig. 1, which shows one way of applying this method, lateral headings (designated in this case as Second Right and Third Right) are driven 504 ft. apart center to center, each heading having its air course on the lower side in the usual manner. Rooms 20 ft. wide and 400 ft. long are driven to the rise with a 200-ft. solid pillar between them. From the face of each such room a crosscut 20 ft. wide is driven to the next room, the alignment of these crosscuts leaving a continuous pillar 30 ft. wide to protect the air course of the lateral heading immediately above.

The lower rib of each of these crosscuts forms a longwall face 200 ft. long, along which a face conveyor is laid. These faces operate in pairs or sections. The conveyors of a section run toward each other so as to discharge onto a third conveyor installed in every other room, beginning with No. 2.

I have designated these rooms as "conveyor rooms" and the conveyors in them as "stationary conveyors," the latter being so named because they stay there until all coal in both adjacent pillars has been mined to within a distance from the heading varying from 50 to 100 ft. or even more, to suit the needs of the operation. As the faces advance toward the heading the stationary conveyors are shortened at their far end.

Stationary Room Conveyor Sunk in a Ditch

Though the face conveyors, which must be easy to move as the faces advance, will be of a light pattern, the stationary conveyors, in order to reduce their chances of getting out of order, may be of heavier construction. Though the face conveyors are laid on the pavement of the seam (which seam is in this case 36 in. thick) the stationary conveyors are laid in a narrow ditch cut in the bottom. Consequently cars and locomotives can pass over the conveyors when the rooms are being driven. In the instance shown in the various illustrations a total headroom of 54 in. having been found necessary for haulage, the depth of cut in the rooms is 18 in. This provides enough fall from the face conveyors to those that are stationary to permit the former to deliver coal very nicely to the latter. Toward its lower end, beginning a short distance from the heading, the stationary conveyor is bent upward, as shown in Fig. 2, for the purpose of elevating its head enough

*Consulting engineer.

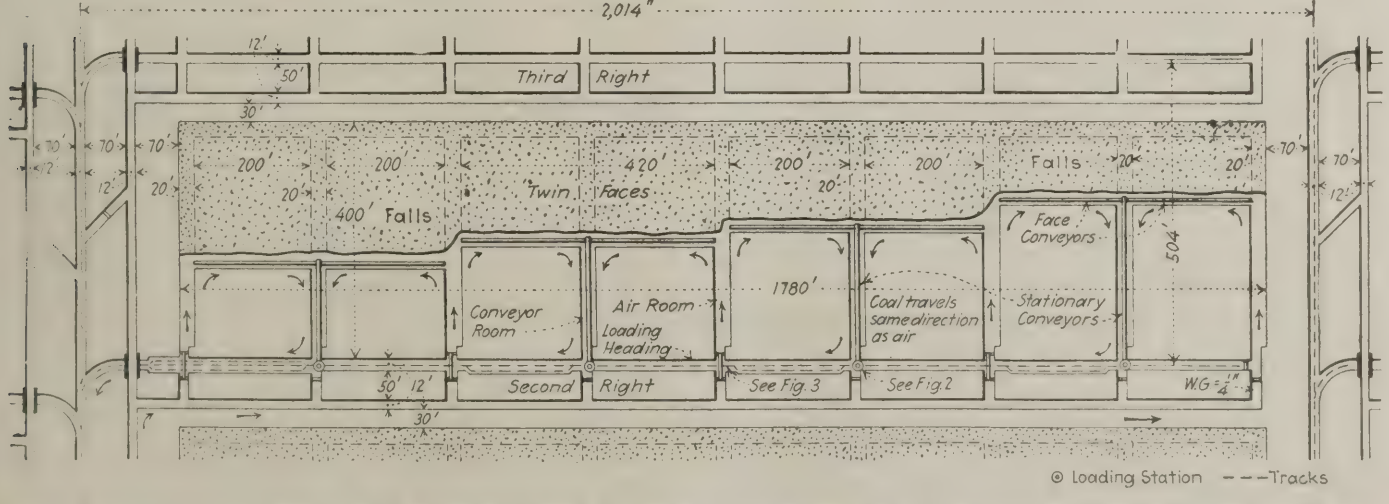


FIG. 1—LONGWALL RETREATING METHOD WITH MAXIMUM CONCENTRATION OF WORKING FORCES BUT WITH AIR SO SPLIT AS NOT TO RESTRICT THE NUMBER OF MEN ALLOWABLE BY LAW AND GOOD PRACTICE

By means of a pipe overcast the air is taken from the intake airway into the air room, up which it passes. At the longwall face it splits, runs past the two faces, returning by two conveyor rooms. The main difficulty from a legal standpoint would consist not so much in carrying out these plans after the workings had been developed to the stage indicated but in developing the work to that stage, for the conveyor and air rooms would have to be driven 400 ft. beyond any of the air passages provided. This could be done only by providing pipe ventilation for these rooms while driving them and the crosscuts between them. The distance might be greatly shortened, if grades permitted, by driving the rooms to meet from adjacent headings, making the distance from the adjacent airway at no point more than 200 ft. If the coal is thin and bottom is not lifted the air rooms could not be driven without specially low cars or conveyors being provided. Special cars might not be objectionable, as they might be already on hand and as they would be used exclusively in the development of new headings, making full trips of special cars feasible. All coal from the longwall faces is loaded at the heading with the cars at right angles to the conveyor.

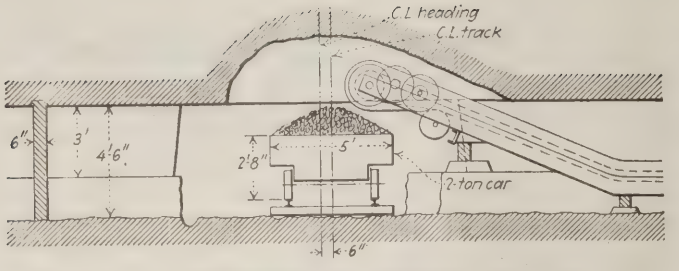


FIG. 2—ROOM CONVEYOR DELIVERING COAL TO CAR

As the car does not have to enter the room it can be made of almost any capacity desired. A lodging must be made for it in the roof, but as the frequency of this provision is only once in every 400 ft., that will involve little rockwork. The conveyor is sunk in a ditch in the room roadway so that the face conveyors can deliver the coal to it without elevation.

above the rail so that cars can be loaded well above their brim. This is called a "loading station."

The mine being in 36-in. coal, a lodging must be made in the roof, as shown, to permit this elevation. As the conveyor needs but little space and as the loading stations are 400 ft. apart, it is fair to say that, considering the large tonnage every station will be required to load, the slate work needed for this purpose will be insignificant. Were the cars, as is often the case, to be taken into what are here called conveyor rooms and placed under the face conveyors for lodging, a hundred times as much material would have to be handled. In the one case a large quantity of bottom would need lifting and in the other a little roof would be removed from the few and widely spaced loading stations.

Trackage and Gathering Cost Reduced

It is obvious also that this way of loading the cars on the heading itself not only reduces the trackage to a minimum but also favors expedition in loading operations. It will be noted that a three-track main siding is provided at the entrance to the heading and that secondary side tracks are constructed handy to each loading station, but nothing prevents making the loading facilities still greater by double tracking the heading completely above the three-track main siding. If this were done the heading would have to be made at least 17 ft. wide, which would take the place out of the yardage-paying class, leaving only the air course and its crosscuts to be driven narrow.

By looking at Fig. 1 it will be seen that the different sections are not in line with one another. The further a section is from the main heading, the further it also is from the lateral, or loading, heading. This is due to the fact that the work was started advancing. Any given pair of faces was started ahead of the pair immediately beyond it. Had the work been started retreating, the section furthest from the main heading would be closest to the loading heading, the distance between the latter and the different sections increasing toward the main heading.

For supervision, for ventilation and in order to permit the cutting machines to pass rapidly from one section to another, a communication way is kept open between successive sections. In order to minimize the expense of maintaining such communication, it is advisable to straighten the general face line as much as the working of the roof will permit. In general, if the work is in good hands, it will be found that the manner in which the roof works does not prevent keeping the face line practically straight if desired; indeed, the straight face has so much to commend it that most persons would prefer it. The kind of roof that permits this is often also the kind that will permit of keeping open a 50-ft. communication between sections as easily as one two yards or so in length.

The heading pillars can also be removed by similar methods. By heading pillars are meant here the protective, unbroken strip of coal left on the lower side of the air course, the pillars between air course and heading and those portions, 200 ft. long, of the large interroom pillars that will not be recovered through the conveyor rooms in the manner that has been described.

Referring more especially to Fig. 5, it will be seen that in the instance illustrated the widths of these pillars are, in the order named, 30 ft. for the first and 50 ft. for each of the other two. Figs. 5 and 6 show that the system adopted for removing these pillars is much the same as that previously described. Two face conveyors, running toward each other, discharge onto a stationary conveyor carrying the coal to a loading station where it dumps it into the cars.

The only noticeable difference between this and the loading stations described above is that in the present case the cars come to and depart from the loading station in a direction parallel, instead of at right angles, with the stationary conveyor. Above the loading station there is a tail track capable of accommodating as many empties as the gathering locomotives are able to handle at one time.

It is easy to see how loading facilities could be further improved by extending a little distance outwardly, and in a straight line, the tail track, joining it by a switch at its lower end with the main, or loading, track. This would permit shoving a trip of empties up the tail track without having to maneuver the trip of loads formed on the main track.

This would, of course, necessitate more rib slabbing than the drawing shows, but such liberty usually can be freely taken at this late stage of operations, even if the roof has been weakened as a result of close, intensive mining. If slabbing increases in slight degree the trouble of keeping the track clean, it will not be for long. It will be found good practice to move the position of the loading station outward on the heading about 350 ft. at a time—that is, every time the stationary conveyor will have been made 350 ft. shorter in the rear.

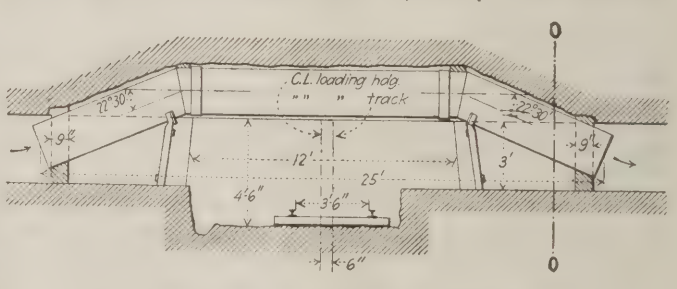


FIG. 3—AIR BRIDGE OVER MAIN ROADWAY

The air to be taken by this bridge is intended to clear only 400 ft. of face from noxious gases. Enough air is supplied to provide ventilation for forty men. Concrete stoppings are provided at both ends of the air bridge, the pipe passing through both of them.

As there comes a time in the operations when all that remains to sustain the output of the heading is the coal tributary to the set of conveyors in the heading pillars, it is important to plan the work in advance so that this set will load enough coal daily to its last day to keep at least one gathering locomotive occupied to capacity every minute of operation.

This will keep down nearly all the items of cost.

especially haulage, supervision and loading-station work. In order to do this it may be advisable to make the barrier pillar below the air course wider than 30 ft. and leave more than a width of 50 ft. above the heading to be mined when drawing heading pillars. Fig. 5 shows 130 ft. of actual coal face to be mined at such a time.

If, without changing the width of the middle pillar, the other two are so widened that the actual coal face will be 200 ft. instead of 130 ft. the daily output will be increased in the proportion of 130 to 200, that is, more than 50 per cent. This will go a long way toward reducing the idle moments of the locomotive, its crew and the men employed around the loading station.

The rooms of odd number, beginning with No. 1, have been designated as "air rooms" because they are used to convey air to the working faces. This air comes direct from the air course through a sort of semi-permanent overcast made of a galvanized-iron pipe of 24 in. diameter placed overhead across the loading heading.

Figs. 3 and 4 show how this pipe, lodged in a narrow cut shot out of the roof, does not interfere with circulation on the heading. Although light and inexpensive, this kind of overcast is most efficient. The pipe can be used over and over again anywhere in the mine.

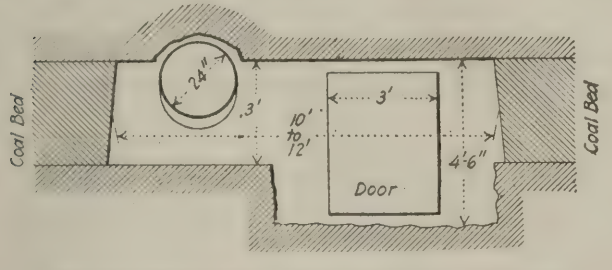


FIG. 4—DOOR AND CROSS-SECTION OF PIPE

The 3-ft. door is intended for use when taking a cutting machine to the shop whenever it is in need of important repairs. Ordinarily the men travel by way of the conveyor rooms but the door might be used by them in case of an emergency. It must be placed far enough back so that the machine can be turned into the main roadway without fouling.

Both ends of it are tightly encased in stoppings, preferably made of concrete, as shown.

In the upper stopping a door is provided, as shown in Fig. 4, through which the cutting machine may be taken in or out, as is found necessary. It is through this door also that the men will find an additional way of escape in case of emergency. It is not likely that the men would use this door ordinarily. They would prefer to travel by way of the conveyor rooms, where there is ample walking space alongside the conveyor, the latter being laid in a cut.

Under the small water gage of 0.25 in., the pipe overcasts, which are only 25 ft. long, are able to deliver not less than 8,000 cu.ft. of air per minute. This air traveling up the air room, splits at the head of it. One-half goes to the left, the other to the right, each split seeking the nearest conveyor room on its side, ventilating on the way one of the two faces of a section whose other face is ventilated symmetrically, that is, from the opposite side and direction, by a split of air coming from the next air room.

The two splits thus ventilating a pair of faces meet at the head of the conveyor room, go down it and return together direct to the outside. This is shown in detail in Fig. 1. By looking at the latter it is seen also that the first and last air rooms must furnish air to only one face each. Hence they will have to carry only

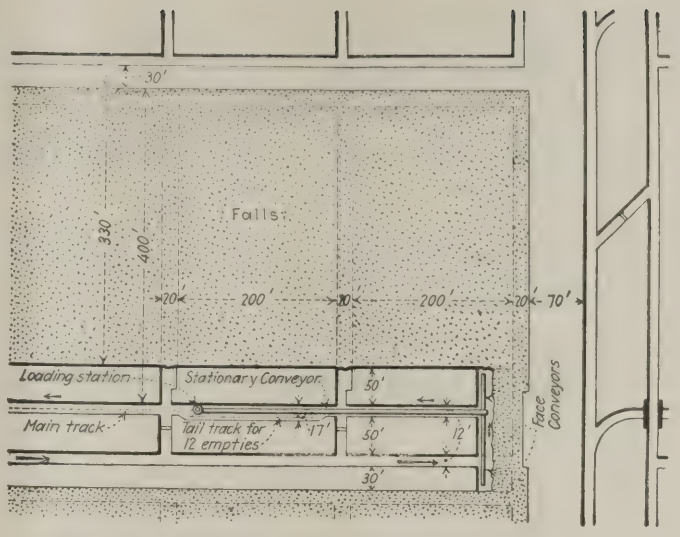


FIG. 5—WORKING OUT THE HEADING PILLARS

In this, as in the rooms, longwall retreating methods with face conveyors are used. In this instance, however, if the coal is thin, the main conveyor can be placed without excavation on a level below that of the bottom of the coal seam. All the side tracks and provisions for the delivery of air are already made, having been constructed for extracting the coal between the rooms.

50 per cent of the volume all other air rooms must carry. This is a matter easily regulated.

In the case of the last air room there is no pipe overcast, as none is necessary there. By building a stopping across the heading above the end of the track, and putting an ordinary regulator in the last crosscut, as shown, the volume of air running up the last air room will be regulated as desired.

In the example shown, Fig. 1, assuming that 4,000 cu.ft. a minute pass up each extreme air room and 8,000 cu.ft. up every one of the other three air rooms, the total volume is 32,000 cu.ft. per minute. This is at the rate of 4,000 cu.ft. for every single face. Figuring at 200 cu.ft. per minute per man, 160 miners may be put to work in the workings shown, or at the rate of 20 men per single face.

In other methods, including the room-and-pillar, the air intended to ventilate the workings off a lateral heading is let out of the air course in a single body through the last crosscut. No matter how large may be the volume thus allotted to the workings, the whole of it counts as one split only and the maximum number of men who may work in it is fixed by law. In West Virginia, for example, it is 60 men.

If only that number of men were put to work in such workings as are shown in Fig. 1, an average of only 7.5 men would be employed on a single face. If it takes 20 men one 8-hour shift to load out a cut and do all work necessary to make the face ready again for another operation of the cutting machine, it must take 7.5 men 2.66 shifts to do the same. In the former case six cuts a week are obtainable from a face. In the latter case it is not probable that any face would average more than two cuts a week.

This method retains all these advantages due to special ventilation no matter how many working sections there may be off a single working heading. Fig. 1 shows only four sections, but a dozen might as well have been shown. So long as the air course can deliver the air necessary, there is no limit to the number of sections nor to the number of miners who may be lawfully employed off a single working heading.

As many men are centralized and efficiently employed in the single second right heading of Fig. 1 as are

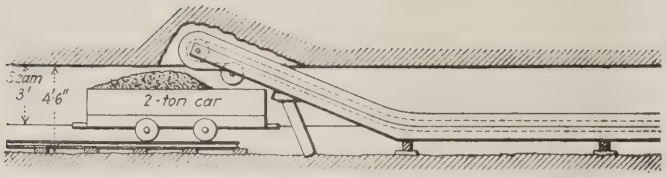


FIG. 6—LOADING COAL FROM HEADING INTO CAR

The conveyor can be moved forward—or should it not be rather backward?—350 ft. at a time. The expense for creating the necessary headroom accordingly is not large. The car is loaded from the end, which is not as desirable as from the side as far as continuity of operation is concerned.

ordinarily found in half a dozen headings scattered over an immense area in the average bituminous-coal mine.

The method presented is characterized by the following advantages, several of which are found in no other method:

(1) Minimum of narrow work per acre of coal operated.

(2) Working faces in every instance ventilated by fresh air brought direct from the outside in any volume desired so that no air that has passed along any working face will pass along any other on its way to the outside.

(3) Cutting machines invariably find within easy reach all the work they are capable of doing, making it unnecessary for them to waste precious time moving from place to place.

(4) Minimum of track work needed.

(5) Reduction in haulage cost due to the location, layout and equipment of the so-called "loading stations" where the cars drop continuously to loading position, to drop away in like manner after loading, being then made up instantaneously into trips. The gathering locomotives move the empties and loads only in trips as heavy as they can handle safely and economically. The locomotives are not only kept moving all the time but never move without being loaded to capacity. The cars also are kept in constant motion and consequently a minimum number of cars and locomotives will permit the mining of a maximum tonnage in a given time.

(6) Ways of approach to the working faces, whether intended for ventilation, the handling of coal and supplies or the going and coming of the men, are everywhere in the solid and at all times the men will find several roads to safety.

(7) Pack walls are not needed and no labor need be performed back of the faces except the necessary timbering and whatever salvaging of timber may be deemed advisable and judged safely practicable.

(8) Muscular power is used to best advantage owing to low and short-throw shoveling.

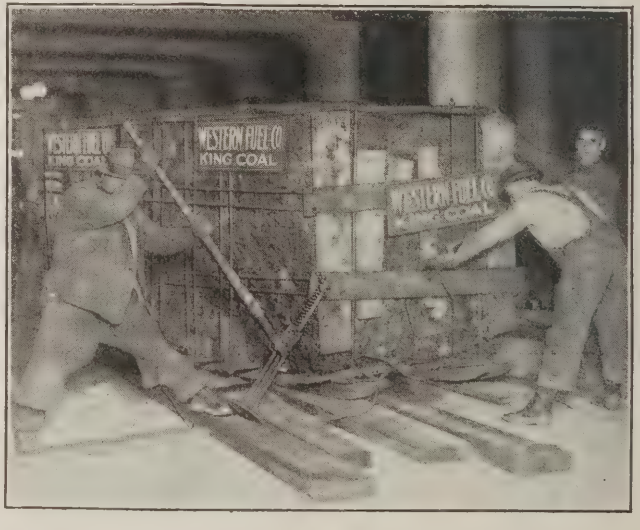
(9) Faces can be kept in working shape at all times at low expense whether the mine be operating or idle.

(10) In any given seam and for a given capacity and style of rolling equipment less brushing of slate is needed than with any other mining system.

(11) Due to a special system of ventilation, an aggregate face development can be provided, lawfully, safely and easily, which is capable of yielding a daily tonnage such as with other methods is obtainable only by multiplying the number of working lateral headings at the corresponding expense for increased trackage and rolling equipment, maintenance and supervision, to which disadvantage of ordinary plans must be added a proportionate multiplication of all kinds of delays and accidents.

(12) Every lateral heading is autonomous in its operation, constituting in itself a separate mine, one in which the system may be applied advancing or retreating, as the operator may choose.





Big Lump of Utah Coal Placed on Exhibition in State Capitol

What is said to be the largest lump of coal ever mined has been placed on permanent exhibition in the Utah State Capitol, in Salt Lake City. The lump was placed there at the request of the Secretary of State, H. E. Crockett. The block was mined at the King mine in Mohrland, Utah. It was found 2,000 ft. underground. From the mine mouth to the railroad at Hiawatha the lump traveled a distance of 6,000 ft. by tramway. Special equipment had to be made to handle the lump in the mine. The coal was taken from a seam 30 ft. thick. It was undercut and uppercut by machine, the sides and back being shaped by hand. The cost of digging and handling from mine to the Capitol Building was approximately $2,000.

The block is 5 ft. square and 10 ft. long and weighs 22,000 lb., including the iron bands which form its crate. These bands weigh 1,100 lb. To convey the huge lump to the Capitol eleven horses were hitched to the specially constructed vehicle carrying the coal. The 11-horse power proved futile. Then five horses and a motor truck were employed. This equipment negotiated the steep grade to the State House.

Contrast Between Our Lignite and German Brown Coal

Cologne Brown Coal Is Almost Two-Thirds Water, Ours One-Third —German Product Has 2½ to 13 per Cent Agglutinating Matter, Ours Less Than 1½ per Cent—Brown Coal Soft, Ours a Mineral

By O. P. Hood*
Washington, D. C.

ALTHOUGH I had read many reports about the brown-coal industry of Germany, actual inspection gave me several impressions for which I was not prepared. We had fallen into the careless habit of thinking about German brown coal and American lignite as similar material. The great briquetting industry which has been built upon German brown coal has been frequently pointed to as an example of what we should do with our own lignites. This puts one in a frame of mind to expect a greater similarity in raw material than actually exists.

Analyses of the two materials indicate a great difference in water content. Our lignite has approximately 35 per cent moisture, whereas German brown coal in the Cologne district has about 60 per cent. Along with this difference in the moisture content is a considerable difference in physical character. Brown coal is much more like earth than like rock. It is far less consolidated than our lignites. We would not think of trying to force a spade into a bed of our lignite, but this would be quite possible with much of the German brown coal.

A piece of brown coal slightly consolidated and 3 in. thick is readily broken with the fingers like a piece of corn bread. Throughout a mass of brown coal small pieces of wood are much in evidence. The binding material between the annual layers of wood growth has almost disappeared, leaving the thin chips to curl and crumble when exposed to the sun. One small pile of brown coal exposed to the weather for a couple of months has the appearance of a chip pile.

Most of the Coal Is of Earthy Texture

These woody pieces have turned a dark chocolate brown, and they have various degrees of friability. Occasionally large chunks of wood are found that would offer considerable resistance to any digging device. The beds in various places vary in the proportion of fine and coarse material but in general the material is distinctly earthy. When taken to the briquetting plant the brown coal is passed over screens which take out pieces over about 3 in., and these are diverted to the boiler house for steam making.

The remaining material above ½ in. is readily broken up in a disintegrator. Our own lignite would have to be put through rolls or a jaw crusher. The vegetable growth that furnished these great beds varied from time to time, so that in some places there is a distinctly banded appearance, the color varying from various shades of chocolate brown to a light yellowish brown. In mining by hand the material is easily dislodged with pick and shovel. Blasting seems unnecessary, and the excavating machinery scrapes it off a steeply inclined face.

Our own lignite, however, is consolidated, so as to be quite comparable in hardness with our more familiar bituminous coal. It is mined in the same manner as is soft coal, by the use of coal-cutting machines and explosives. It usually occurs, also, in measures that have rock above and below, whereas in the German measures the overburden is sand, gravel and clay. These differences are responsible for the different methods of working. The greater part of German brown coal is taken from open pits by means of excavating machinery.

There is a limit, of course, to the depth of the overburden, as compared with the thickness of the coal, that can be economically removed, and when this limit is exceeded underground mining methods are used. Those parts of the beds that can be worked from open pits are developed first, but as the industry grows older the deeper lying portions will be worked by underground mining at a higher cost.

Our own lignite can in places be stripped of the overburden by excavating machinery, and can be loaded into cars by the same machines. This work probably would be done by our standard dipper excavators, and machines of this type are to a limited extent used in brown coal, but the relatively easy digging together with the uniformity of material has led the German engineer to develop in high degree the chain bucket excavator for this work.

Beside these physical differences there are important chemical contrasts. Certain materials in brown coal, on being heated, form an excellent binder and waterproofing material. The temperature at which this material develops is well below that of the distillation of any of the other coal substances. The percentage of this binder in the raw material must be at least 2½ per cent if briquets are to be produced by the German method. This method, briefly, is to subject the brown

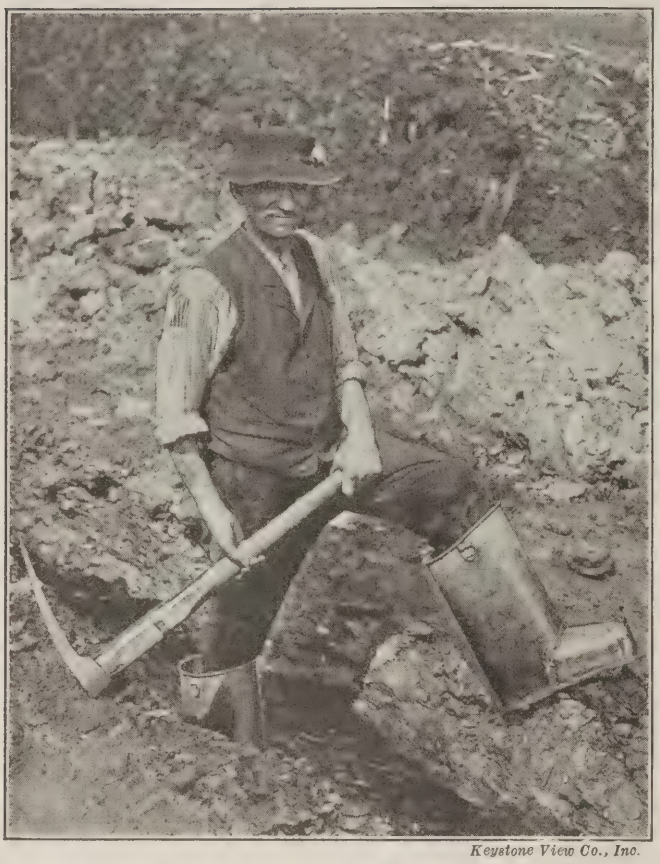


Keystone View Co., Inc.

CHAIN BUCKET CONVEYOR DIGGING BROWN COAL

This coal deposit is so soft that it can be dug like sand by a dredging bucket or "landbagger." Note the soft partings in the coal and the smoothness of the excavated surface. This system would work with American or other peat but not with American lignite. This illustration is from a photograph made in the Nieder Lausitz district.

*Chief mechanical engineer, U. S. Bureau of Mines.



Keystone View Co., Inc.

WORKMAN IN GALVANIZED-IRON BOOTS CUTTING DITCH

Scene from a brown-coal mine in the Nieder Leusitz district. Even the boots in Germany are "ersatz," or substitutes, in some cases. These fields needed much drainage. Note the pick with its novel fastening and single point—somewhat light for digging clay. The pick shape shown is prevalent in the mines of Continental Europe.

coal, which has been dried to a moisture content of about 13 per cent, to high pressure, pushing it through a converging die which generates sufficient heat by friction to melt the inherent binder and thus waterproof each particle. Different brown coal beds possess this natural binder in varying quantities up to more than 13 per cent.

The low-temperature distillation of this material yields lubricating greases and paraffine from which candles are made. Most of our American lignites have binding material of this sort in quantities less than 1½ per cent. This immediately suggests that our own problem of briquetting is fundamentally quite different from that of the German brown-coal area. We are quite justified in looking to the development of the brown-coal industry as an excellent example of what can be done when it is necessary to beneficiate a low-grade fuel, but we are not justified in looking to this example for specific technical detail as a solution of our own lignite problem.

America has a lignite problem that must be solved in our own way to fit our own raw material and to suit our own economic conditions. The German brown coal occurs in well-populated districts where there is a high degree of industrial development coincident with a scarcity and relative high price of other fuels. It is in the possession, also, of a people who have not always had the choice of an abundance of the best coal and who have already acquired an attitude of thriftiness toward the use of heat.

Our own lignite occurs in districts furnishing a far less concentrated market and a much smaller degree of industrial development, and where the distances from coal field to a market are much greater. Our lignite also occurs among a people quite familiar with some of the best coals on earth and with habits of using heat in quantity, particularly for domestic purposes, quite unknown to European habit.

The brown coal industry of Germany at the present time is rapidly developing, as a result of the scarcity of industrial fuel. There is a real shortage of fuel which can be met in the most expeditious manner by the development of brown coal. While a relatively small percentage of Germany's total fuel resources are in the form of brown coal, they are turning to this portion for rapid development at this time. There is enough of this material to last from eighty to a hundred years, and the methods of mining and treating have been developing since about 1856, so that practices are substantially standardized and can be applied with little risk and uncertainty.

In 1921 the total output of brown coal was 123,000,000 tons, while more than $28,000,000 tons of briquets were produced. The raw brown coal is used for industrial purposes on step grates, but since it has only from 3,200 to 4,500 B.t.u. per pound, it is quite evident that it cannot be transported any great distance, except under extreme need. The briquets, on the other hand, make a most excellent fuel for industrial and domestic consumption.

It takes about three tons of brown coal to produce one ton of briquets, one ton of the raw material being required to reduce the remaining two tons to one of briquets. The briquets, however, have a fuel value of about 8,600 B.t.u. per pound. Although they have less heat value than good natural coal, these briquets are sometimes preferred by the domestic trade because of their convenience and cleanliness.

Many Engineers Enter Commercial Branches

THAT engineering college graduates are handicapped without a supplementary commercial training is the basis of research investigations just completed by Dr. W. F. Rittman and W. F. Reilly, of Carnegie Institute of Technology, Pittsburgh. In the *Carnegie Technical Journal*, a quarterly publication of the alumni and students of Carnegie Tech. Dr. Rittman and Mr. Reilly present substantial proof of the need of commercial training in technological college courses.

With the co-operation of the alumni office, a study of the present occupations of Carnegie Tech. graduates was made. Of the graduates from 1908 to 1921, the investigations showed that approximately 67 per cent of the total engineering graduates are now engaged in commercial or managerial work. This majority becomes significant in consideration of the fact that "engineering" graduates include a wide range of highly technical fields such as mechanical, electrical, civil, chemical, metallurgical, mining, sanitary and science.

An interesting tabulation in the report shows the following percentages of engineering graduates in all departments who are now in commercial or managerial capacities: Mechanical engineering, 65 per cent; electrical engineering, 60 per cent; civil engineering, 73 per cent; chemical engineering, 59 per cent; commercial engineering, 91 per cent; metallurgical and mining engineering, 67 per cent; sanitary engineering, 60 per cent; science, 77 per cent.

Pack Coal with Caterpillar Tractor to Prevent Storage-Pile Fires

THE tendency of bituminous coal to fire spontaneously when stored in large quantities long presented a serious problem to the Philadelphia Electric Co. and others who are compelled to store coal for months or even years at a time, says an article by James R. McCausland in *Current News*, which is published by that company's section of the National Electric Light Association.

The Coal Bureau, among whose duties are included the extinguishing of such fires and the development of methods for preventing them, has been experimenting with methods of storing coal for several years and has now arrived at a solution which is proving successful.

Some kinds of coal are entirely unsuitable for storing under the best conditions, but even good coal stored improperly will develop fires. When a fire is discovered in a storage pile the only satisfactory method of extinguishing it is to dig it out, remove the coal to another section of the yard and spread it out to cool. Water is not effective on these fires, nor can they be smothered by covering with fresh coal.

The method of storing coal most used formerly was by locomotive crane. The crane hoisted the coal from the cars in its clamshell bucket and then swung around and dropped the bucket load on the storage pile. It was found quite early that about 10 ft. was the maximum height to which coal safely could be stored by this method. It was later found that the susceptibility to fires of coal stored in this way was due to the fact that all of the lumps in any bucket load rolled down to the bottom of the pile, forming a honeycomb arrangement through the spaces of which air could reach the interior of the pile, while the fine coal was all left at the top of the pile. This infiltration of air to the center of the pile caused gradual heating up to the ignition point.

To discover, if possible, this heating before a fire developed or at any rate before a large quantity of coal was consumed, temperature observation pipes reaching to the bottom of the pile were placed at intervals, so that thermometers could be inserted and any rise in temperature noted before the danger point was reached. This method, however, was not always effective, because fires have been found within 5 ft. of the temperature pipes without causing a noticeable rise in temperature at the location of the pipe. Furthermore, fires were not prevented in this way but merely discovered early and kept under control.

It was found that storing by contractors' dump wagons was an advance over this method because all the coal, lump and fine, was left at exactly the location in the pile at which it was dumped and there was no concentration of lumps at the bottom and fine coal at the top of the pile. Also the trampling by the horses and rolling by the wagon wheels compacted the coal quite thoroughly, greatly reducing the spaces through which air might circulate. This method has disadvantages, however, which caused a further solution to be sought. Storing by contractors' dump wagons is practically prohibitive in cost—about three times that by locomotive crane; it is very slow; and coal is wasted by being pulverized and blown away, and also by being dragged down the side of the pile and ground into the mud or cinder fill in the storage lot.



FIG. 2—HERE THE COAL IS DUMPED BY MOTOR TRUCK

The caterpillar tractor is on hand, making firm and air-resisting the first bed of coal spread by the motor truck. Plank is laid for the truck so as to prevent the excessive breaking of the coal. When ground too fine it is likely to be blown away.

An idea taken from the war has resulted in the development of the method now being used. At yards having locomotive cranes the coal is spread by the cranes in layers 3 to 4 ft. in thickness and then rolled, as shown in Fig. 1, by a caterpillar tractor—a small second cousin to the tanks used in France for rolling out the Hindenburg line. The tractor hauls a drag made of rails, and by the action of this drag as well as by the rolling effect of the tread of the tractor the coal is compacted just as by wagons. Where there are no locomotive cranes motor trucks are now being used instead of horse-drawn wagons and have proved themselves highly superior. They can handle much larger quantities of coal in the same time, the cost is much less, and the pulverization of the coal is practically eliminated by planking over the drive by which the truck reaches the dumping point. This modification of the method is illustrated in Fig. 2.



FIG. 1—CATERPILLAR AND DRAG COMPACTING COAL

The coal is laid by locomotive crane in layers 3 or 4 ft. thick. The caterpillar tractor with a rail drag is then run over it, which makes it so tight that air for its combustion is excluded.

In addition to preventing fires the method last described permits at least a third more coal to be stored on a given area because it has been found already that a height of 12 to 14 ft. is entirely practicable. Further experience may show that the maximum height may be raised even more than this.

Reading Power System When Completed Will Be Largest in Coal Mining

IN ITS Schuylkill County and Northumberland County operations the Philadelphia & Reading Coal & Iron Co. is developing what in its entirety will be the largest electric power system in the world that is devoted entirely to coal mining and one of the largest purely industrial electric systems in this country.

It will eventually comprise five or six large modern power stations, tied together in one great system supplying power to the company's forty-odd operations, to the Pottsville shops and to incidental uses. The individual plants will generate from 15,000 to 20,000 kw. each, and the total power will be at least 100,000 hp.

There will be 85 miles of high-tension line, carrying a current of 23,000 volts, and additional secondary mileage in the way of service connections and direct cables, through boreholes, to powerful pumps in the mines. These pumps will operate at the high tension, and some of these installations, notably at the Draper mine, are completed.

Would Light Every House in Philadelphia

The completed system will, at a conservative estimate, supply enough power to illuminate every house in a city like Philadelphia, with some left over for general purposes. Its development foreshadows at the Reading mines the almost universal substitution of electricity for all other forms of power in operating mine and breaker machinery, and it also implies the elimination of seventeen engine-driven non-condensing power plants—sixteen at mines and one at the Pottsville shops.

Two modern electric plants which will be incorporated in the new system already are in operation—a 5,000-kw. plant at Good Spring and a 4,800-kw. plant at Locust Spring. These plants are tied together now in a system which runs from Brookside, in the west end of Schuylkill County, to Pine Forest, a little north of Pottsville, thence north to Indian Ridge, near Shenandoah, and thence west through the Mahanoy Valley to Locust Spring, the total mileage of primary high-tension line already being about 55. A line is now being built from Locust Spring to Bear Valley, west of Shamokin, and later a short link will run from Bear Valley to North Franklin at Trevorton, the extreme northwest of the Reading properties. Next summer a line will be run south from Pine Forest to Pottsville, to supply the shops, and another line will run from Pine Forest to Silver Creek on the east. At Silver Creek one of the proposed new plants will be built.

An additional extension from Indian Ridge to North Mahanoy and the territory now supplied by the old North Mahanoy plant will complete the high-tension mains already in operation. The old electric plants will not be scrapped but will be retained as emergency units.

The great extent to which electricity is used by the Reading, even under the present system of isolated stations, is shown by the statistics. The company is now operating more than 100 miles of underground trolley line, has 140 electric locomotives in service, operates 106 electric pumps and charges about 9,000 electric lamps for miners. Incidentally it has its own independent telephone system, with independent trunk lines and with six exchanges, reaching every part of the property.

The Good Spring plant, opened in June, 1919, was the first unit designed for the proposed new system, and it typifies in a general way what will be done at other plants. This station was placed at Good Spring because that point is central for the Tremont district, because ample supplies of barley coal were available at that colliery, and because Pine Creek, near by, supplied sufficient water for effective operation. The boiler plant and dynamo room are constructed of brick and steel. There are seven Stirling water-tube boilers generating 4,500 hp. and fitted with Coxe traveling stokers. Coal is supplied from overhead bunkers, which are fed by a conveyor line from a large bin, the bin in turn being supplied with coal by an aërial tramway running to the foot of the breaker. Ashes are disposed of by a flushing system which washes them into a large tank, whence they are hauled by a 20-ton car to the spoil bank. The boilers have automatic regulators controlling the speed of the stokers, thus maintaining constant steam pressure, and each boiler has a steam-flow meter to indicate the actual work it is doing.

The generating equipment consists of 5,000-kw. steam-turbine generators operating at a pressure of 150 lb. and condensing at a vacuum of 28.5 in. The condensers are of the barometric type.

Power is generated at 6,600 volts and conducted to an eleven-panel switchboard equipped with indicating and recording instruments for measuring electric current. It is controlled through oil circuit breakers and is distributed to the collieries in the Tremont district at a line voltage of 6,600. For long-distance transmission there is a transformer station which steps up the potential to 23,000 volts, and it is carried through the rest of the circuit at that voltage. At each colliery supplied from this high-tension line a transformer station is installed, equipped for measuring and controlling the power consumption at that mine, the voltage being stepped down from 23,000 to 2,300 for colliery distribution. At present there are twenty-two transformer stations installed, having a combined capacity of 25,300 kw. These stations, like the power station, are protected from lightning by means of the latest oxide-film lightning arresters.

Pumping Problems Above and Below Ground

Water for Good Spring is obtained from Pine Creek, 5,600 ft. distant, and is pumped to an elevation of more than 800 ft. To save water in operation, all the water from the condensers is pumped by centrifugal pumps through spray systems which reduce the temperature from 100 deg. to 85 deg., the same water being used continuously and the evaporation being less than 2 per cent.

Pumping is expected to be the constantly increasing consumer of electric power, as at present an average of 11 or 12 tons of water is raised for every ton of coal, and the proportion of water per ton mined may be expected to increase as the mines go deeper.

In addition to the general saving which a modern power system, such as described, may be expected to show over a group of isolated colliery stations, there will be a large saving in fuel. Good Spring burns nothing but barley coal, thereby releasing the larger sizes

which are required elsewhere, and each additional plant to be erected in the new system will accentuate the saving in this direction.

Rotary and Endgate Dumps Compared

AT THE Coal Mining Institute of America the value of rotary dumps was questioned by a member located at Beaverdale, Pa. He asked "At drift or slope mines where the coal is 3 or 4 ft. thick are rotary dumps more efficient than crossover dumps?" In his reply Sheldon Smillie said he supposed the thickness of the coal was mentioned in the question as a means of determining the size of the car used. Evidently the interlocutor felt that with a small car the rotary dump did not have sufficient capacity and reduced the tonnage dumped. The rotary dump is a crossover dump, but, that point conceded, it is as well to use the parlance most frequently adopted and regard the "crossover" as being the ordinary crossover end dump.

The regular crossover, if crowded, can dump eleven cars a minute, but that cannot always be attained, said Mr. Smillie. The rotary single-car dump is guaranteed to discharge four cars per minute. In practice it will dump under pressure eight or nine cars in a minute. The solid car which the rotary dump will discharge is cheaper than the endgate car which the end dump demands, but there is not much difference in the cost of the smaller sizes of the two types of car.

The main argument for the rotary dump is in the upkeep. The West End Coal Co., in the anthracite region, declares that $5 per annum is spent on each endgate car for such repairs as occur to the endgate or are due to the weakness which the use of the endgate causes. The introduction of the solid car has made it possible to make the flare on the side of the car horizontal and to let the wheels protrude into the car body, the tops being covered over with a light housing. It has also made it possible to build wider cars than heretofore, with further increase in capacity.

The solid car reduces leakage. At one mine, before the solid car was introduced eight men were kept steadily employed cleaning roads; now two men perform that service satisfactorily. Of course, as the cars at the mines before and after the change were loaded only level full, the comparison cannot be applied without much revision to conditions where the loads are built up several inches above the tops of the car sides.

Leakage keeps the rail covered with coal and, as the coal is wet, gives a rail with low adhesive qualities. In consequence much sand is used, and the coal shoveled up from the track is so mixed with non-combustible as to be of little value for combustion. As the coal in falling is broken it becomes so fine that it mingles with the sand and then cannot be separated.

With the endgate car the coal that is built up above the sides is likely to be dumped over the top of the door instead of through the door opening. In that case the coal is badly broken. The end-dumping car also refuses to dump completely when the coal is wet. The coal may have to be jarred loose or shoveled. With a rotary dump which will jar the car in the overturned position wet coal is readily discharged. The long rotary dump which will discharge a train of cars without uncoupling not only saves the work of dissembling and assembling the trip but gives all the advantages of train operation.

One car may run harder than another. If a nimble car follows a stiff one on a crossover dump it may catch it at the kickback switch and cause a collision. The grades must be made for the badly running cars with the disadvantage that the better cars will almost run away and need some holding back. But working with trips a sort of average is struck and one trip will act much like another when passing over the same grade, and the grades can be made to suit this condition.

Another advantage with the rotary dump is that no tipple need be built. The cars need not leave the hill. They can be dumped on the side hill and the coal allowed to run down a chute to the car, the screens or a picking table, as desired, that is if conditions are favorable to such an arrangement. All that is needed is a shed to protect the screening and picking devices. Thus much timber is saved. With the crossover end dump the track must be turned at right angles to the hill and the tipple extended far enough to provide for a kickback.

J. Milton Duff being called on said that the leakage from an endgate car was not considerable. Most of the coal on the mine track resulted not from leakage but from spillage. Trouble had been found with rotary dumps from the fact that coal sometimes wedged between the car and the plate in the revolution of the dump. He said also that eleven or even twelve cars had been dumped per minute over the crossover and that eight cars was the capacity on which figures usually were based. Eleven or twelve cars per minute can be dumped only where one-ton cars are in use. However, ten cars can be discharged per minute where they are of two-ton capacity.

Japanese Store Coal with Belt Conveyor And Box-Car Loader

ONE of the simplest ways to store coal and well suited to small-capacity storage is to use a portable belt conveyor or a series of them. At a Japanese plant shown here a Link Belt conveyor is caused to deliver coal to a Pratt box-car loader. This loader is intended for delivering sand and other materials to the far end of a car, and for this it is well fitted, as it takes up little space itself and can be readily managed in small compass. It is, it is true, a little rough in its operations, but as the coal it is handling is already fine and as it is delivering onto a pile of slack no damage is done such as might accrue with a high-grade lump coal, especially when falling on an unyielding floor. For those who regard a steam or electric shovel as too expensive the use of a conveyor of one type or another will greatly appeal.



ONE OF THE MANY WAYS IN WHICH COAL IS STORED

At this plant in Japan a conveyor and a box-car loader are being used to transfer coal in storage.

Book Reviews

Tentative Standards for Testing Materials

Every year the American Society for Testing Materials issues a book entitled A.S.T.M. Tentative Standards. This year 163 such standards are included—18 relating to steel, wrought and cast iron; 13, to non-ferrous metals; 27, to cement, lime, gypsum and clay products; 15, to preservative coatings; 13, to petroleum products and lubricants; 35, to road materials; 4, to coal and coke; 9 to waterproofing; 5, to insulating materials; 4, to shipping containers, 12, to rubber products; 4, to textile materials and 4, miscellaneous. The tentative standards are printed for one or more years with a view to eliciting criticism, of which the committee concerned will take due cognizance before recommending final action by the society.

Specially interesting to coal-mining engineers may be mentioned those on carbon tool steel, boiler and firebox steel for stationary service, lap-welded and seamless steel and lap-welded iron boiler tubes, iron and steel chain, merchant bar iron, foundry pig iron, chilled cast-iron wheels, chemical analyses of plain carbon steel and alloy steels, heat treatment of carbon-steel castings, white-metal bearing alloys or babbitt metal, compressive strength of portland-cement mortars, concrete aggregates, compression tests of concrete, test for fusibility of coal ash, shatter test for coke, terms relating to coal, structural Douglas fir, testing small clear pieces of timber, testing insulating varnish, testing electrical porcelain, testing transformer and switch oils, insulated wire and cable, cotton or rubber-lined fire hose, wrapped hose and braided hose for use with pneumatic tools, steam hose, rubber belting for power transmission purposes, adhesive tape for general use for electrical purposes, rubber insulating tape, rubber gloves for electrical workers, rubber pump valves and testing rubber products.

Some specifications—only a few—are too broad, such as the one specifying that lump coke should be dried at a temperature between 104 and 200 deg. C. and that the depth of a coke shatter box shall be approximately 15 in., which is objectionable because the height of the box is a part of the distance the coke has to fall. A little breadth is sometimes needed in defining a product like, say, gasoline or carbon steel, but why not in describing the equipment for a test? Attention will be called elsewhere to the definition of volatile matter in coal. The book contains 774 pages and measures 6 x 9 in. It is a credit to the painstaking and scholarly society by which it is issued, whose address, by the way is 1315 Spruce St., Philadelphia, Pa.

Chemistry for Coal Salesmen and Others

Parr's third edition of "Fuel, Gas, Water and Lubrication" (McGraw-Hill Book Co., New York), though written as a brief survey of the chemistry of these materials and designed for use by the engineering student, is a valuable book for the coal salesman. Here will be found the elementary things about coal that must be learned by any coal man who must tell about his product.

Following a brief but useful statistical summary of the reserves and production of coal are chapters on sampling, analysis, classification of coals, coal contracts, combustion, storage and spontaneous combustion. The treatment, of course, is technical, not popular, but the ideas are carried to the eye by diagrams and tables in such a way that the non-technical may easily grasp them.

That the majority of examples and much of the discussion center around Illinois coals—the book is based on lectures by the author at the University of Illinois—does not detract from the usefulness of the work.

Boiler waters and their analysis are covered, as are the subjects of coke and gas.

Even more technical will be found "The Practical Chemistry of Coal and Its Products," by Findley and Wigginton (Benn Brothers Limited, London). This book is intended for chemists at gas works and coke mines.

Sampling and the elementary form of analysis of coal are simply covered. What will doubtless be of more value to works' chemists are the outlines of analytical methods of determination of the light oils, benzol, toluol, etc.

The work throughout is characterized by brevity of treatment. No words are wasted, but the meaning is clear. The analysis of mine gases is treated in 8 pages. It is a book for chemists and not for laymen.

Transvaal Chamber of Mines Report

The thirty-second annual report of the Transvaal Chamber of Mines, covering the year 1921, was published in Johannesburg on Aug. 9, 1922. As its title implies, its 271 pages are devoted to a review of mining conditions in the Transvaal. In addition to detailed reports of the Chamber, its activities, membership, the work of its various committees, etc., there are several appendices devoted to the mining industry as a whole.

Appendix No. 1 deals with the Chamber's correspondence and reports on native labor, dust allaying, survey commission, customs tariff and other important subjects coming within the scope of the organization. The second appendix outlines the case of the Chamber in its dispute with the South African Industrial Federation. Follows a chronological account of the dispute on the Transvaal gold and coal mines; comprehensive statistical tables on mineral production, dividends, labor, etc.; reports of quarterly meetings, and records of the companies registered and liquidated during the year.

The statistical data are very complete, well presented and of considerable use for historical and other purposes. Aside from this feature, however, the report is of value chiefly to the Chamber's membership.

Forms for the Labor-Purchasing Department

Two of the new ventures in industry are the purchasing and personnel departments. The former is the older of the two. It started out, it is to be feared, with the motto unexpressed but too often implied: "Anything so it's cheap." Purchasing departments have reformed. They are beginning to put quality, life, adaptability and the responsibility of the firm supplying the goods ahead of mere cheapness.

The personnel department, on the other hand, always has striven for quality. It was given a price and told to get the best value it could for the money. Much is known about its methods, and C. N. Hitchcock, of the University of Chicago Press, Chicago, Ill., in a small paper-backed volume entitled "Forms, Records and Reports in Personnel Administration," has brought together much of this information. This little book of 127 pages measuring 6 x 9 in. contains 103 different forms and appears to be a painstaking compilation.

After a man has been employed the employer frequently wonders why he did not make certain inquiries as to the employee's fitness. A form filled out at the time of the employment will prevent such an oversight, and a correct record will aid in averting the re-employment of a man whose previous record was unsatisfactory. There are many other uses for such records. In future we may be more careful as to whom we introduce into our industrial families, and we shall then have less trouble in our industrial organization, for men will strive to meet and retain the qualifications which personnel departments require.

IN PREPARATION FOR A REPORT on analyses and characteristics of Alabama coals, field representatives of the U. S. Bureau of Mines have taken 376 coal samples from 79 mines in that state.

FUEL HINT—When you get a cinder in your eye run home and put it in the coal bin.—*Toledo News-Bee.*



Problems of Operating Men

Edited by James T. Beard



Diplomacy vs. Merit as Factors in Promotion

Analysis of the Situation—Causes That Affect Choice Between Two or More Applicants — Causes of Non-promotion — Diplomacy a Controlling Factor

SOME months ago there appeared, in *Coal Age*, a letter by a western writer who deplored the fact that meritorious effort was so frequently unrewarded. I remember the writer claimed that the ability to tell a funny story appeared to be a stronger recommendation in securing promotion, than merit by reason of knowledge and experience.

The statement, I recall, brought forth numerous letters denouncing the charge. My own experience as a miner and mine official, however, inclines me to accept the statement as true, since it agrees with my own conclusions in several instances that have come under my observation. More than once, I have attempted to analyze the situation in hand, with a view to ascertaining the actual cause of the distinction made in the choice between two individuals in line for promotion.

Causes That Contribute to or Hinder Promotion

Investigation showed that promotion is often the result of personal friendship; influence of friends; fellowship in social organizations; peculiar adaptability of the applicant to the purposes of those in authority; and, lastly, the ability of an applicant to "throw the bull," as we say, or impress the employer by the force of his personality.

In contrast with these contributory elements, in the promotion of employees, the following are a few causes of non-promotion: There may exist a personal dislike of the applicant, on the part of the one in authority, who may be jealous of his aspirations, or fear his ascendency, or regard him as too honest for certain hidden purposes of a purely selfish nature.

It will often happen that the failure to secure promotion is due to the individual's relying too firmly on his record, expecting his work to speak for itself. Undoubtedly, this is the case with many of our best workers, who are prone to let their work speak for them, instead of themselves speaking for their work. To boast or even speak of what they have done is contrary to their nature.

In the struggle for ascendency and success in life, there are certain natural or physical elements that are inherent in the individual, such as perseverance, initiative, aggressiveness and personality, all of which are capable of growth and development. Another faculty with which men are unequally endowed is the quality of being tactful or diplomatic.

Analyzing the Situation

This last named quality can only be developed by a close study of human nature with all its conditions and environments. A man may have a complete knowledge of the principles of coal mining, gained through study and practical experience; but his success as a foreman will depend, primarily, on his being able to handle the men in his charge, with tact and diplomacy, without which he cannot hope to gain their confidence and respect.

Now, if this brief analysis is correct, we must naturally infer that the qualities to be cultivated, in seeking advancement, must include the ability to be diplomatic. Proof of this quality, however, is only to be had in the practical test.

The exercise of diplomacy is as important in a mine foreman's relation to and contact with his employers as with his men. If tact fails in dealing with his men, the foreman can still resort to more urgent measures; but strong-arm methods are futile in respect to his superiors, whose word is power.

Diplomacy Wins the Day Where Lack of Tact Fails

By way of illustration, let me assume that a certain foreman's opinion differs from that of his superintendent in regard to the work in hand. A tactless foreman, with the best intention and the courage of his conviction, may give blunt expression of his ideas in a way that would naturally offend his superior and fail in securing any results.

On the other hand, a tactful foreman will handle the same situation, with a delicacy and a courteous display of appreciation that is akin to flattery and, in nine cases out of ten, the obsequious foreman will win out by virtue of his diplomacy.

In conversation with an operator, in regard to the selection of a mine official, I recently propounded the following: If two men apply to you for an official position—the one simply signifying his willingness to be judged by his work; and the other making a parade of what he has done and stating particularly what he can do under the present conditions, while demanding your judgment on suggestions he throws out—to which of these men would you give the preference, in the absence of other recommendations?

Without hesitating a moment, my friend replied, "To the one who made the display of his capabilities." Now, if this is the attitude of the average coal operator, and my observation inclines me to think that it is, modest worth is irretrievably handicapped in seeking advancement.

Before closing, allow me to suggest that it might not be a bad economic feature, while it would certainly be justice to worthy employees, if large corporations would each employ a man who can be entrusted with the investigation of individual merit, and authorize him to recommend men who are, in his judgment, capable and worthy of promotion.

While the generally accepted doctrine that "a man eventually gets what he deserves" may be right, it is equally true that a man does not always deserve what he gets.

Washington, D. C. GLENN GLOM.

Leaks in the Coal Business

Inefficient management an injustice and loss to the public—Waste in the extraction of coal—Failure to properly clean coal for shipment.

WHEN one considers the injustice and loss sustained by the consuming public, through inefficiency in management and wrong methods of mining and marketing the coal, it is surprising that more notice is not taken in the daily press and other publications, regarding the matter.

It does not require a deep study of the situation to prove the crying need of such a fact-finding commission, as has recently been appointed by the president, to ascertain the facts and recommend what is needful to secure the greatest public good.

There is much for this commission to consider in working out a plan that will give a square deal to all concerned and bring satisfaction and contentment to those who now carry heavy burdens by reason of the conditions that have been allowed to grow and develop without seeming restraint, since the close of the war.

Beginning with the management of coal operations, there is scarcely a doubt that many individuals are now holding office and drawing good pay

whose work is not adequate to the expense of their employment. In fairness to all concerned and especially to the consuming public on whom the burden will eventually rest, all such positions should be eliminated, with the aim of securing the highest possible efficiency in management.

Attention has been drawn by many writers to the great waste prevailing in the extraction of the coal, through the employment of methods not suited to the conditions existing in the seam. It is only necessary to add here that the loss to the coal industry, in this respect, is irretrievable. Thousands of tons of coal are abandoned each year and lost beyond recovery.

Shipping Impure Coal a Handicap

At the present time, the coal industry is experiencing another handicap, one that developed large proportions at the time of the war; namely, the failure to properly clean coal for shipment. The blame for this omission rests partly with the miner who is not careful to separate the slate and bone when loading his coal and, in part, is the fault of the operator. The enforcement of strict regulations and careful supervision will largely overcome this evil.

Many operations are not equipped with suitable means of cleaning the output as it comes from the mine. In many cases, cleaning tables should be installed and the coal freed from its impurities before being loaded for shipment. The transportation of unclean coal means a considerable loss to the consumer, in freight charges, to say nothing of the added loss in heat value.

Inequality of Wages a Cause of Much Dissatisfaction

One cause that cannot fail to receive the attention of the President's fact-finding commission is the existing inequality of wages paid for labor of various kinds, in the mining and handling of the coal. Probably no single cause is responsible for the same amount of dissatisfaction and trouble, as the wage question. When it is considered that two hours of labor a day brings some men, employed in the mine, $17.50, while others laboring eight hours a day receive only $4 for their work, it is evident that some revision of wages is needful.

Again, machine men, working in thick seams that often contain much of impurities, are paid the same price per ton, as the men cutting coal in thinner seams. Naturally, work in the thicker seams brings big wages, often far in excess of what the men can earn in cutting low coal. Without doubt there is need here for an equalization of the rate of pay.

To me, a coal miner for more than 33 years, it is evident that this comission must establish a just basis of profits and compensation for labor that will be equally fair to all concerned.

These items and many others of equal import may well receive the careful study of a fact-finding commission. The eliminating of middle-men, in the sale of coal to the individual consumer, will also greatly assist in lowering the ultimate price to the public.

Linton, Ind. W. H. Luxton.

Improved Longwall—Explanation

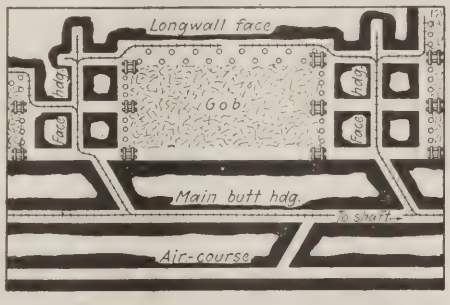
Face headings dividing panels driven single instead of three abreast—Timbers set as longwall face is advanced to break roof and protect pillar.

In the issue of *Coal Age*, Nov. 9, p. 759, F. C. Cornet has kindly drawn attention to a point that I had failed to make clear in my previous letter (Sept. 21, p. 455).

In that letter commenting on an improved method of working longwall panels, advancing, I proposed driving the face headings separating the panels, single instead of three abreast, as was suggested in the original article by M. L. O'Neale (Vol. 21, p. 877).

As stated in my letter at that time, the scheme suggested by Mr. O'Neale, of driving face headings between the panels and keeping these headings a few yards in advance of the longwall face has unquestionable advantages. My suggestion was to drive these headings single, instead of three abreast, however, and thus save a considerable expense for yardage.

In order to bring the matter more clearly before the reader, I have revised



IMPROVED METHOD OF ADVANCING LONGWALL WORKING

my sketch so as to show the timbers that I intended should be set to break the roof and maintain an air passage between the gob and the coal rib when drawing back the pillars. As shown in the accompanying figure, these breaking timbers are reinforced by cribs built at each crosscut. In my previous letter, I assumed that this was understood to duplicate the method already briefly described by Mr. O'Neale, in his original article.

With this explanation, I think Mr. Cornet and other readers will agree that driving the face headings single is an undoubted advantage over driving them three abreast. Under the light cover assumed by Mr. O'Neale, my plan should present no difficulties in respect to ventilation when drawing back the pillars. Indeed, the conditions are similar, in every respect, to those presented in the original article, except for the driving of a single face heading between panels, instead of three headings abreast of each other.

Linton, Ind. W. H. Luxton.

Competent Machine Runners

Experience needed in running and caring for a coal-cutting machine—Expensive to employ incompetent machine men—Capabilities of men fit them for different work.

Reference made by a writer, in a recent issue of *Coal Age*, regarding the choice of men for particular work, leads me to offer a few remarks relative to the competency and incompetency of machine runners. The employment of competent men to operate coal-cutting machines is an important consideration in any coal company.

An electrician whose duty it is to inspect and keep in repair the coal-cutting machines of a large company has a hard job on his hands unless competent men are employed to operate the machines. An experience of seventeen years in operating and keeping in repair machines of various types and makes, run by all classes of men, convinces me of the importance of employing only men fitted for the work.

What Constitutes a Competent Machine Runner

In my opinion, a competent machine runner is one who has had sufficient experience to enable him to take proper care of the machine in his charge. Many seem to think that competency depends on knowing how to switch on the power for operating the machine. My claim is that it is more important to know when to switch off the power and stop the machine.

An inexperienced, careless operator is a great expense to his company and a handicap in the work of cutting coal. Much damage can be done by the man who does not know or understand when a machine should not be run until some needed repairs have been made. Such a man may cost the company four or five hundred dollars, by reason of his lack of knowledge and experience.

Operating a machine that is in need of some slight repair will often cause damage that will throw the machine idle for several days. The expense of making the repairs is by no means the only item. A far greater loss is the delay in cutting the coal and the consequent reduction in the output from that section of the mine.

Where Does Responsibility Rest?

Who, then, is responsible for the employment of incompetent machine men? It often happens that inexperienced men are employed through relationship, or the close friendship of a mine official; and the company must stand the expense of their incompetency or carelessness in the performance of work. There are mine officials who put the company to needless expense in this manner.

Each and every man in the mine should be chosen with regard to his special capability to perform certain work. Different men are endowed with different capabilities which fit them for different tasks. One writer has referred to the duty of a mine foreman

to select men who are fitted for the work he gives them. It is just as important for a mine electrician to select competent men for cutting the coal. If the electrician is efficient, he will make daily inspections of each machine in the mine. Only in this way will he be in a position to know beforehand what will be needed and to make timely repairs.

Observation shows that comparatively few operators realize the great saving in expense, in the operation and maintenance of coal-cutting machines, by the employment of an efficient and competent electrician charged with the duty of employing competent men to run the machines. Moreover, by his daily inspection of the machines, many delays and much expense will be avoided, which will more than offset the expense of the man's employment.

O. KENNETT.

Hillside, Ky.

Developing Mine Officials

Need of moral and mental development —Strict discipline essential—Only one boss worthy of the name.

THE discussion, in *Coal Age*, of ways and means of developing better mine officials has appealed to me with peculiar interest, inasmuch as I have always been strongly inclined toward the moral and mental development of men who are to supervise and direct the work of their fellows. Moral development is largely the result of a high standard of character and favorable environment. Mental development is only attained by arduous study and application.

What I believe would do more than anything else to develop a higher efficiency, in all classes of mining men, is a higher standard of requirement in regard to mining examinations for certificates of competency. It is my belief that a series of five or six annual examinations would not prove too rigid a requirement, in the granting of mine foremen's certificates.

It is generally agreed that our present mine foremen are not developing into managers as fast as they should. Indeed, the facts seem to prove the truth of the old saying, "Once a Foreman, always a Foreman." This should not be true. Instead, a properly trained foreman should eventually develop into an efficient superintendent and manager.

DEVELOPMENT REQUIRES TRAINING

There is no development possible through an indifferent course of training and a low standard of requirement. Such condition may be the result of a lack of necessary activity on the part of the individual himself or those supervising his work. We often find energetic young men losing their ambition when working under conditions that do not demand the exercise of their best powers.

More than once, I have observed that a *real* boss and disciplinarian is the maker of *real* men. In other words, there is only one boss worthy of the name and he is one who demands respect and enforces discipline. A young man who finds himself working under a laggard would do well to look about him, until he finds a real boss, one who is rigid and severe in his requirements. On finding such a one, the worker can console himself that he is developing into a real man.

In respect to one's own personal efforts in development, there is nothing better that can be said than to quote the old rule of study and application. Solve a problem every day. For myself, I prefer the careful study of the questions and answers found in our coal-mining journals and textbooks. Such a study develops confidence in one's own capabilities.

Pikeville, Ky. GEORGE EDWARDS.

Inquiries Of General Interest

Calculation of Efficiency in Fan Installation

Air Volume and Water Gage Determined by Measurement—Volume of Fan—Volumetric Efficiency—Manometric Efficiency—Power on the Air—Input and Mechanical Efficiency

KINDLY explain the necessary calculations involved in the correct solution of the following problem:

Careful measurement of the air current passing in an airway 11 ft. 4½ in. by 6 ft. 2 in., shows that the air travels at the rate of 1,243 ft. per min. The reading of the water gage at this point in the airway is 0.75 in. The fan producing the circulation is a 10 x 6 ft. double-inlet, Sirocco fan, operated as a blower and run at a speed of 86 r.p.m. The fan is driven by an electric motor belted to the fanwheel. The current is a three-phase system, having a power factor of 0.85, the input to the motor being 42 amp. under a pressure of 440 volts.

It is required to calculate (a) the volumetric efficiency; (b) the manometric efficiency; and (c) the overall efficiency of this installation. I shall greatly appreciate seeing the correct solution of this problem in *Coal Age*.

STUDENT.

Monaville, W. Va.

(a) The first step is to calculate the volume of air in circulation. The sectional area of the airway is $11.375 \times 6\frac{1}{3} = 70.146$ sq.ft.; and the volume of air passing is, therefore, $70.146 \times 1,243 =$ say 87,190 cu.ft. per min.

In order to determine the volumetric efficiency of the fan, it is necessary to first calculate its volume in cubic feet per minute. Running at a speed of 86 r.p.m., a fan 10 ft. in diameter and 6 ft. wide has a volumetric capacity of $6(0.7854 \times 10^2)86 = 40,526.6$ cu.ft. per min. The volumetric efficiency of this fan is, therefore, $(100 \times 40,526.6) \div 87,190 = 215$ per cent.

(b) The manometric efficiency of the fan is the ratio of the actual water gage observed in its operation, to the calculated theoretical water gage. The theoretical water gage of a fan is calculated by dividing the square of the tip speed in feet per second, by 2,233. At a speed of 86 r.p.m., the tip speed of a 10-ft. fan is $86(3,1416 \times 10) \div 60 =$ say 45 ft. per sec. The corresponding theoretical water gage is, therefore, $(45 \times 45) \div 2,233 = 0.906$ in. Finally, the manometric efficiency of this fan is $(100 \times 0.75) \div 0.906 = 82.7$ per cent.

(c) The mechanical overall efficiency is the ratio of the power on the air to the electrical input of the motor. The horsepower on the air is the product of the quantity of air in circulation (cu.ft. per min.) and the unit pressure (lb. per sq.ft.), divided by 33,000, which gives in this case $(87,190 \times 5.2 \times 0.75) \div 33,000 = 10.3$ hp.

Finally, an input of 42 amp. at a pressure of 440 volts is equivalent to $(42 \times 440) \div 746 = 24.77$ hp. For a power factor of 0.85, the effective input is $0.85 \times 24.77 = 21.05$ hp. The overall efficiency is then $(100 \times 10.3) \div 21.05 =$ say 49 per cent nearly.

Standard Wire Gauzes

American standard gauze for safety lamps determined by experiments of Sir Humphry Davy — Experiments of French engineers set up another standard used in some French lamps.

PLEASE explain, through the columns of *Coal Age*, how many openings to the square inch there are in the standard wire gauze used in safety lamps. My understanding has always been that the standard safety-lamp gauze has 784 openings to the square inch of mesh. Recently, some one has told me, or I have seen it stated somewhere, that there are 900 openings to the square inch in standard gauze. I am anxious to know which is correct.

Wheeling, W. Va. S. C. PRITCHARD.

The standard wire gauze used in practically all English and American lamps consists of a mesh of No. 28 B.w.g. steel wires. There are 28 of such wires to the inch, making $28 \times 28 = 784$ openings to the square inch of

mesh. This was adopted as the standard mesh for safety-lamp gauzes, as the result of protracted experiments by Sir Humphry Davy (1815).

Most of the wire gauze, used by safety-lamp manufacturers in this country, has been imported from England. The only other standard wire gauze, as far as our knowledge goes, is that adopted by two eminent French engineers, who investigated the subject in a series of careful experiments. The result was the adoption of a mesh containing 1,264 openings to the square inch, which is now used in some French lamps. We know of no standard safety-lamp gauze containing 900 openings to the square inch, although it is possible that such a gauze is manufactured by some company, today.

Examination Questions Answered

Miscellaneous Examination Questions

(Answered by Request)

QUESTION—*Name the non-explosive gases found in lignite coal mines. Where are these gases found and how are they produced; what are their effects on health and combustion; and what is the most effective means of removing them?*

ANSWER—The gases generated in a lignite mine do not necessarily differ from those in bituminous mines. The non-explosive or extinctive gases found in coal mines are carbon dioxide (CO_2) and nitrogen (N_2). Carbon dioxide is found in poorly ventilated places and wherever combustion, in any form, is going on in the mine. It is produced by the explosion of powder, burning of lamps, breathing of men and animals and the slow combustion of coal in the gob.

Nitrogen is to be found in poorly ventilated places and is produced as the result of the depletion of the oxygen of the air through insufficient ventilation, the oxygen being absorbed by the coal or consumed by some form of combustion taking place in the mine.

The effect of these two gases on health is to produce headache, nausea, and final suffocation by excluding the oxygen of the air from the lungs, if the gas is present in sufficient quantity. Both of the gases being extinctive have the effect to dim or extinguish the flame of a lamp and retard combustion in any form.

The most effective means of removing these gases from the mine is to provide an ample circulation of air, sufficient to sweep them from their lurking places and carry them out of the mine.

QUESTION—*A shaft bottom* 18 *ft. wide and* 250 *ft. long is timbered with* 14 *x* 14 *in. cross-timbers, placed on* 2*-ft. centers. The roof is badly broken and there is a great deal of weight on the timbers, some of which are badly decayed. Describe in detail how you would direct the work of replacing these timbers, at the least expense, yet insuring the safety of the workmen.*

ANSWER—The timbers being 14 x 14 in. in section and placed 2 ft. apart, center to center, there is but 24 — 14 = 10 in. between the timber frames. It may be possible to wedge over one timber set four or five inches to make room for a new set of timbers to be put in place. If this can be done, the old set should then be removed, taking due precaution to avoid disturbing the loose material any more than necessary. There should now be room for standing another new timber set, before drawing a second set of old timbers.

If it is not possible to wedge over one of the old sets of timbers, as just mentioned, the work of standing the new timbers must be started at one end, or at some point where it is comparatively safe to remove an old set. It will be safer and often cheaper to stand a set of temporary timbers of smaller diameter between the old ones, supporting the collar or cross-beam by center posts, in order to hold the loose material in place while replacing the old set with a new timber frame. Such temporary sets must be set before withdrawing the old timbers.

QUESTION—*A slope is* 5,800 *ft. deep, dipping* 25 *per cent. The cable in use is a six-strand, nineteen-wire, steel cable,* $1\frac{3}{8}$ *in. in diameter. (a) What is the breaking strain on the cable when the load is at the bottom of the slope? (b) What safe load will this cable hoist on the given incline, allowing* 30 *lb. per ton of moving load for frictional resistance?*

ANSWER—(a) The breaking strain of a six-strand, nineteen-wire, steel hoisting rope, 1 in. in diameter is 34 tons. Then, since the strength of wire rope varies as the square of the diameter, the breaking strain of a similar rope $1\frac{3}{8}$ in. in diameter is $S = 34(1\frac{3}{8})^2 = 64.28$ tons.

The breaking strain of the rope is the same regardless of the position of the load on the incline. The safe working load, however, must be estimated when the load is at the foot of the incline, in order to make due allowance for the weight of the rope itself.

(b) The safe working strength of a steel hoisting rope may be taken, under ordinary conditions, as one-fifth of its breaking strain; or, in this case, $\frac{1}{5}(64.28 \times 2{,}000) = 25{,}712$ lb.

In estimating the total safe load including the weight of the rope, both the grade and track resistances must be taken into account. An allowance of 20 lb. per ton, for each per cent grade, makes the grade resistance $20 \times 25 = 500$ lb. per ton. To this, must be added the track resistance of 30 lb. per ton. The total resistance is, therefore, approximately, 530 lb., per ton of moving load. The total safe load, including the weight of the rope, then, is $25{,}712 \div 530 = 48.5$ tons.

A $1\frac{3}{8}$-in. wire rope weighs 3 lb. per running foot, which makes the total weight of this rope lying on the incline $(3 \times 5{,}800) \div 2{,}000 = 8.7$ tons. The net load hoisted is, therefore, 48.5 — 8.7 = say 40 tons.

QUESTION—*A slope mine has two intakes and one main return; where would be the best place to install a booster fan and how can I prove whether the return airway will be large enough to carry the increased quantity of air, before installing the booster?*

ANSWER—This is a fool question. Judging from the brief description given, the best place to install the booster would be on the junk heap. Better results in ventilation may be expected, in general, if the mine had one intake and two return airways. A single return airway would need to have a large sectional area to carry the air of two main intakes. Except under special conditions, a booster fan has no place in a mine.

QUESTION—*A shaft* 250 *ft. deep has been sunk to a gaseous coal seam. From the foot of the shaft, the main heading runs to the dip. This heading has been driven* 200 *ft. in advance of the last cut-through, where the entry is dipping* 14 *per cent. How and where would you test for firedamp; or where would you expect to find the gas in largest quantity?*

ANSWER—The question gives no information regarding the character of the workings. It is natural to assume that the gas, in this case, is generated at the face of the dip workings and, mixing with the air current, is carried by the return airway to the foot of the upcast shaft where it passes out of the mine. If the circulation is insufficient to properly ventilate the workings, a firedamp mixture will accumulate in cavities of the roof and in any void places in the workings. All such places should be carefully tested in the expectation of finding gas accumulated therein. Tests for gas must be made at the roof of all entries and rooms and in all live workings that are being driven to the rise.

QUESTION—*A pump discharges* 340 *gallons of water per minute and has a capacity of* 3.4 *gal. per stroke; how many revolutions per minute will a single-acting pump have to make, under these conditions?*

ANSWER—A single-acting pump discharges only on each alternate stroke, or but once during a revolution. Therefore, the speed of the pump in this case is $340 \div 3.4 = 100$ r.p.m.

Spens Outlines Work as Federal Fuel Distributor in Report Accompanying His Resignation

In formally transmitting to the President his resignation as Federal Fuel Distributor, which became effective Jan. 1, C. E. Spens presented a brief report on the work of the emergency office, which was established Sept. 22, after the conclusion of the coal strikes.

F. R. Wadleigh has been designated by the President to succeed C. E. Spens as federal fuel distributor. Mr. Wadleigh has been chief lieutenant to Mr. Spens throughout Mr. Spens' administration. He also is continuing to fill the position of chief of the coal commodity division of the Department of Commerce.

"On account of the greatly decreased production of coal, due to the miners' strike, which lasted approximately five months," says the report, "our first act was to apprise the public of conditions and to urge upon consumers—industrial and domestic—to confine their purchases to current requirements, that there might be no distress, until such time as increased production would permit of reserves. An inquiry also was directed to the Governors of all the states as to their local conditions and to ascertain whether or not federal assistance was necessary or desired. The replies indicated there was little, if any, cause for anxiety in any of the states west of the Mississippi River, excepting as to Minnesota, North Dakota and South Dakota. In most of the territory east of the Mississippi River the situation appeared to be quite serious.

Two Advisory Committees Appointed

"Two committees were appointed to assist the Federal Fuel Distributor—one designated as the Advisory Committee on Industry and the other as Advisory Committee on Transportation.

"On Sept. 27, regulations were issued and served on all coal producers, providing for daily information as to shipments and prices charged on each class of coal shipped. These regulations, due to the improved conditions, were withdrawn on Dec. 1.

"At a conference on Oct. 5 with the Advisory Committee on Transportation, specific recommendations were agreed upon and issued by that committee to all carriers as to the different requirements necessary to meet the situation. These recommendations contemplated, among other things, that all railroad material, including railroad fuel in coal cars, was to be promptly unloaded; that all maintenance and construction work requiring use of power and cars should be discontinued in so far as practicable, that this equipment might be turned into commercial service; that a vigorous campaign should be inaugurated to reduce to a minimum the number of locomotives and cars awaiting repairs, and that there should be an organized effort to check delays in transit or at terminals of cars loaded with coal as well as empty coal cars returning to the mines.

"There has been a continuous decline in the percentage of cars in bad order—the reduction from Sept. 1 to Dec. 1 being 4.3 per cent.

"Production is now approximately 11,000,000 tons per week, although during November in particular, there was an unusually large number of holidays at the mines.

"It is estimated that the current consumption is from 8,500,000 to 9,000,000 tons per week. A census taken at our direction by the U. S. Geological Survey and the Census Bureau, Department of Commerce, indicated that the amount of bituminous coal in storage on Sept. 1 was 22,000,000, which had increased to 28,000,000 on Oct. 1, and our best estimate is that on Nov. 1 the amount had grown to 35,000,000 tons and at least to 40,000,000 by Dec. 1.

"That the carriers co-operated to the fullest extent is evidenced by the increased production, when consideration is given to the fact that they themselves were still suffering from the ravages of the shopmen's strike, and the further fact that during this period offerings of tonnage of all character were extremely large. A glance at the following figures, which represent the number of carloads of revenue freight loaded for each week specified, during this fall, as compared with similar periods in 1921 and 1920, show that the total loading in 1922 was considerably in excess of that for 1921, and, in a number of instances, greater in 1922 than in 1920. The week ended Oct. 14, 1920, was the heaviest week in the history of the railroads, viz.: 1,018,539 carloads, but for the week ended Oct. 28, 1922, the loading was 1,014,480 carloads, or only about 4,000 cars less than the 'peak' week:

Week Ending	1922	1921	1920
September 16	945,919	852,552	991,166
September 23	973,291	873,641	1,008,109
September 30	988,381	904,831	992,283
October 7	968,169	899,681	1,011,666
October 14	983,470	910,529	1,018,539
October 21	1,003,759	964,811	1,008,818
October 28	1,014,480	951,384	981,242
November 4	994,827	837,576	915,615
November 11	953,909	755,777	927,586
November 18	969,094	790,363	889,138
November 25	955,495	673,465	803,701
December 2	845,219	741,849	882,604

"The bituminous production in 1921 was 415,000,000 tons. The production in 1922 up to and including Dec. 16 was 387,152,040 tons, so that the production during 1922 will nearly equal that in 1921, despite the strike this year that lasted nearly five months.

"As to priorities in transportation, as contemplated in the act, the instances where we have recommended issue of individual priorities have been comparatively few. Where applications for priorities have been received, we have endeavored to take care of such instances by increased car supply and by co-operation with shippers. Individual priorities are undesirable, creating as they usually do, discriminations and often merely resulting in the transfer of cause for similar applications to other localities.

"In the matter of prices on bituminous coal, practically all complaints received have been confined to prepared sizes for household use, and in consequence our efforts as to prices have been largely confined to domestic coals.

"Numerous conferences were held with the operators in the various districts with the following results: In the Pocahontas district, New River district, Tug River and Winding Gulf districts of West Virginia the operators voluntarily expressed a willingness to maintain a maximum price, f.o.b. mines, that constituted a reduction in the previous maximum price of approximately $3 per ton; in Alabama, $1 per ton; in the Pittsburgh (Pa.) district, $1.50 per ton; southern districts of Ohio, $2.25 per ton; in Pittsburgh No. 8 Ohio district, $1.50 per ton; in the Fairmont (W. Va.) district, $1.25 per ton; and in the Fifth and Ninth districts in Illinois, $1 per ton. The reductions in these districts automatically resulted in similar reductions in competitive fields, and in other districts increased production has had a similar effect.

"We have in no instance attempted arbitrarily to fix specific prices, all the reductions referred to having been made voluntarily by the operators, at our instance and request.

"The following figures, taken from *Coal Age*, give a comparison of the weekly average spot prices of bituminous coal, f.o.b. mines, for the week ended Sept. 11 up to and including the week ended Dec. 11, as compared with the months of September, October and November, 1920. Production and demand in 1920 were abnormally large:

WEEKLY		WEEKLY	
September 5	$5.08	November 20	$4.15
September 11	5.17	November 27	3.99
September 18	4.99	December 4	3.95
September 25	5.06	December 11	4.07
October 2	4.89		
October 9	4.60	MONTHLY	
October 16	4.45		1920
October 23	4.26	September	$8.52
October 30	4.19	October	7.78
November 6	4.16	November	5.87
November 13	4.12	December	4.38

"In the matter of bituminous coal loaded into vessels at

Lake Erie ports, this season's tonnage of cargo coal amounted to 18,501,055 tons; in 1921, 22,412,380 tons; in 1920, 22,408,355 tons. In addition, the amount of bituminous coal on hand on commercial docks at Upper Lake Ports (Lake Superior and Lake Michigan, not including Chicago) was 4,300,744 tons on April 1, 1922; 2,053,022 tons on April 1, 1921, and 860,521 tons on April 1, 1920. There were about 2,000,000 tons more of bituminous coal on hand on these commercial docks on April 1, 1922, than on April 1, 1921, and more than 3,000,000 in excess of that on hand April 1, 1920.

"Due to the miners' strike the shipment of lake coal was necessarily largely concentrated within the period Sept. 11 to Dec. 1. During the twelve weeks ended with Dec. 4, this year, the average weekly loading into vessels amounted to 1,012,664 at Lake Erie ports as compared with an average weekly loading of 477,945 tons for the same period in 1921.

"The movement of soft coal from Illinois and Indiana and other districts this season also has been far in excess of that during last year, so that the northern districts served principally by the lakes are in a satisfactory condition in so far as bituminous coal is concerned. The distribution of 'lake' coal as between the various ports this season has followed very closely the percentage distribution that obtained during the previous years.

"Due to the miners' strike, it has been estimated that the production of anthracite this season—that is, from the date the strike ended, Sept. 11, up to April 1, 1923—will not exceed 60 per cent of last year's production, and the plan of distribution of this season's production contemplates a prorata distribution among last year's consuming communities. The following figures indicate the trend of weekly production since the week ended with Sept. 9 as compared with similar period in 1921:

	1922	1921
September 9	50,000	1,483,000
September 16	1,107,000	1,749,000
September 23	1,863,000	1,725,000
September 30	1,947,000	1,802,000
October 7	1,959,000	1,764,000
October 14	2,075,000	1,813,000
October 21	2,003,000	1,910,000
October 28	1,804,000	1,751,000
November 4	1,839,000	1,689,000
November 11	1,863,000	1,350,000
November 18	2,191,000	1,879,000
November 25	2,174,000	1,650,000
December 2	1,819,000	1,815,000
December 9	2,038,000	1,675,000
December 16	2,200,000	1,637,000

"In terms of cars, the loading this season as compared with 1921 and 1920, is as follows:

	1920	1921	1922
Average daily loading October	5,910	5,853	6,049
Average daily loading, November	5,447	5,327	5,919

"Up to and including the 19th of this month, the average daily loading for December, 1922, was 6,196 cars.

"The lake anthracite program contemplated a movement of about 2,000,000 tons. Lake navigation closed with approximately a movement of only 1,250,000 tons, a shortage in this program of 750,000 tons, which deficit, it is planned, will be equalized by all-rail movement, and which movement is now under way.

"Canada's current allotment of 1,300,000 tons would represent about 4 per cent of the total production. During the calendar year 1921 the total shipments of domestic anthracite amounted to 51,916,578 tons, of which Canada received 3,920,000 tons, or 7.55 per cent.

"In the matter of prices on anthracite, the Commonwealth of Pennsylvania appointed a Fair Practices Committee, reporting to the Pennsylvania Fuel Commission, to fix maximum prices, f.o.b. at the mines. This committee has practically completed its work; prices on approximately 99 per cent of the production have been established, which maximum prices range from $8.50 to $12 per ton, dependent upon cost of production.

"Throughout our service we have enjoyed the most sincere co-operation on the part of the Interstate Commerce Commission, State Fuel Administrators, railroads and also a large majority of the coal operators. In no instance have we found it necessary to invoke the penalties provided in the act.

"The bituminous situation generally is in good shape. Complaints continue of shortage in car supply, but there are few complaints of current shortage of bituminous coal. There is, however, a demand by industry, particularly public service corporations, in certain sections, for greater opportunity to increase reserves, due to a large extent to anticipated possible renewal of labor troubles this coming spring.

"With the seasonal reduction in other traffic, which this year, however, has been greatly retarded, additional power should be released for the transportation of coal, and while this power generally is not yet up to standard due to the shopmen's strike, barring extreme weather, which, of course, would further affect the railroads' capacity, we are hopeful that the situation may be cared for without serious distress. Difficult weather might result quite seriously.

"The clamor for anthracite is quite urgent. We have repeatedly advised the public of the situation with regard to this commodity, that they might provide themselves, to some extent, with substitutes. The current production is, however, so satisfactory that, barring unexpected difficulties, we believe the available supply will somewhat exceed the earlier expectations.

"Of the amount appropriated by Congress for the purpose of this act, approximately $40,000 will have been expended for the period Sept. 22, the date the law became effective, until Jan. 1, 1923."

Operators Within Rights in Draining Mine Water Into Indian Creek, Judge Holds

In an opinion covering nearly 100 typewritten pages handed down last week Judge J. Q. Swearingen, in the Common Pleas Court of Fayette County, Pennsylvania, denied an injunction sought by the Mountain Water Supply Co., the Dunbar Water Co. and the Pennsylvania Railroad Co. to restrain twenty-nine coal operators in the Indian Creek Valley from draining sulphuric acid-laden water into Indian Creek, thereby contaminating the water supply of the plaintiff companies.

The court held that the mine owners could permit the water from mines to flow by gravity into Indian Creek when that stream provided the natural drainage for the watershed and that it is incumbent upon the water companies to receive the water as it flows into the creek and into the storage reservoir of the plaintiffs and purify it for whatever use it is intended.

The decision is the conclusion of the first phase of the battle between the Pennsylvania Railroad Co. and its subsidiary water companies on one side and the coal operators on the other.

The case will be appealed to the higher courts. This has been the understanding from the beginning of the litigation.

Ford Buys Pond Creek Coal Property

The Ford Motor Co. has purchased the coal lands, mining plant and equipment of the Pond Creek Coal Co., situated in Pike County, Kentucky, according to an announcement Dec. 28 by T. B. Davis, president of the latter company. The purchase price was not announced, but Mr. Davis estimated that upon final liquidation the net worth of the present company would approximate $45 a share. There are 212,920 shares of common stock, which would make a valuation of about $9,581,400. The Pond Creek company is a producer of soft coal, in a non-union mining field.

Henry Ford had an option to purchase the Elkhorn coal properties in eastern Kentucky which he failed to exercise. It expired Dec. 22.

Howat Ticket Wins in Kansas

The Howat ticket headed by William Bogartz for president, won in the recent election in District 14, United Mine Workers, the official recount now shows. The new officers have assumed office, thus raising the Howat question formidably again in Kansas. Alexander Howat, now in prison for violating orders of the Kansas Industrial Court, was ousted from the district presidency by the International nearly two years ago for calling an unauthorized strike.

Miners' Nationalization Committee Submits Plan for Public Ownership and Operation of Coal Industry

"A plan of public ownership, public control and democratic management of the coal industry," prepared by the Nationalization Research Committee of the United Mine Workers, was made public Dec. 29 by C. J. Golden, president of District 9 and chairman of the committee, at a dinner of the League for Industrial Democracy, at the Aldine Club, New York City. The miners' union created the Nationalization Research Committee at the international biennial convention of 1921 to study nationalization of mines and the plan is the result of eight months' work by the committee.

The scheme, which is embodied in a brochure entitled "How to Run Coal," placed a valuation on the soft-coal industry—based on operators' and government estimates—of between $1,500,000,000 and $2,000,000,000. This, they pointed out, was a little more than the selling price of soft coal at the mines for 1921.

The estimate of capital investment in the anthracite fields was given as $432,000,000, the federal census figures, and the value of royalty payments on coal in the ground in which operators have made investments was placed at $2,000,000,000. So the miners estimate the total cost of the government taking over the coal fields as $4,500,000,000.

The miners propose as the basis of an organization for operating the mines and fixing prices a Federal Interstate Commission of Mines, at the head of which would be a Secretary of Mines with a place in the Cabinet. This commission would be appointed partly by professional and industrial associations and partly by the President. It would include fact finding, scientific determination of costs, price fixing and other similar duties.

The work of administration, of actual operation, would be done by a National Mining Council, composed of three groups representing the financial, technical and administrative heads of the industry; the miners and the coal consumers. They would be appointed by the federal commission from the nominations made by the groups represented.

Wages would be made a first charge upon the industry, with a national basic wage as a foundation for determination. There would be differentials for risk, skill and local conditions, the determination to be not on "class warfare" but on measurement of skill and efficiency.

The plan frankly states that a political labor party, which would protect the interests of the miners by bringing political influence to bear on government commissions, is essential to the success of the plan, inasmuch as the representatives of the people designated to decide problems of control and expenditure probably would at present be unsympathetic to labor.

The plan, which the committee calls the American plan, has the following preamble of justification:

"The coal industry has been so disorganized and mismanaged that the situation in recent years has approached what big business men and stand-pat Senators describe as a 'catastrophe.' Intelligent men, with the welfare of the industry at heart, agree that the 'game is up'—the old game of speculative profits, overproduction, shortages, sky-high prices, unemployment, gunmen, spies, the murder of miners, a sullen, desperate public. Unless unification and order enter the industry, there will be a blow-up somewhere, followed by drastic, angry and frenzied legislation. The American Kingdom of Coal is today in as chaotic and explosive condition as the States of Europe. No single constructive suggestion has come from the operators. No large leading idea has come from the public. The public is feeling intensely, but is not yet thinking wisely.

"The operators have a fresh explanation for the annual crisis as often as it rolls around. One year it is car shortage, another year, high wages, then the war, then government interference. Of thought-out plan and remedy they have offered none.

"The only large-scale proposal has come from the United Mine Workers of America in their demand for nationalization. It is the only proposal that grapples with slack work for the miners, high prices and irregular supply for the consumers. It is now the job of the miners to decide what kind of nationalization they want. There are only three plans possible for control and administration. All other plans are minor variations on those three. There are only three plans possible, because, after the owners are bought out, only three interests are concerned—the public, the miners and the technical and managerial group. The plans differ in the proportion of power they give to each of the three interests."

Any plan must not only provide a decent American standard of living to the worker, but must satisfy his desire for a voice in the management, said the proposal. Some gains, such as control over the rate of pay, qualifications, hours, inspection and other details, have been won by the union.

"But these gains are not enough for a worker in a democratically managed industry," said the plan. "He wishes the right to make suggestions on technical improvements, on car-pushing, on slack work, on output and the right to take part in carrying them out. There will be no complete co-operation until his suggestions are welcomed and weighed. His good-will and intelligence should be encouraged. They must be incorporated in any successful scheme of administration. The working miner must have a real part in the government of coal. Democratic management is what the worker wants.

"But any plan of nationalization must also include ownership by the public. Ownership of the mines by the miners alone would be as unjust and as disastrous as ownership by the coal operators has proved itelf to be. The public must give the final decision on the large issues of the industry.

Would Separate Control from Administration

"Any plan of nationalization must include the separation of control from administration. The decision of policy is one thing. The job of administration, that is, running the industry, is quite a different thing. To give control to the community as a whole, to safeguard the future as well as the present, to practice the American policy of conservation equally with that of business initiative—all this is in the job of control. Control means to know what is actually being done as well as to know what must be done to get results and to order the thing to be done. Control means statistics of output, requirements, stocks; it means tests, inspections, research, publicity; it means the collection of all the necessary new and now unknown facts about the industry.

"Under public ownership and democratic administration the coal industry will find out how much coal the people want, how much of a supply is already in stock, what is the cost of mining coal, how much pay a miner gets, and what the correct price is for a ton of coal. These are simple, easy, fundamental and essential facts in running an industry. But not one of these elementary facts is known today.

"A permanent fact-finding agency will be one of the instruments of control. Control means a permanent federal interstate commission of mines, and the eyes of the commission will be a fact-finding agency, with uniform accounting and a research group. At the head is the Secretary of Mines, a Cabinet member. This federal commission will be created by Congress and composed of at least eleven members. Five of these members should be named by such bodies as the professional and industrial associations (engineers, &c.). The other six members will be appointed by the President. The functions of this federal commission include fact finding, scientific costing, budget determination, price fixing, research. A scientific budget is essential to the success of this plan."

The Federal Commission on Mines would control the finances of mining under the plan, and the National Mining

Council, representing the operation body, would present to the commission its receipts, expenses, salaries, wages, costs, plans for development and prices.

"Any plan of nationalization must arrange for the determination of price, quality and quantity of output by the whole community, and not by the group, of workers," said the plan. "This means that the Federal Commission on Mines and the Secretary of Mines will have the final say on these matters. That will be the public safeguard."

The Bureau of Wage Measurement would be a part of the federal commission, which will pass upon the findings of the bureau "from the point of view of business expediency and economic feasibility. The Bureau of Wage Measurement will deal scientifically with the disputed points in rate fixing, such as dead work, for which no satisfactory standardized rate has been worked out.

"Wages will be made the first charge against the industry. A good American life for the miner will be regarded as of equal importance with a steady supply of coal at a reasonable price to the public. For the first time in the history of the industry, disputed wage questions will be removed from the administration of the industry, where they do not belong, and placed under the economic control of the industry, where they do belong. The mine manager will be able to turn his face away from the business office and direct his full attention to the getting out of coal. In the past the 'good' manager has too often been forced to be a labor 'squeezer,' cutting rates to prove his efficiency. The good manager of the future will be ranked by his skill in coal production and in the sound organization of work. Administrators, instead of wage haggling and market juggling, will administer."

Plan Would Maintain Collective Bargaining

The principle of collective bargaining would be maintained under the nationalization plan, which holds that the union must be safeguarded as much as under private ownership.

"The United Mine Workers of America under nationalization will not only participate in administration, but must in addition maintain its own life and integrity as 'an independent organization of initiative and defense,'" says the statement. "It must be in a position to discuss wages through the Wage Scale Committee, an independent joint conference board. This is the same right which workers under consumers' co-operation enjoy."

This was in substance the outline of the plan for nationalization as put forward by the miners. It was given "not as a final plan but as something round which the miners may build their own program and as a focus for the thinking of the public." It pointed out that "the coal industry is so dependent on transportation that the miners' program is one with the program of the railroad workers for nationalization of the railroads."

Joined to the plan was a second section, entitled "A Warning," which contained the miners' reasons for putting forward their plan. It said:

"The present private control of coal is doomed. Plans for reorganization are already being pushed by the press, President Underwood of the Erie Railroad and many others. This is a dangerous time for miners. The miners must do their own thinking and do it quickly. They must beware of specious plans in place of sound plans. When the miners offered to the House Committee the suggestion for an emergency investigating commission with a joint representation of the industry, miners and operators, the operators responded with a substitute—a commission from which miners were barred. When the miners urged a federal fact-finding agency, permanent and compulsory, the business interests answered with various schemes for governmental regulation, or for trustification.

"The conditions of success for nationalization are these:

"1. Administrative organizing minds in the public service.

"2. A competent technical staff.

"3. A 100 per cent organized union.

"4. Collective bargaining publicity accepted as the basis of wage agreements.

"5. A large labor representation in all departments of government.

"6. A political labor party.

"Confiscation, in any form, is of course unthinkable. All those holding an investment in mines, equipment, and coal beds will be recompensed at a just figure. The first steps will be taken by the Federal Fact-Finding Agency, the Bureau of Statistics, in listing the plants, and in making a list of the owners of the coal beds. That register is an immediate need, regardless of nationalization. Then follows the task of a valuation of the coal beds. The government has used up several years in valuing railroad properties. We suggest as the principle for appraising the value of coal the principle of established expectations. This means that the nation buys up the established expectations of the owners of the coal beds. It gives compensation for the disturbance of established expectations of being able to draw an income. With established expectations as the principle of purchase, the work of valuating is simplified.

"For the British coal industry, it was estimated by Sidney Webb that between two and three hundred million pounds would meet all demands. That would be from a billion to a billion and a half dollars. This estimate included coal and collieries, royalties, and every form of stock holding.

"Four and a half billion dollars for the coal industry and the coal of the United States is a liberal estimate."

Analysis of Railroad Performance Expected To Result in More Efficient Service

Railroad performance in the handling of coal since the close of the strike has been studied and analyzed more carefully than ever before. The conclusions which are being reached do not reflect credit on the railroads. When the figures are all compiled, it is believed they will prove conclusively that railroading efficiency is very low.

These figures also will show, it is believed, that in addition to the poor handling of cars the principal causes of transportation deficiencies will be found in the lack of motive power and in the inadequacy of terminal facilities. The railroads have enough open-top cars actually engaged in the transportation of coal to move the entire requirements of the country if each car will average thirteen trips a year. It is believed that even a better movement is within the range of good management. At present the average railroad car in service is twenty days under load and 2.2 days in movement, but it is earning revenue during only 1.5 days.

This year's careful scrutiny of transportation conditions will develop, it is believed, that bottle-neck and expensive terminals must give way to expanded facilities and the sale of high-priced, close-in terminals. In many cities the land occupied by terminals can be sold for very high prices. Terminals can be located on cheap outlying land with better facilities for the spotting of cars where they are available to motor trucks.

I. C. C. Issues Service Order 32

Service Order No. 32 has been issued by the Interstate Commerce Commission to insure further supplies of coal for the Government Fuel Yard at Washington. The Chesapeake & Ohio R.R. has been ordered to assign cars at the rate of five per day for ten consecutive working days to the mine of the E. E. White Coal Co. at Glen White, W. Va.; to the mine of the same company at Stotesbury, W. Va.; to the mine of the East Gulf Coal Co., at Helen, W. Va., and to the mine of the White Oak Coal Co., at Sprague, W. Va.

The Pennsylvania R.R. is instructed to assign five cars per day for five consecutive working days to the Arrow No. 5 mine of the Arrow Coal Mining Co. at Reitz, Pa.; six cars per day for ten consecutive working days to the mine of the Emerson & Morgan Coal Mining Corporation at Hagevo, Pa.

The Baltimore & Ohio R.R. has been directed to assign two cars per day for ten consecutive working days to the Big Chief Mine of the Sagamore Coal Co., Indian Head, Pa., on the Indian Creek Valley R.R.

Publication of Facts as Obtained by Coal Commission An Important Work in Public Education

By Paul Wooton
Washington Correspondent of *Coal Age*

While it is confidently expected that the President's Coal Commission will make available considerable quantities of facts which may be used in the wage negotiations, it is pointed out that the Jan. 15 report need not be the only revelation of facts which can be used by the wage-scale committees.

Both operators and mine workers apparently have been convinced that the commission does not expect to undertake mediation. Since the entire responsibility in the negotiation of wages is left to those immediately concerned, those who are engaged in the task, many believe, have a right to expect such assistance as the commission can give by making available in installments such facts as the commission is gathering. The situation is one which needs all the light that can be thrown on it.

In addition to contributing authoritative data to those conducting the wage conferences, the success of the commission's work depends to a great extent on the public support which may be given to its recommendations. If the commission withholds its facts and submits ultimately a long and voluminous report, the public will not be inclined to attempt to digest it. In the opinion of those who are particularly anxious to see the commission accomplish the maximum of good, the data on which its conclusions will be based should be submitted to the public piece by piece as fast as it comes to hand. Facts presented in this interim manner will be published widely and will be assimilated by the public. It will not only give Congress the benefit of the opinion which the public thus will form and make known but it will do an important work in public education. As it is, the public is surprisingly ignorant of the workings of the coal industry. So much of its prosperity depends on the proper functioning of the coal business that anything which makes it possible for the people to grasp the problems more knowingly, will do a service to the nation.

Insufficient Cost Forms Supplied

Regardless of who may be to blame, a bad psychological effect has been created among the operators because sufficient cost forms were not immediately available. It has been difficult for the leaders among the operators to engender any great amount of enthusiasm among their associates in the matter of submitting this cost information. It has had the tendency to slow up the work at a time when basic information of this character is essential to the commission's progress.

Published statements to the effect that there is friction among the members of the Coal Commission and that the President may be called upon to decide between the disputants were denied categorically by Chairman Hammond on Dec. 30. He characterized the statements as "imagination" and "romance." He declared that while there are frequent occasions where the opinions of the members of the commission do not coincide, there never has been a single discussion where even a semblance of heat was developed. As a matter of fact, Mr. Hammond stated, the discussions of the commission have been particularly free from anything other than the most friendly and earnest exchanges of views.

It has been stated that "one portion of the commission wants to abandon the questionnaire method." No such thought ever has been entertained, Mr. Hammond declared. The commission is unanimous in its belief that it must make use of the questionnaire method, as it is obviously impossible for comprehensive facts and figures to be gathered in a short time by any other means. He said the commission had been assured by members of Congress that it can get all the authority it needs to gather any information which is germane to the inquiry.

Chairman Hammond revealed at the Dec. 30 conference with the newspaper correspondents that thought is being given by the railroads and by the operators to reductions in freight rates and in the price of coal, respectively, during certain months with the idea of decreasing the seasonal character of the coal movement.

Professor Stoek, University of Illinois, the recognized authority on storage of bituminous coal, whose services as a consulting engineer in the U. S. Bureau of Mines are being utilized by the Coal Commission, was in Washington last week and was called into conference by the commission. He convinced the commission, it is reported, that the storage of bituminous coal is entirely practicable and that the danger of spontaneous combustion has been greatly exaggerated.

The Coal Commission's report to Congress of Jan. 15, according to definite statements of Mr. Hammond on Dec. 30, will not take up the questions of transportation, car shortage or the labor situation. He further indicated that the report will be final as far as it goes and that there will be no tentative discussion. It will contain facts on the coal industry, such facts as have been assembled so far by the staff of the commission.

The Jan. 15 report is but the forerunner of a series of statements that will be published by the commission. As an investigation is completed, results will be given to the public. Suggestions for legislation affecting the coal industry called for by the act creating the commission will not, however, be formulated prior to the final report of the commission next September.

Commerce Commission to Investigate Car And Motive-Power Equipment of Roads

The Interstate Commerce Commission began Dec. 7 a general investigation, under docket 14,489, of the adequacy of the car and motive-power supply of railroads and into the practices prevailing with respect to the interchange of cars. The inquiry has been instituted "with a view to promoting economical and efficient service, to prescribing and establishing such just and reasonable rules, regulations and practices with respect to car service, and to require the respondents to provide themselves with such safe and adequate locomotives and cars wherewith to perform as common carriers their car service as may upon such investigation appear to be contemplated and required by law." As a preliminary step the commission has by questionnaires called upon the carriers for the following information:

(a) Freight train cars owned or leased at the beginning and close of year 1922, and number ordered but not delivered Dec. 31, 1922.

(b) Estimated number of additional cars needed by classes, estimated cost thereof, proposed program for acquiring such cars and proposed plan of financing.

(c) Ages of cars in service by classes, Dec. 31, 1922, 100,000 lb. capacity and over.

(d) Ages of cars in service, 80,000 lb. and less than 100,000 lb. capacity.

(e) Ages of cars in service, 60,000 lb. and less than 80,000 capacity.

(f) Ages of cars in service less than 60,000 lb. capacity.

(g) Locomotives owned or leased at the beginning and close of year 1922 and number ordered but not delivered on Dec. 31, 1922.

(h) Unserviceable locomotives on line first of each month in 1922, by classes, and tractive power.

(i) Ages of locomotives at close of year 1922, by classes —freight, passenger, switch.

(j) Estimated number of additional locomotives needed,

proposed program for acquiring such equipment and proposed plan of financing the purchase thereof.

(k) Commodities loaded monthly, 1922, revenue freight—carloads.

(l) Carloads of non-revenue freight loaded monthly 1922.

(m) Freight cars on line daily, serviceable and unserviceable, by months in 1922, box, coal.

(n) Freight cars on line daily, serviceable and unserviceable, by months in 1922, refrigerator, flat.

(o) Freight cars on line daily, serviceable and unserviceable, by months in 1922, stock, all freight.

(p) Freight-car surplusages, daily averages by months, 1922, railroad owned cars.

(q) Freight-car shortages, daily averages by months, 1922, railroad owned cars.

(r) Freight-car surplusages, daily average by months, 1922, cars owned by private companies.

A questionnaire also has been directed to all private car lines requesting information concerning fraight-train cars owned or leased by them, and the number of such cars ordered, but not received.

All carriers by railroad subject to the interstate commerce act are made respondents. The Governor of each state, as well as the tribunal thereof, if any, having regulatory powers over the common carriers by railroad, have been notified of this proceeding. The times and places for hearings will be announced later.

Creation of Coal Commission Unanimously Approved, Council of Churches Finds

As the result of an inquiry conducted by the research department of the Federal Council of Churches during the last few weeks into the public attitude toward regulation of the coal industry, the council has made public its conclusions, based on interviews and detailed replies to specific questions received from employers, labor representatives, technicians, editors, educators and church leaders in various parts of the country, summarized as follows:

"(1) The demand for a full and authoritative statement of the facts is almost a wail. There is apparently unanimous approval of the government's action in creating the present commission. Even persons generally well informed who have lost no opportunity to read and observe, use such expressions as these: 'I am in a mist of perplexity'; 'There is so much doctored publicity'; 'The public finds itself quite without any dependable information'; 'No intelligent public opinion'; 'Complete lack of reliable information.' The editor of a great metropolitan paper which has given much space to the coal controversy complains that 'none of us has sufficient data yet on which to formulate a policy.' One of the ablest members of the American Federation of Labor executive committee writes: 'If there is any one thing in connection with the coal situation which impresses the thinking man, it is the absence of reliable and adequate knowledge.' Manifestly if the Coal Commission should not fill this need it would be distinctly disappointing to the general public.

"(2) Fear is expressed lest the commission may not pursue its inquiry to the full extent of the powers given it by Congress; that, specifically, it will not secure the facts concerning investment and profits. The law obviously contemplates that the commission shall utilize the data in the hands of the Federal Trade Commission and the Bureau of Internal Revenue and shall supplement this as necessary by direct testimony. It is likewise apparent that if the question of the relation of civil liberties to the control of the mining industry, with particular reference to portions of Pennsylvania and West Virginia, is not fully canvassed by the commission, there will be much dissatisfaction with its findings of fact. The public is apparently well aware now that the crux of this whole matter, in so far as the labor controversy is concerned, is the question whether the miners are to be allowed to unionize or are to be permanently arrayed against each other in competing union and non-union fields. Some persons recommend the latter alternative as a matter of public policy; others see justice only in the former.

"(3) There is a remarkably widespread conviction that what is wrong with the industry goes far deeper than those natural periodic conflicts of interest over wages and hours which arbitration might adjust. It seems to be generally recognized that because of overdevelopment and seasonal demand in the soft-coal industry some form of government regulation is necessary.

"(4) The replies indicate no organized public opinion in favor of government ownership or of full government control of the mines. It is felt, rightly or wrongly, that federal operation of the railroads was accompanied by waste and inefficiency, and that industrial progress in general demands as little federal interference as possible. There has been much talk of nationalization among the miners themselves, but official spokesmen for labor are by no means of one mind on the subject. There is on all hands fear that the machinery of government control would fall under political domination. Yet the coal situation so clearly constitutes an emergency that many people are thinking in terms of regulation through one or more federal agencies. The suggestions are for the most part not developed in detail, but the analogy of railroad regulation through the Interstate Commerce Commission has apparently impressed many people as instructive in this connection. Further, it appears likely that if the threatened strike takes place next spring, there will be a general demand for drastic action. 'I am against nationalization of any industry,' writes a well-known conservative editor, but adds that 'it may be that nationalization is the only cure for the troubles of the coal industry, and if the present commission so reports, I should certainly be inclined to a favorable consideration of its recommendation.'"

Berwind-White Mine Workers Worse Off Than Slaves, Says Report of Investigators

Miners employed in the Berwind-White Coal Co.'s mines have to endure living and working conditions "worse than the conditions of the slaves prior to the Civil War" according to the report of the committee appointed by Mayor Hylan, of New York City, to investigate labor conditions in the Berwind coal mines in Somerset and other counties of Pennsylvania which supply the Interborough Rapid Transit Co. with coal. This report, made public Jan. 1 by David Hirshfield, Commissioner of Accounts of New York City and chairman of the committee, urged that the government take over the coal fields and operate them for the "benefit of the people and place it beyond the possibility of any men or group of men to restrict coal production or its distribution."

The committee declared that E. J. Berwind, president of the Berwind-White company, as chairman of the Board of Directors of the Interborough, controlled the coal-supply policy of the transit company, which had made it possible for him "to purchase from his own company coal mined under unfair and heartbreaking conditions and reap therefrom enormous profits, amounting in 1921 to over $1,600,000, with corresponding financial detriment to the tax and rent payers in the City of New York."

Agreement on Four-State Wage Negotiation Expected in Chicago in Three Days

Chicago, Jan. 2.—Western operators were optimistic before the opening of the miner-operator conference in Chicago Wednesday that within three days both sides would have agreed to four-state negotiation with the idea of continuing the present wage scale one year. The possibility of an "unholy alliance" between operators of the outlying districts and the miners, on the ground that the miners would oppose the one-year plan and because the outliers would be bankrupted by a continuance of the present high wages was scouted by the best observers. Instead it was generally prophesied that a quick agreement upon four-state negotiation would be made and then that outlying districts would struggle in the negotiations for a variation in their scales so that they might meet non-union competition in 1923. The sub-committee on methods was scheduled to meet an hour before the main conference.

Hammond Appeal Urges Operators and Mine Workers At Chicago to Agree on Wage-Making Machinery

John Hays Hammond, chairman of the President's Coal Commission, addressed an appeal on Jan. 2 to the operators and mine workers assembled in Chicago to set up the machinery for wage-scale negotiations. In effect, he points out that the coal-consuming public is tired of living under the existing armistice between the operators and the mine workers. It wants peace. The inference of the appeal is that the people who burn coal look to the men who own the mines and to the men who work in mines to come to terms and to keep at work. It is not a private quarrel but a public issue.

It is significant that while the Coal Commission does not claim authority to negotiate or arbitrate it does mention in the opening sentence that it has a specific duty to investigate causes of strikes and in the last sentence it suggests that it will not hesitate to fix the blame if the mines are shut down on April 1. Were an impartial body like the Coal Commission to place the blame all admit the possibility that the public then would be likely to take into its own hands the matter of arbitrating the disputed points, without being invited by either side most immediately concerned. The text of Chairman Hammond's telegraphic appeal to operators and mine workers' committee follows:

"The United States Coal Commission respectfully calls your attention to the fact that among the subjects assigned to it by the Congress of the United States for investigation is that of the causes which from time to time induce strikes in the industry. There is sharp conflict in opinions expressed to the commission as to whether the cessation of work on April 1, 1922, in the unionized bituminous-coal fields of America was a strike by the miners or a lock-out by the operators.

"As the duly appointed representatives of operators and miners in the fifteen organized union districts, you have met for the purposes of finding a way to maintain peace in your fields. Failure to agree would create an intolerable situation. Such failure would inevitably result in most serious injury to the general business and common welfare of this country. All branches of the industry have promised this commission their co-operation in the discharge of its duties. The commission, therefore, in the public interest urges upon you the obvious necessity of promptly devising some plan whereby the mines affected by your conference will be kept in operation to the end that the revival of all industry be unchecked, the uninterrupted flow of commerce among the states be maintained, and the menace of an insufficient coal supply be averted.

"Business halts while in doubt as to your action, and awaits with anxiety the speedy and successful outcome of your labors! You can contribute to the peace of American economic life by reaching a speedy agreement and avoiding further conflict in the fields under your control. Your agreement will spare the commission the necessity of fixing the blame for failure to adjust your differences."

Development of German Mines Handicapped By Depth of Coal Deposits

BY H. C. HERZOG

Owing to the depths of the German coal deposits and the not over-flourishing condition of the mines, the development of German mine capacity has never gone far beyond actual needs, and cannot nearly be compared with conditions in countries where, as in the United States, the deposits are easily accessible. Apart from considerations of expense, which, especially in the Ruhr basin, always were a weighty matter, the coal syndicates which made it one of their chief tasks to prevent overproduction have exercised a strong restraining influence on development.

In pre-war times Germany had eight bituminous-coal producing districts: Rhineland-Westphalia, Upper Silesia, Lower Silesia, Hanover, Aix-la-Chapelle, Saxony, Sarre and Alsace-Lorraine. Two of them, Sarre and Alsace-Lorraine, have since then been alienated entirely and Upper Silesia in large part. The Ruhr district, which has always played a leading part in the German coal production, has now attained a position of predominance among the country's coal fields.

Of all mining districts the development of the mine capacity in Upper Silesia was furthest ahead of actual production, owing to such favorable conditions as comparatively shallow depths, abundance of timber and cheapness of labor. The intimate relation between the coal industry on the one hand and the metallurgical industry on the other hand in this district has further acted as a spur upon the development of the coal mines.

No authoritative figures are available on the relation between developed mine capacity and actual production in any district. Conditions in this respect are different in almost every mine. An average, it appears, has never been drawn. From various estimates it may be assumed that in 1913 the developed mine capacity in Upper Silesia was approximately 10 to 15 per cent and in the Ruhr district 5 to 10 per cent in excess of the highest annual production.

Since the outbreak of the war development has practically stopped. Seven new shafts, estimated to produce annually about 1,000,000 tons of coal each, have been sunk or are being sunk in the Ruhr district and two in Upper Silesia. None of them, however, has begun producing yet.

At present the developed mine capacity of Germany, excluding the Sarre district and Alsace-Lorraine, can, if the above estimates are correct, be assumed to be 190,000,000 tons per year, taking Upper Silesia as a whole, or from 150,000,000 to 155,000,000 tons after deducting the now Polish part of the Upper Silesian basin.

Actual coal consumption in 1913 of the territory embraced within Germany's present frontiers was 119,000,000 tons, or 75 per cent of the developed mine capacity. The various groups of consumers shared in this production in the following way: Railroads, 21.7 per cent; gas works, 11.1 per cent; electric plants, 6.8 per cent; shipping, 3.8 per cent; industry, 43.5 per cent; domestic fuel, agriculture and sundries, 13 per cent. On the strength of these figures it is seen that the excess of developed mine capacity over consumption is from 30,000,000 to 35,000,000 tons per year. Reparation coal amounts to approximately 20,000,000 tons per year, which explains the strained condition of the German coal situation today.

The total reserve of coal remaining to Germany has been calculated as follows, in millions of metric tons:

Depth in meters	0–1,200	1,200–1,500	1,500–2,000
Total Germany	104,711	67,695	106,496
Ruhr District	71,391	56,061	95,667
Upper Silesia	26,685	5,646	9,140
Lower Silesia	1,546	543	855

Under existing conditions only the strata down to 1,200 m., or at the utmost those to 1,500 m., are of any practical value. The lower levels must be considered as a reserve for the remote future. It is most unfortunate for Germany that through the alienation of Polish Upper Silesia a large part of the best accessible reserves has been lost to the country. The Upper Silesian reserves down to 1,200 m. level were calculated at 170,000,000,000 tons as compared with 71,391,000,000 tons in the Ruhr District. Taking into consideration the levels down to 1,200 m. only, the reserves are 104,711,000,000 tons, or 0.015 per cent of the developed mine capacity.

A SPECIAL MEETING of the Board of Directors of the National Coal Association has been called by President Ogle at the Waldorf-Astoria Hotel, in New York, on Jan. 16. The finance committee of the association will meet just prior to the session of the board.

Purchasing Agents to Issue Chart Showing Coal Consumption, Stocks and Output

A chart which will be both a "business barometer" and at the same time show the production and consumption of coal by industrial concerns in the United States and Canada will soon be issued by the National Association of Purchasing Agents. "The biggest and most important matter ever undertaken by any association" is the way Mark Kuehn, chairman of the fuel committee of the association, describes it. The chart will show three principal lines: A line of consumption, a line showing the coal on hand, and a line of production, which will be furnished by the U. S. Geological Survey. Forms have been sent to every member of the association, upon which each will be asked to make reports showing the amount of coal on hand on the first day of the month, the coal consumed during the month and the coal on hand the last day of the month. These reports are to be treated as confidential, but a tabulation of all reports will be printed each month in the monthly magazine of the association, the *Purchaser*, and will be mailed to each member.

Mr. Kuehn says that the membership of the association buys approximately 80 per cent of all coal consumed for commercial purposes and feels that the committee is in a position to undertake the problem and have a chart that is reliable. The chart, he feels, will prove a dependable business barometer.

The stock line will show the average days of supply on hand from month to month, says Mr. Kuehn, and will be indicative of the future.

The production figures or line will be furnished by the U. S. Geological Survey and will show what the mines are doing and give full information regarding the production of coal.

The first chart will be printed in the January number of the *Purchaser* and will show the lines of production, consumption and stocks for the months of October, November and December, reflecting the trend of business for that period. Thereafter the chart will go to the members regularly each month with a month's data added.

The form on which the members of the association have been asked to report the amount of coal consumed by the industry they represent follows:

Confidential

THE NATIONAL ASSOCIATION OF PURCHASING AGENTS
REPORT OF COAL SUPPLY OCT. 1, 1922

Dear Sir:

This statement will be held strictly confidential, only aggregate totals will be disclosed. Please mail your statement at once if possible. Use estimated weights if exact tonnage cannot be given. Report only in *net tons*. Do *not* report in pounds.

Stock on hand Oct. 1, 1922 ..... net tons
Coal consumed during October ..... net tons
Stock on hand Oct. 31 ..... net tons
Coal consumed during November ..... net tons
Stock on hand Nov. 30 ..... net tons

.....
Name of Company.

.....
Name of P. A.

.....
City and State

This report mailed
.....
date

The fuel committee of the association has been active during the past year. Items of interest and data with definite information are regularly supplied from various sections of the United States and Canada by fuel counsellors, and furnished for the members through the *Purchaser*. The association took a leading part in the hand-to-mouth policy of buying coal adopted following the conference called by Secretary Hoover in Washington, thus augmenting the movement which the association already had under way.

Warriner Avers Shamokin and Mount Carmel Mines Are Working Full Time

Following a newspaper statement that miners are being deprived of the opportunity to work in the Shamokin and Mount Carmel districts of Pennsylvania, S. D. Warriner, president of the Lehigh Coal & Navigation Co. and chairman of the general policies committee of anthracite operators, sent the following letter to W. H. Woodin, State Fuel Administrator of New York:

"Any published accounts saying that miners are being deprived of the opportunity to work in the Shamokin and Mount Carmel districts, or in any other part of the Schuylkill region, are entirely untrue. Not only are the mines offering full time work but they are maintaining steady operation, in the Shamokin and Mount Carmel districts especially, under great difficulties due to the prolonged drought. Instead of keeping mines and miners idle, operators are hauling water in special tank trains from Sunbury to supply their boilers, this haul being from 20 to 30 miles, according to the situation of the mines.

"Published stories of great amounts of culm and 'dust' being sent out of the region are merely revivals of a hoary fabrication. For many years good coal has been reclaimed from culm banks, but there is less so recovered today than there was five years ago or four years ago, and the great bulk of it goes into steam consumption.

"Total coal shipments from the Schuylkill region—which includes the Shamokin and Mount Carmel districts—were a little more than 2,000,000 gross tons each in November. Of this total, almost 1,280,000 tons were domestic sizes. The remainder, a little less than 750,000 tons, comprised all the steam sizes shipped from that region, and this tonnage included more than 280,000 tons of buckwheat No. 1, available for domestic purposes when used in combination with larger sizes for steady burning or when used alone to bank household fires.

"Shipment figures to date for December indicate that output will be substantially the same as in November, so that the above figures on total tonnage and proportion of sizes apply to this month. For the entire anthracite territory, including Schuylkill, Lehigh and Wyoming regions, the percentage of domestic sizes shipped was 66 per cent. In November the domestic sizes were almost 68 per cent. For the region as a whole, therefore, the proportional shipments of small sizes are not increasing, but are showing a slight decrease.

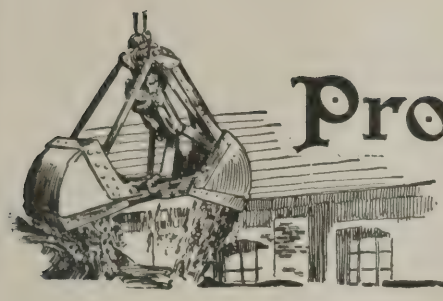
"In short, there is no idleness of mines in the Schuylkill region through causes within control of the operators; there is no shortage of coal cars on the railroads serving that region; and there is not, nor has there been, any substantial variation in the proportion of sizes shipped to market."

Lake Coal Loadings During Season of 1922*

(IN NET TONS)

Ports	Railroads	1922 Cargo	1922 Fuel	1922 Total	1921 Cargo	1921 Fuel	1921 Total	1920 Cargo	1920 Fuel	1920 Total
Toledo	Hocking Valley	3,241,786	92,597	3,334,383	4,426,687	116,157	4,542,833	3,93,269	93,095	4,023,364
	Toledo & Ohio Central	860,814	27,965	888,779	1,106,251	32,319	1,138,570	1,729,894	65,695	1,795,589
	Baltimore & Ohio	2,912,587	77,864	2,990,451	2,561,015	78,085	2,639,100	1,619,875	44,804	1,664,679
Sandusky	Pennsylvania	2,794,264	99,730	2,893,994	1,853,148	52,138	1,905,286	1,604,305	26,542	1,630,847
Huron	Wheeling & Lake Erie	430,222	17,587	447,809	1,577,500	45,468	1,622,968	1,864,527	93,919	1,958,446
Lorain	Baltimore & Ohio	1,836,014	91,529	1,927,543	2,546,216	103,113	2,649,329	3,276,539	211,643	3,488,182
Cleveland	Pennsylvania	1,056,464	93,239	1,149,703	2,062,722	91,910	2,154,632	1,221,955	180,335	1,402,290
	Erie	381,903	14,464	396,367	359,981	12,782	372,763	437,653	19,234	456,887
Fairport	Baltimore & Ohio									
Ashtabula	New York Central	1,515,608	88,464	1,604,072	1,125,792	62,214	1,188,006	1,641,732	274,396	1,916,128
	Penhsylvania	1,674,618	90,038	1,764,656	2,300,210	78,097	2,378,307	1,942,021	101,706	2,043,727
Conneaut	Bessemer; Lake Erie	1,618,192	63,317	1,681,509	1,474,202	20,603	1,494,805	2,405,884	41,076	2,446,960
Erie	Pennsylvania	199,670	72,387	272,057	1,018,656	66,183	1,084,839	733,701	106,338	840,039
Totals		18,522,142	829,181	19,351,323	22,412,380	759,069	23,171,449	22,408,355	1,258,783	23,667,138

*Compiled by Ore & Coal Exchange, Cleveland Ohio; H. M. Griggs, Manager.



Production and the Market



Weekly Review

Holiday business has been surprising in its volume and coupled with the usual idleness of the men and the meager car supply has firmed up all prices. *Coal Age* Index of spot bituminous-coal prices stood at 369 on Jan. 2, as compared with 349 in the preceding week. This is the third consecutive week in which the index number has advanced, and prices have rallied to the level of Oct. 18, 1922. The average spot price, f.o.b. mines, corresponding to this week's index is $4.47; last week it was $4.23.

The holiday lull in production enabled the railroads to make inroads on their line congestion but empties are still very slow in returning to the mining fields. While the volume of demand did not increase last week, it was more apparent than ever because of reduced offerings and shows the urgency of the hand-to-mouth purchasing that has been the rule for so long. It is evident that reserves are so low that they do not permit the least relaxation of current purchases.

Only Steam Prices Rose in Middle West

The market ranges from comparative quiet in the Middle West to feverish activity in the North Atlantic section, although New England has not yet felt the urge to buy heavily at the high ruling quotations. Strangely enough, the steam coals were the only ones to increase in price last week in the Middle West, in spite of the fact that the domestic season is at its height and retail supplies far from topheavy.

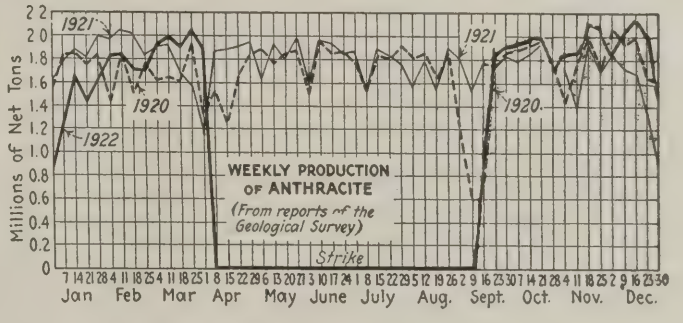
The Pittsburgh and Cincinnati markets are very firm. Smaller industries are actively seeking tonnage and iron and steel buying is improving. The eastern Ohio field is furnishing over 50 per cent of its output to the railroads and has little free coal to offer. Ohio coal is substituting for anthracite and Pocahontas, the latter being almost unobtainable.

Softer weather has eased the tension in the Northwest. Bituminous coal on the docks is largely under contract, but all-rail offerings are comfortably heavy. The market is basically weak and the weather determines the day-to-day demand.

Light receipts, steady industrial demand and the growing need of screened soft coal to offset the anthracite shortage has done the trick in the East. The market is tight all around, quality coals are no longer quoted and mediocre grades are eagerly sought. Those who must have immediate tonnage are fast bringing a bidders' market for the coal that is rolling.

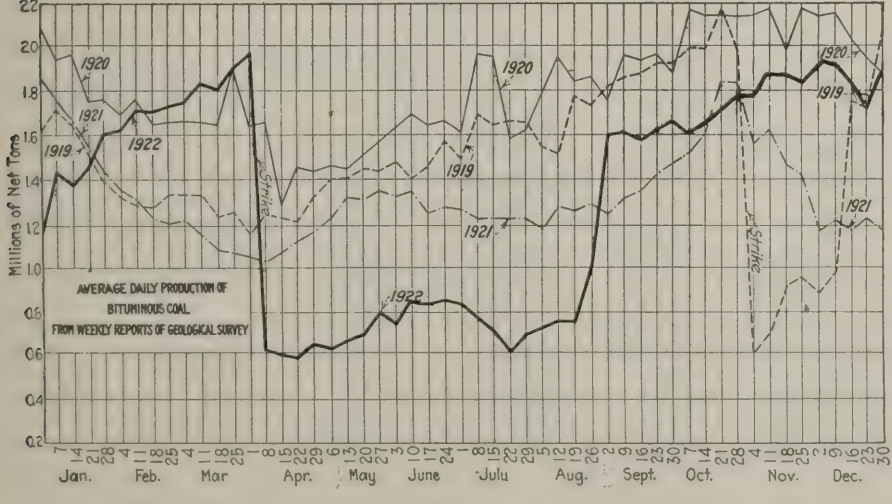
New England Reflects Conditions

The conditions are reflected in New England. Both coastwise and all-rail shippers have raised their prices but purchases are kept down by the reserves in hand.



The shortage of anthracite really determines the market; gas screened coals move at fancy figures and this excellent demand has reduced the available supply for industrial consumption.

Famine conditions in the anthracite market have put a heavy burden on the retailer. Practically every dealer has had some trouble in distributing receipts but



Estimates of Production

(Net Tons)

	1921	1922
BITUMINOUS		
Dec. 9	7,312,000	11,495,000
Dec. 16 (*b*)	7,063,000	10,666,000
Dec. 23 (*a*)	7,450,000	10,031,000
Daily average	1,242,000	1,672,000
Calendar year	399,111,000	397,631,000
Daily av. cal. yr.	1,329,000	1,318,000
ANTHRACITE		
Dec. 9	1,675,000	2,038,000
Dec. 16	1,637,000	2,197,000
Dec. 23	1,316,000	1,976,000
Calendar year	89,806,000	50,872,000
COKE		
Dec. 16 (*b*)	126,000	298,000
Dec. 23 (*a*)	117,000	280,000
Calendar year	5,403,000	7,769,000

(*a*) Subject to revision. (*b*) Revised from last report.

mainly because the coal is scattered in small lots. Substitute fuels are also scarce and high priced.

Independent operators obtain large premiums for quick shipments of family sizes. Little of this costly tonnage finds its way to the larger Eastern centers, however, as retailers hesitate to pass such figures along to the consumer. Steam coals are in good demand and there is no surplus tonnage. Prices have rallied to the level of company quotations.

BITUMINOUS

"The production of bituminous coal continued to decline in the week ended Dec. 23," says the weekly report of the Geological Survey. "The total estimated output, including coal coked at the mines, mine fuel and local sales, was 10,031,000 net tons. Increased traffic difficulties and interruptions caused by the occurrence of certain church holidays were largely responsible for the decrease.

"Preliminary reports of cars loaded during the first four days of last week (Dec. 25-30) indicate that production virtually ceased on Christmas Day. It is expected that the probable output will be between 10,500,000 and 10,700,000 net tons. Thus while the total output during Christmas week will be considerably less than that in the week before, the average daily rate of production moved upward considerably because of the less number of working days.

"The estimated cumulative production of bituminous coal during 1922 to Dec. 23 stood at 397,631,000 tons. Production during the first 301 working days of the past six years has been as follows, in net tons:

1917	530,535,000	1920	543,199,000
1918	571,530,000	1921	399,111,000
1919	446,650,000	1922	397,631,000

"Thus it is seen that from the viewpoint of bituminous coal production 1922 is 0.4 per cent behind 1921, 26.8 per cent behind 1920, 11 per cent behind 1919, 30.4 per cent behind 1918, and 25 per cent behind 1917.

"Receipts of coal in New England, according to reports from the Massachusetts Special Commission on Necessaries of Life, during the month of November were as follows:

	Tide (net tons)	Rail (net tons)	Total (net tons)
Anthracite	345,000	650,000	995,000
Bituminous	1,095,000	684,000	1,779,000

"Total receipts of anthracite for the first eleven months of 1922 were 5,470,000 tons, and of bituminous coal, 17,078,000 tons. During the corresponding period in 1921, total receipts were 10,520,000 and 15,716,000 tons of anthracite

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Jan. 2, 1922	Dec. 18, 1922	Dec. 26, 1922	Jan. 2, 1923†
Smokeless lump	Columbus	$3.55	$6.30	$6.30	$6.75@$7.75
Smokeless mine run	Columbus	2.15	6.00	6.00	6.50@ 6.75
Smokeless screenings	Columbus	1.65	5.50	5.50	5.25@ 6.25
Smokeless lump	Chicago	3.10	7.75	7.75	7.50@ 8.00
Smokeless mine run	Chicago	2.50	6.60	6.60	6.50@ 6.75
Smokeless lump	Cincinnati	3.25	7.00	6.75	6.00@ 8.00
Smokeless mine run	Cincinnati	2.05	5.80	6.25	6.00@ 6.50
Smokeless screenings	Cincinnati	1.55	5.30	6.10	6.00@ 6.50
*Smokeless mine run	Boston	4.70	7.85	8.60	8.50@ 8.75
Clearfield mine run	Boston	2.05	4.15	4.25	4.75@ 5.50
Cambria mine run	Boston	2.50	4.55	4.80	5.00@ 6.00
Somerset mine run	Boston	1.80	4.10	4.40	5.00@ 5.75
Pool 1 (Navy Standard)	New York	3.15	5.75	6 25	
Pool 1 (Navy Standard)	Philadelphia	3.00	5.35	5.50	5.50@ 6.10
Pool 1 (Navy Standard)	Baltimore	2.40	5.75	6.00	6.50@ 7.00
Pool 9 (Super. Low Vol.)	New York	2.35	5.15	5.35	5.50@ 6.00
Pool 9 (Super. Low Vol.)	Philadelphia	2.30	4.85	5.30	5.35@ 5.75
Pool 9 (Super. Low Vol.)	Baltimore	2.20	5.05	5.10	5.50@ 6.00
Pool 10 (H.Gr.Low Vol.)	New York	2.10	4.50	5.10	5.50@ 6.00
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.00	4.15	4.85	5.00@ 5.25
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.00	4.55	4.60	*4.25@ 4.75*
Pool 11 (Low Vol.)	New York	1.65	3.50	4.15	4.00@ 5.00
Pool 11 (Low Vol.)	Philadelphia	1.70	3.55	4.45	4.65@ 4.90
Pool 11 (Low Vol.)	Baltimore	1.75	4.10	4.10	4.25@ 4.50
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	3.20	3.55	
Pool 54-64 (Gas and St.)	Philadelphia	1.55	3.35		4.00@ 4.25
Pool 54-64 (Gas and St.)	Baltimore	1.45	3.85	3.85	3.75@ 4.00
Pittsburgh so'd gas	Pittsburgh	2.65	5.25	5.25	5.00@ 5.50
Pittsburgh mine run (St.)	Pittsburgh	2.15	2.60	3.10	3.00@ 3.50
Pittsburgh slack (Gas)	Pittsburgh	1.80	3.25	3.00	3.00@ 3.50
Kanawha lump	Columbus	2.80	5.35	5.25	5.50@ 6.00
Kanawha mine run	Columbus	1.85	3.00	3.10	3.25@ 3.50
Kanawha screenings	Columbus	1.40	2.80	2.85	3.00@ 3.25
W. Va. lump	Cincinnati	2.75	6.25	6.25	6.00@ 7.00
W. Va. Gas mine run	Cincinnati	1.45	3.35	3.75	3.50@ 4.00
W. Va. Steam mine run	Cincinnati		3.10	3.35	3.50@ 3.75
W. Va. screenings	Cincinnati	1.25	3.00	3.10	3.25@ 3.50
Hocking lump	Columbus	3.00	5.15	5.25	5.00@ 5.50
Hocking mine run	Columbus	1.90	2.60	2.85	3.00@ 3.25
Hocking screenings	Columbus	1.40	2.55	2.60	2.75@ 3.00
Pitts. No. 8 lump	Cleveland	3.05	4.35	4.75	4.75@ 5.50
Pitts. No. 8 mine run	Cleveland	2.00	3.20	3.25	3.40@3.50
Pitts. No. 8 screenings	Cleveland	1.95	3.05	3.10	3.25@ 3.35
Midwest					
Franklin, Ill. lump	Chicago	3.80	5.25	5.35	5.25@ 5.50
Franklin, Ill. mine run	Chicago	2.90	4.10	4.10	4.00@ 4.25
Franklin, Ill. screenings	Chicago	2.10	2.70	3.10	2.75@ 3.50
Central, Ill. lump	Chicago	3.10	4.25	4.35	4.25@ 4.50
Central, Ill. mine run	Chicago	2.50	3.10	3.10	3.00@ 3.25
Central, Ill. screenings	Chicago	1.90	2.00	2.20	2.25@ 2.40
Ind. 4th Vein lump	Chicago	3.35	5.10	5.10	5.00@ 5.25
Ind. 4th Vein mine run	Chicago	2.55	3.85	3.85	3.75@ 4.00
Ind. 4th Vein screenings	Chicago	2.10	2.25	2.35	2.50@ 2.75
Ind. 5th Vein lump	Chicago	2.95	4.75	4.75	4.50@ 5.00
Ind. 5th Vein mine run	Chicago	2.25	3.60	3.60	3.50@ 3.75
Ind. 5th Vein screenings	Chicago	1.80	1.95	2.35	2.25@ 2.50
Standard lump	St. Louis	2.60	4.10	4.25	*3.75@ 4.00*
Standard mine run	St. Louis	1.85	2.10	2.10	2.35@ 2.50
Standard screenings	St. Louis	1.65	1.35	1.50	1.50
West Ky. lump	Louisville	2.85	3.85	4.35	4.25@ 4.50
West Ky. mine run	Louisville	1.90	2.25	3.35	*2.50@ 3.00*
West Ky. screenings	Louisville	1.65	1.80	2.50	*2.00@ 2.25*
West Ky. lump	Chicago		3.85	4.25	4.00@ 4.50
West Ky. mine run	Chicago			2.60	2.75 2.50@ 3.00
South and Southwest					
Big Seam lump	Birmingham	3.35	3.95	3.95	3.45@ 4.45
Big Seam mine run	Birmingham	2.10	2.35	2.60	2.50@ 2.75
Big Seam (washed)	Birmingham	2.15	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago		6.25	6.25	6.00@ 6.50
S. E. Ky. mine run	Chicago		3.85	3.85	3.75@ 4.00
S. E. Ky. lump	Louisville	2.85	6.35	6.75	*6.25@ 7.00*
S. E. Ky. mine run	Louisville	1.60	3.35	3.50	3.25@ 3.75
S. E. Ky. screenings	Louisville	1.30	3.25	3.10	3.00@ 3.40
S. E. Ky. lump	Cincinnati	3.00	5.85	6.50	6.00@ 7.00
S. E. Ky. mine run	Cincinnati	1.50	3.15	3.35	3.25@ 3.75
S. E. Ky. screenings	Cincinnati	1.20	2.75	3.25	3.00@ 3.50
Kansas lump	Kansas City	5.00	5.25	5.50	5.50
Kansas mine run	Kansas City	4.10	3.60	3.75	3.75
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

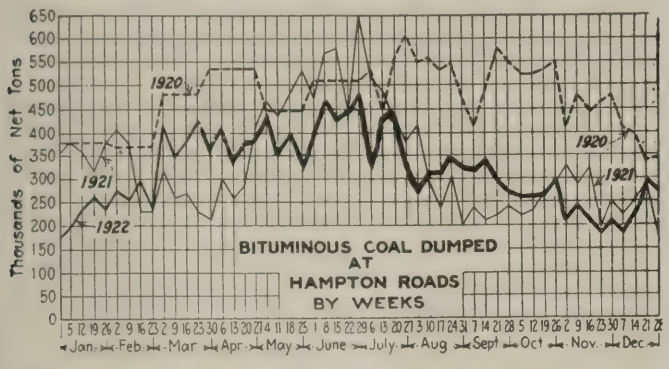
Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	Dec. 26, 1922 Independent	Dec. 26, 1922 Company	Jan. 2, 1923† Independent	Jan. 2, 1923† Company
Broken	New York	$2.34		$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85		7.90@ 8.10		7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.50@13.00	7.20@ 8.25	12.50@13.00	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.50@13.00	7.35@ 8.25	12.50@13.00	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.50@13.00	7.35@ 8.35	12.50@13.00	7.35@ 8.35
Ranges	New York	2.34				8.25		8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.00@11.00	6.15@ 6.30	7.00@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 8.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.00@ 5.00	4.00@ 4.10	4.00@ 5.50	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00	4.00	5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	3.00@ 3.25	2.75@ 3.00	3.00@ 3.50	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.50@ 2.75	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.75@ 2.00	1.50@ 2.00	1.75@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.00@ 1.75	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22		2.00@ 2.50		2.10		2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.

and bituminous respectively. Thus it is seen that during the present year to Dec. 1, total receipts of all coal—anthracite and bituminous—was 3,688,000 tons, or 14 per cent less than in 1921."

Hampton Roads dumpings were 277,312 net tons during the week ended Dec. 28, as compared with 300,552 tons dur-



ing the preceding week. Total dumpings for the year were approximately 14,900,000 tons, as compared with 1921 figure of 17,500,000 tons.

During December 376,050 net tons of soft coal and 97,000 tons of anthracite passed through the "Soo." This brought the season's movement of bituminous coal to 8,790,571 tons and anthracite to 670,447 tons. During 1921 the "Soo" movements totaled 12,507,027 and 2,256,128 tons respectively.

Notwithstanding the coal strike, up to Dec. 16 the railroads reported loadings of 7,093,638 cars of coal during the year, as compared with 7,734,627 cars during the corresponding period of 1921 and 9,731,796 cars in 1920.

ANTHRACITE

Production of anthracite declined to 1,976,000 net tons during the week ended Dec. 23, largely due to ceasing work on Christmas eve and the occurrence of certain church holidays. In comparison with the preceding week's output this was a decrease of 221,000 tons, or 10 per cent. Early returns for last week showed that no coal was loaded on Christmas Day and that even on Tuesday, Dec. 26, loadings were but a fraction of normal. It is not likely that the output for the week will exceed 1,500,000 tons. The cumulative output during 1922 to Dec. 23 is 50,872,000, or 38,934,000 tons less than during the corresponding period of 1921.

Anthracite domestic sizes are being distributed as fast as they are received and dealers are swamped with orders. Substitute domestic fuels are relieving the situation, but these, too, are in short supply.

COKE

Production of beehive coke declined to 280,000 net tons during the week ended Dec. 23, as compared with 298,000 tons in the previous week. The decline was general in all coke-producing districts except Colorado and New Mexico.

The Christmas celebrations reduced Connellsville production just at a time when the coke market was very active. The emergency domestic demand upset the boat just when blast furnaces were negotiating first-quarter contracts, and prices offered because of the need for coke as a substitute for anthracite places coke out of reach of regular users. Blast furnaces now say they will be forced to bank or blow out unless lower prices are realized soon. Operators, however, are not inclined to put on more ovens to increase the output, as the longer hauls involved would adversely affect the already poor car supply.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Dec. 16, 1922	888,082	198,510
Previous week	919,828	200,505
Same week in 1921	726,074	134,789

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Dec. 15, 1922	7,677	.....	105,018	41,200
Dec. 8, 1922	6,657	.....	111,961	37,613
Same date in 1921	370,000	180,000	.....	.....



Coal Age Index 369, Week of Jan. 2, 1923. Average spot price for same period, $4.47. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Six Months July to Dec. 1921	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 16, 1922 Inclusive	Week Ended Dec. 16, 1922
U. S. Total	45.6	55.7	....	....
Alabama	63.5	64.6	84.4	(a)
Somerset County	55.5	74.9	36.6	42.5
Panhandle, W. Va.	55.3	51.3	57.0	57.8
Westmoreland	54.9	58.8	67.9	56.9
Virginia	54.8	59.9	56.3	49.4
Harlan	53.3	54.8	21.7	24.9
Hazard	51.7	58.4	16.6	15.1
Pocahontas	49.8	60.0	36.5	35.8
Tug River	48.1	63.7	27.5	31.0
Logan	47.6	61.1	25.5	23.5
Cumberland-Piedmont	46.6	50.6	32.3	30.8
Winding Gulf	45.7	64.3	30.5	28.2
Kenova-Thacker	38.2	54.3	42.5	48.2
N. E. Kentucky	32.9	47.7	27.8	27.3
New River	24.3	37.9	31.1	30.1
Oklahoma	63.9	59.6	61.2	38.8
Iowa	57.4	78.4	73.7	77.9
Ohio, Eastern	52.6	46.6	41.5	30.5
Missouri	50.7	66.8	74.4	77.6
Illinois	44.8	54.5	49.9	49.5
Kansas	42.0	54.9	54.1	55.8
Indiana	41.4	53.8	37.7	(a)
Pittsburgh†	41.2	39.8	42.1	(a)
Central Pennsylvania	39.1	50.2	54.4	42.1
Fairmont	35.3	44.0	34.4	38.8
Western Kentucky	32.5	37.7	32.4	27.6
Pittsburgh*	30.4	31.9	56.5	(a)
Kanawha	26.0	13.0	15.3	15.8
Ohio, southern	22.9	24.3	38.1	35.0

* Rail and river mines combined.
† Rail mines.
(a) No report.

Foreign Market And Export News

Great Britain Ends Year with Maximum Production and Growing Demand

Great Britain is ending the year with maximum production. The output during the week ended Dec. 16 was 5,738,000 gross tons, according to a cable to *Coal Age*, exceeding any week since 1913 and compared with 5,592,000 tons during the week ended Dec. 9.

Severe weather during the past week has increased shipping congestion and price concessions are being made to relieve the situation. A South American railway has placed orders for nearly 250,000 tons of second Admiralty at 26s. and for best Monmouthshire at 25s.@25s. 6d.

According to the Board of Trade returns exports of coal during November totaled 6,570,578 tons. In the last eleven months the quantity of coal exported was 58,243,742 tons, compared with 20,351,390 and 22,629,777 tons respectively in the corresponding periods of 1921, and 1920.

Numerous contract inquiries are circulating from France, South America, and other directions over the coming year. The market in Northumberland and Durham is very stable but there is not enough coal to go around. Among the inquiries are the following: The Norwegian State Railways, 35,000 tons of best steam coals for shipment during the next two months; the Frederickshaven Gasworks, 2,000 tons of Durham gas coals; the Aalborg Gasworks, 2,000 tons to be shipped during January; the Soviet Government, 150,000 tons of Northumberland steam coal for deliveries monthly during next season, and the Esthonian State Railways 10,000 tons of steam coals for shipment.

Supplies Gain at Hampton Roads

Little change from the dullness of the past two months was apparent at the end of the year. Total dumpings were approximately 14,900,000 tons, against approximately 17,500,000 tons for the previous year.

Car shortage continued the chief factor in the situation, with stocks somewhat increased after the holiday let-up in output. Demand had fallen off somewhat, with a consequent reduction in prices.

German Production Is Inadequate

The Prussian State has just published its report on coal mining for the first nine months of the current year. As 96 per cent of Germany's production of bituminous coal falls to the share of Prussia, the report permits a comprehensive survey of German coal mining.

GERMAN COAL PRODUCTION

	First Quarter	Second Quarter	Third Quarter
Ruhr	23,958,226	21,899,931	23,594,753
Upper Silesia	2,197,640	2,080,057	2,237,917
Lower Silesia	1,356,251	1,304,753	1,421,158
Bonn	1,568,685	1,407,375	1,491,776
All others	138,188	131,911	145,502
Total	29,218,990	26,824,027	28,891,106

The figures for Upper Silesia do not include the output of the detached part of the province prior to its division, which was 12,577,905 tons. Germany's coal resources are in the main situated near the frontiers. This is of special interest in view of the threatened occupation of the Ruhr district.

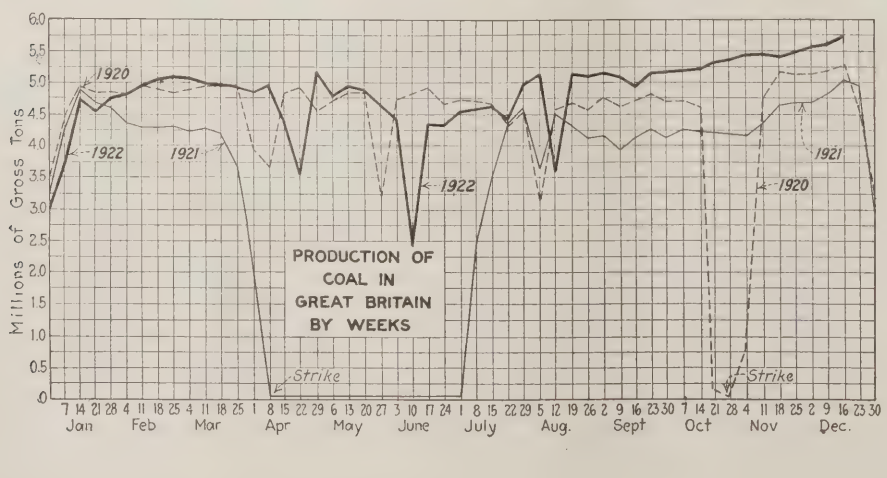
Production in Upper Silesia was 775,371 tons in November as compared with 812,685 tons in October.

English coal shipments to Germany have been falling off during the last 60 days, although up to the autumn months the total imports had grown by leaps and bounds.

BRITISH COAL IMPORTS IN GERMANY

	Tons
January	247,300
February	359,900
March	467,700
April	256,600
May	601,500
June	889,600
July	1,133,400
August	1,165,200
September	1,060,800
October	918,600

At the allied conference the French have asked that an allied or French commission be set up at certain points in the Ruhr to control delivery of the amount of coal ordered by the Reparation Commission. Also that a tax be established on coal in the Ruhr district, under an allied or French commission. One-quarter of this tax to be payable in foreign currency, and it is estimated that 400,000,000 gold marks a year can be collected.



Hampton Roads Pier Situation

	Week Ended Dec. 21	Week Ended Dec. 28
N. & W. Piers, Lamberts Pt.:		
Cars on hand	638	958
Tons on hand	40,185	65,709
Tons dumped	112,801	110,429
Tonnage waiting	17,350	8,850
Virginian Ry. Piers—Sewalls Pt.:		
Cars on hand	814	921
Tons on hand	46,600	51,050
Tons dumped	96,078	74,072
Tonnage waiting	23,301	15,000
C. & O. Piers, Newport News:		
Cars on hand	619	1,144
Tons on hand	35,000	67,750
Tons dumped	59,471	63,108
Tonnage waiting	3,320	2,718

U. S. Exports During November

November exports were 440,208 tons of anthracite and 1,618,037 tons of soft coal as compared with 329,380 and 1,078,806 tons respectively in November, 1921. For the eleven months this year there were 1,983,429 tons of anthracite and 9,614,195 tons of bituminous coal exported as compared with 1921 figures of 3,869,944 and 19,822,735 tons respectively.

Pier and Bunker Prices, Gross Tons

PIERS

	Dec. 23	Dec. 30†
Pool 9, New York	$8.50@$8.75	
Pool 10, New York	7.50@ 8.00	$8.75@$9.25
Pool 11, New York	7.00@ 7.50	8.15@ 8.50
Pool, 9, Philadelphia	8.10@ 8.30	8.35@ 8.50
Pool 10, Philadelphia	7.60@ 7.80	7.90@ 8.00
Pool 11, Philadelphia	7.00@ 7.25	7.25@ 8.50
Pool 1, Hamp. Roads	8.25@ 8.50	*7.50@ 8.80*
Pools 5-6-7 Hamp. Rds.	8.25	*7.25@ 8.00*
Pool 2, Hamp. Rds.	8.25@ 8.50	*7.50@ 8.00*

BUNKERS

Pool 9, New York	$8.90@$9.15	
Pool 10, New York	7.90@ 8.40	$9.00@$9.50
Pool 11, New York	7.40@ 7.90	8.40@ 8.75
Pool 9, Philadelphia	8.35@ 8.65	8.60@ 8.90
Pool 10, Philadelphia	8.00@ 8.25	8.30@ 8.50
Pool 11, Philadelphia	7.15@ 7.50	7.50@ 7.75
Pool 1, Hamp. Rds.	8.25@ 8.50	*7.50@ 8.00*
Pool 2, Hamp. Rds.	8.25@ 8.50	*7.50@ 8.00*
Welsh, Gibraltar	38s. f.o.b.	38s. f.o.b.
Welsh, Rio de Janeiro	57s. 6d. f.o.b.	57s. 6d. f.o.b.
Welsh, Lisbon	50s. f.o.b.	50s. f.o.b.
Welsh, La Plata	50s. f.o.b.	50s. f.o.b.
Welsh, Genoa	42s. t.i.b.	42s. t.i.b.
Welsh, Algiers	38s. f.o.b.	38s. f.o.b.
Welsh, Pernambuco	65s. f.o.b.	65s. f.o.b.
Welsh, Bahia	65s. f.o.b.	65s. f.o.b.
Welsh, Madeira	40s. 6d. f.a.s.	40s. 6d. f.a.s.
Welsh, Teneriffe	38s. 6d. f.a.s.	38s. 6d. f.a.s.
Welsh, Malta	41s. f.o.b.	41s. f.o.b.
Welsh, Las Palmas	38s. 6d. f.a.s.	38s. 6d. f.a.s.
Welsh, Naples	39s. 3d. f.o.b.	39s. 3d. f.o.b.
Welsh, Rosario	52s. 6d. f.o.b.	52s. 6d. f.o.b.
Welsh, Singapore	50s. t.i.b.	50s. t.i.b.
Welsh, Constantinople	50s. f.o.b.	50s. f.o.b.
Welsh, St. Michaels	50s. t.i.b.	50s. t.i.b.
Welsh, Port Said	49s. f.o.b.	49s. f.o.b.
Welsh, Oran	38s. f.o.b.	38s. f.o.b.
Welsh, Fayal	50s. t.i.b.	50s. t.i.b.
Welsh, Dakar	42s. 6d. f.o.b.	42s. 6d. f.o.b.
Welsh, St. Vincent	42s. f.a.s.	42s. f.a.s.
Welsh, Montevideo	50s. f.o.b.	50s. f.o.b.
Welsh, Alexandria	42s. f.o.b.	42s. f.o.b.

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations by Cable to *Coal Age*

Cardiff:	Dec. 23	Dec. 30†
Admiralty, large	28s.@29s.	*28s.@28s.6d.*
Steam, smalls	17s.6d.@18s.	**18s.@19s.**
Newcastle:		
Best steams	25s.	25s.
Best gas	24s.@24s.6d.	**25s.**
Best bunkers	22s.@23s.	22s.@23s.

† Advances over previous week shown in heavy type; declines in *italics*.

North Atlantic

Events Combine to Boost Market on All Coals

Though Prices Rise Rapidly, Little Free Tonnage Is in Sight—Bidding Now Common—Best Grades Disappear—Domestic Demand Out of Bounds.

Curtailed holiday production, insufficient car supply and inclement weather have boosted the market on all coals. Although prices have increased rapidly in the last two weeks there is very little free tonnage to be had and those who must have an immediate supply are bidding for the coal that is rolling.

Mediocre coals are now eagerly sought, as the best grades are practically unobtainable and reserves at the smaller industries are evidently approaching the danger line. The domestic demand has grown out of bounds and has further cut into the available spot supply. Shippers are securing fancy prices for screened coal that is on wheels.

BALTIMORE

Industrial demand has increased to such an extent that the meager supply is very inadequate. The car supply is wretched, and even the lightened production due to Christmas and New Year holidays could not be taken care of by the number of empties received.

Prices kept mounting and even mediocre coals were quickly absorbed around $4 and better. The greatest trouble with traffic at present seems to be the widely scattered distribution of coal cars and the inability of the railroads to get quick unloading and dispatch.

The export situation continues a closed book. A review of the industrial situation in Maryland shows that while a few of the larger industries have fair supplies ahead that others of important nature are now at the danger line. In an effort to prevent any industrial stagnation, some of the coal men are using their discretion about handling in full some of their contract calls and giving a little of the coal to emergency cases.

NEW YORK

Very little spot coal is being offered. While reports show the cars at the local terminals to be steadily increasing it is known that most of the coal is on order and that the free coals consist mostly of Pool 11. Quotations are increasing rapidly, most grades showing advances of $1.50@$2 from those of about two weeks back.

Demand is stronger but there is no flood of orders. Inquiries have increased probably because of the continued car shortage which is as bad as it was before the Christmas holiday. Public utility corporations are now in the market and several railroads are buying high-volatiles around $3.50.

The use of bituminous coal as a substitute for anthracite has aided in keeping down the supply at the local terminals. Screened bituminous has grown into such favor that the supply cannot meet the demand. Some operators are refusing orders until they get caught up.

Coke is in good demand. Some houses are booked so far ahead that new orders are being refused for the present. Quotations for 48-hr. run of oven, low-sulphur, range from $8.50 without car numbers to $9.50 with car numbers supplied; prepared coke is being quoted around $12.50 at ovens.

There were about 2,679 cars at the local piers on Dec. 29, as against 2,465 cars the previous day.

High-volatile coals, including Pool 4, were quoted around $4.85 f.o.b. mine; slack, $3.75@$4; ¾-in. lump, $5@$5.50. Other quotations heard late in the week included Pool 14 at $8.25@$8.50, f.o.b. local piers.

CENTRAL PENNSYLVANIA

Slight improvement is noted in the car supply. On the Cresson division of the Pennsylvania there was a 30 per cent distribution on several days last week, due, it is said, to the fact that the railroads are pretty well stocked, thus releasing cars for commercial purposes. Conditions are reported worse along the New York Central lines. On the Pittsburgh, Rochester & Buffalo road there is still a 100-per cent distribution. However, this line does not reach much of this field.

Production shows but little variance from November. Up to and including Dec. 21, the production was 54,910 carloads as compared with 55,303 cars for the corresponding period of November. Prices are advancing and are higher now than at any time during the fall and winter.

PHILADELPHIA

The holiday season has had the effect, as usual, of curtailing production, and this combined with the indifferent car supply, has made it a difficult matter to anywhere near meet the demands of the consumer. With winter just beginning it looks as though the consumer without heavy reserve stocks is going to find it difficult to have his needs cared for. The promise of betterment in the immediate future is not encouraging, as no sooner are the regular holidays over, when the celebration begins all over again on Jan. 8 with the Greek Christmas.

Prices have again gone upward, but as there is so very little tonnage to be had it really doesn't mean a great deal, as most consumers are being supplied by their shippers on contracts or on block orders placed a long while ago. In many instances the consumer who is seriously short simply makes new offers in his desperation for fuel, and most spot sales recently at high prices have been for coal which was rolling.

Those concerns with good grades of coal who have been making a bid for a domestic market for their fuel are receiving added encouragement from their customers, who state they have developed many users who expect to continue the use of soft coal. The only drawback at present is the slow movement of coal on order.

FAIRMONT

Cars are more plentiful than in the high-volatile fields. Many of the mines, however, especially those loading commercial fuel are not getting as much as a 30-per cent supply of empties. The Western Maryland is furnishing more cars proportionately than is the B. & O. The Christmas holiday intervened to curtail production somewhat. Prices are advancing in response to a heavier demand.

UPPER POTOMAC

The advent of the holiday period found mines in the Upper Potomac and Georges Creek regions producing coal on a somewhat larger scale than had been possible earlier in December. The improvement was especially marked in the Upper Potomac region. With the demand in the East attaining larger proportions, prices are on a somewhat higher level.

West

SALT LAKE CITY

Retailers are doing a good business, but operators report things as quiet. Prices remain firm, except for nut coal. More "charity" coal was sold during the holiday season, according to one prominent dealer. On the other hand another leading firm said fewer persons had bought coal for presents this year than for a long time. The labor and car situations continue satisfactory.

DENVER

Transportation has grown a little easier in Colorado and the softness of the weather has slowed down the market so that plenty of coal is reaching everybody who wants it, with prices steady as follows: Walsenburg lump, $6; nut, $5.50; Trinidad lump, $5.50; nut, $5.25; Canon City lump, $6.50; nut, $6. Production is a little better but the state's total for the week was only about 56 per cent, which is from 10 to 15 per cent less than the running time of all the surrounding coal states.

KANSAS CITY

With a slightly strengthened market as a result of the recent clearing of mine tracks of no-bills and a consequent diminution of supply, coal men of this district are feeling the pinch of weakened transportation. Kansas mines are operating from 40 to 45 per cent of normal time, and Arkansas mines, the products of which must be moved a greater distance, only 25 per cent of normal. Unseasonably, warm weather so far has kept the situation from becoming extremely serious.

Quotations on Kansas coal are: Lump, $5.50; nut, $5; mine run, $3.75; screenings, $2.50. Arkansas coal is quoted at $6 for lump; $4 for mine run, and $2 for slack.

Anthracite

Retailer Heavily Burdened As Icy Temperature Appears

Distribution of Small Lots Covers Wide Area — Substitute Supply Low — Storms and Poor Car Supply and Motive Power Hamper Delivery.

The advent of severe weather has placed a heavy burden on the retailer. Receipts of anthracite have been sufficient to keep the yards working at top speed mainly because the small-lot distribution has been spread over an unusually wide area. The supply of substitute fuel is running down, as cars are scarce in the soft-coal fields and deliveries are hampered by storms and poor motive power.

Independent producers are securing their own figures for prompt business, although the East is taking but little of the higher-priced coal. All steam sizes move easily and buckwheat commands a premium. Washery product sells at very little price concession.

BALTIMORE

The last days of the old year brought a better run of anthracite to Baltimore, just when the majority of yards were completely out of coal and hundreds of householders were clamoring for new supplies. Some relief also came through the arrival of coke.

In order to speed the deliveries, the Police Department lifted the ban against deliveries on Sunday. The better arrivals of anthracite in the past few days will probably give the "coal politicians" another chance to give out a story to the daily press of Baltimore telling "what we did." This entire situation is one of the few points of comedy in the fuel supply situation in the minds of people who really understand the coal trade. Because of light call at city stations established to sell fuel to the poor it has been practically decided to abandon this means of relief.

NEW YORK

The local situation is serious. There is little domestic coal to be had and the supply of substitutes is growing less. Cold weather has resulted in a greater demand which the dealers are not able to meet. Domestic coals, including pea size, arriving here disappear almost as rapidly as they are received.

The peddler pool coal stations provided by the State Fuel Administration are doing a better business than when first established. A couple of thousand consumers living in the lower section of Manhattan who had bins large enough to hold a half-ton were enabled to secure that quantity early last week through the co-operation of the Fuel Administration and one of the large retail dealers.

Cashiers' checks are being offered by buyers in the mining fields for quick shipments, according to information received here. Not much of the high-priced domestic coals of the smaller independent operators are being brought here.

Pea is as short as the larger sizes. Offers of washery pea coal at around $13.50, alongside this harbor, were reported late in the week, while fresh-mined pea was quoted at $14.75, alongside.

Buckwheat has gained much strength. The surplus has been cleaned up and is growing scarcer. The better grades of independent product are going at a premium over company schedules. Rice and barley are holding firm. Current prices are quoted in the Weekly Review.

BUFFALO

The hard-coal trade is just now facing a big snow storm and it sets people to teasing for coal as they have not done in the time just passed when there was not much snow and only cool weather. Dealers do not really believe anyone is suffering for want of fuel, but there is at least much inconvenience and it is going to last till the worst of the winter is over. It is useless to expect more than that. The consumption equals the mining.

The independent shipper rubs his hands over the advance from $9.50 to $14.50 and is pleased to know that the consumer who would not pay the smaller price is eager to pay the larger one now.

The Mayor of Buffalo has set a policeman to counting the cars of coal that go across to Canada, though nobody believes that he knows hard coal from soft and there is enough soft coal for all. And if it was all anthracite the Mayor has no authority to act in the matter.

After the Lake trade closed some of the shippers diverted some cargoes that did not get off, into the local trade, and the increase has made a big difference in the situation. But the one-ton delivery is likely to last just the same.

PHILADELPHIA

The advent of wintry weather has put a heavy burden on the retail trade. Buyers in their eagerness for coal are going from yard to yard in the hope that they can find some dealer willing and able to care for their needs.

Dealers generally admit that there have been good shipments of coal made to them during the past ten days, and with some of them the cars accumulated just a trifle faster than they could unload. These latter cases were, of course, exceptional.

Practically every dealer has received enough coal to keep him busy. Unfortunately, they are all so far back on their orders that they hardly know where to send the coal. The time has come when those people who, earlier in the fall were served with one or two tons, are now coming back for replenishment.

The larger companies say that they are fully up to their allotments of 60 per cent of last year's supply. Prices, both wholesale and retail, remain quite stable, and it is really exceptional to hear of offerings of coal at any price. Occasionally a dealer has been known to seek a car or two of family coal at prices up to $13, but unable to place the business. However, in another instance a dealer was able to place an order for two cars each of egg, stove, nut and pea at a flat price of $12.

The steam trade is strong and there is no surplus buckwheat, as the companies who were storing this size are now picking it up. Independents are getting up to $5 a ton for such buckwheat as they sell on the market. The companies still have sufficient rice, but barley is being more closely taken. Most individual shippers are moving all steam sizes without difficulty.

BOSTON

Protracted gales and thick weather along the coast have interfered with arrivals, and all-rail on accentuated car shortage together with light production have meant very meagre receipts recently. There is a feeling that with full output in January the hard-coal situation will gradually correct itself, but of course a further season of storm and cold will upset such calculations.

At retail the dealers are managing somehow to keep things going. A reasonably heavy tonnage of bituminous is being used in place of anthracite especially in apartment houses, and this is bound to be felt later on.

South

BIRMINGHAM

The accumulation of empty coal cars during the holidays has served to afford a fairly good quota at all mines and is expected to give temporary relief to the car shortage for the remainder of the week. Mine labor is somewhat slow in returning to work and normal forces will probably not be available until after New Year's. Output for the week of Dec. 23 and also for the week of Dec. 30 will be considerably below the weekly average, due to the mines being idle on account of Christmas.

The market for both commercial and domestic coal has been very quiet during the past week. Continued warm weather has slackened interest in domestic trade and there is no insistent demand for such fuel except as occasioned by the recurring periods of cool weather. There will probably be more favorable market conditions and a better demand for commercial coal after the turn of the year.

Prices remain stable, no changes being noted over the quotations given a week ago.

VIRGINIA

Production is much below market requirements, owing to further losses sustained as a result of an even more limited supply of empties. About 22,000 tons of coal per week are being used for the production of coke, there being a ready demand for it in the district. More coal is being produced on the line of the C. C. & O. than on any other line in the district.

Chicago and Midwest

Markets Hold Strong on Everything They Can Get

Demand Is Fairly Stiff for Both Steam And Domestic Though No Heavy Stock Call Is Heard—Railroads Hold Down Production under 50 Per Cent.

Nothing seriously worries the coal markets of the Midwest region nowadays. All available coals are in fair demand at firm prices high enough to make it worth anybody's while to handle coal. Illinois and Indiana domestic sizes bring $4@$5.50 and there is a place for all that can be shipped. Steam buyers take enough of the smaller sizes to keep distress coal practically off the market even though few of them are buying heavily for stock, apparently figuring there is real doubt of a spring strike. Steam prices are steady and have advanced a little in Indiana.

Transportation, which was extremely bad a week ago during the pre-Christmas zero weather, has slowly improved during the recent comparatively warm spell but production in this territory is still below 50 per cent. This is enough to just about take care of the demand on Western coals. Traffic congestion is keeping most shipments from the East down low.

CHICAGO

After weathering a period of painful transportation trouble and a coal spell which snapped up demand for all sorts of coal to the rush point, concerns here are still busy meeting a fairly strong call for most coals. Domestic sizes are maintaining last week's prices evenly. Steam demand has pushed screenings in Indiana up about 25c. and the trade is buzzing along at a good clip in spite of a week of weather that was decidedly warm for late December. Car supply has been improving a little throughout Indiana and Illinois, but it still is an exceptional mine that works more than half time.

There is no sign of immediate heavy stocking by big consumers here. The slow process of rolling in small reserves continues, but the general opinion of Western operators that a strike is going to be avoided has already taken off what little edge there was to storage demand. Buyers here give evidence of planning to wait at least until after wage conferences start before they decide what to do about preparing for a spring shut-down of mines.

Very little coal other than that from Indiana and Illinois is trading here now. A Cincinnati transportation jam has shortened down shipments from the East materially and Kentucky coal is now going principally to other markets, though it requires very little encouragement to start a flood of western Kentucky fuel in this direction. Anthracite at mine prices ranging $6.25@$8.25 continues to come in a small but steady flow through one big Erie shipper retailing here at $14@$17. Pocahontas shipments here are slight indeed. Current prices are quoted in the Weekly Review.

ST. LOUIS

A little cold weather has caused a picking up in the domestic market in St. Louis proper. This is chiefly for small loads and the cheaper grades. Country domestic has also shown up a little better the past week. Steam is slow locally and in the country but a good tonnage is moving to the Chicago market. There has been no change in retail prices.

A little storage coal is being put in by big manufacturing plants. One plant reports 50,000 tons on hand Jan. 1 and another, 15,000 tons. These are fully supplied and are about the only two plants that have their storage up to the maximum.

SOUTHERN ILLINOIS

While the weather is not exactly seasonable, yet the demand for the better grades of Carterville and Duquoin coal has been good and most mines are sold up on all sizes. This is principally caused by the car shortage which has given the mines about two days working time the past week. Mines producing an inferior coal, however, have no bills on hand. The association mines are maintaining a price of $5.50 on the domestic sizes and $3 on screenings. The independent mines are as low as $4.50 on domestic sizes and $2.75 on screenings. Railroad tonnage is fair.

Mt. Olive movement is slow on everything excepting railroad tonnage, which is fairly good to the Northwest. Car supply is sufficient to cover the demand. Domestic sizes in the St. Louis market sell for $4 and outside for $4.50. Steam sizes, egg and nut, are a little heavy selling down to $2.50.

In the Standard district conditions are unusually bad on account of no cars. Pennsylvania lines have been jammed up in the last two weeks, perhaps the worst in several years. The B. & O. have a record at one mine of giving it cars for fourteen hours' work between the 18th and 30th of the month.

Prices on Standard 2-in. lump are $3 @$3.25; 6-in., $3.75@$4; steam nut and egg, $2.50@$2.75; mine run, $2.35@ $2.50. Car supply in this field varies from one day a week to three days on different roads. Steam is moving about equal to domestic sizes.

INDIANAPOLIS

After nearly a week of zero weather, moderating temperatures have softened the coal business, especially the retail end. The holiday season hurt the industrial demand, as many of the plants in the state closed during the week for inventory.

In those instances where prepared grades had been increased 25c. a ton and sometimes slightly more because of the sudden rush with the advent of zero weather, a relapse has been noticed in the prices. Prices of West Virginia and Kentucky coals continue weakening slightly. The transportation situation has been such in the past two weeks that the normal flow of these coals into Indiana has been hampered, but even with slightly less tonnage delivered there is no price strength.

LOUISVILLE

Jobbers and producers report a dull market this week, and except for the very light loadings, due to car supply and the fact that miners are loafing, prices would probably be lower than last week. With the mildest sort of weather general consumption is light, and industries are refusing to place much tonnage until after the inventory period. Jobbers report that there is no general inquiry from any line of industry. Retailers are buying in very small quantities.

Calling off of some railroad embargoes on movement of freights other than coal, food and livestock, show that terminal congestion is being relieved, and the transportation situation looks much better, provided there is no heavy snow or severe weather. Present indications are for better return of empties to the mines, and a softening rather than a strengthening of the market.

Quotations show eastern Kentucky lump, $6.25@$7; mine run, $3.25@ $3.85; screenings, $3@$3.50; western Kentucky lump, $4.25@$4.50; mine run, $2.50@$3; screenings, $2@$2.25.

WESTERN KENTUCKY

Miners have done little work since Christmas, and many mines have been down, or limping along on short forces. Poor car supply has not been felt so much the past few days, due to the poor loading capacity. However, transportation is light, and with good weather indications are that railroads are cleaning up congestion, and that there will be a much better car supply available before long. In fact it is now showing some improvement. Transportation conditions are better generally, it is said.

Prices are firm but not advancing as had been anticipated when a few days of cold weather broke in shortly before the holidays. Some operators report that they are just about supplying contracts, booked business, etc., and are not soliciting orders until the holidays are over, being unable to figure a good production. Industrial demand is slower over the inventory period and with mild weather price advance looks to be checked for the time being, especially if car supply improves.

Christmas was the warmest December 25, since 1893, and as a result of the very mild weather retailers are buying in small lots, as domestic demand has been quiet generally since just before Christmas. Even charity orders on retailers for half to ton lots, have been scarce this year.

Quotations at which coal appears to be moving show lump at $4.25@$4.50; mine run, $2.50@$3 and screenings, $2 @$2.25. However, some lump is quoted as high as $5, and some low grade at $4, while some mine run quotations are reported as high as $4 and screenings as high as $3.

Eastern Inland

Wintry Blasts Hit Car Supply; Market Stiffer

Domestic Is Strongest Feature—Smokeless Practically Unobtainable—Offerings of Industrial Fuel Curtailed by Holiday Idleness—Volume of Demand Unchanged—Quotations Advance.

Severe weather has made the car supply more irregular and the market has stiffened further in the past week. Domestic coal is, of course, the strongest feature, as retailers are hard put to replenish their stocks, which are rapidly being distributed to householders in response to an active demand. Smokeless sizes are practically unobtainable.

Holiday idleness reduced the offerings of industrial coal and while the volume of demand remains unchanged the advancing quotations show the urgency of consumers' hand-to-mouth needs, as the spot tonnage is being accepted without any price bickering.

CLEVELAND

Domestic consumers have small amounts on hand and dealers have not been sufficiently well stocked to supply the demand without replenishing their supplies, with the result that coal buying on the part of dealers has been more firm. Gradually consumers are learning to substitute soft coal for anthracite and West Virginia coal, which is difficult to obtain. Railroads are buying a larger tonnage than any other consumers.

Southern coal is coming into this district more easily over the Wheeling & Lake Erie, but shipments that are routed by way of the C. & O. have been delayed the last few days in contrast to a recent increased movement by this route.

Pocahontas shoveled lump is sold at around $13, delivered. Prices on Ohio coal shipped here are remaining firm. Good buying is expected on the part of steel plants in this district after the turn of the year. Mills are booked with orders for some months to come, demand is strong and prices are stiffening. The backbone of steel demand is the large purchasing by the railroads.

EASTERN OHIO

Operations were at a minimum during the pre-holiday week. On Dec. 18, about 1.140 cars were loaded, and each succeeding day registered a lower output, on Saturday, only 721 cars being loaded. Aggregate production amounted to 266,000 tons, the lowest figure for any six-day week of the year.

Severe weather has slowed up railroad movement to a considerable degree. At the present rate of production, over half of eastern Ohio's output is going to the railroads for fuel, both for current needs and necessary reserve stocks at this time of the year. Consequently the supply of fuel available for other steam users has become more restricted and keen demand from that quarter has stiffened up prices from 25c.@50c. per ton on most all grades.

With the present status of the coal trade, due principally to transportation conditions which are not expected to improve much before spring, and the possibilities of another coal strike at the end of the coal year, many operators are advising their customers to not only buy now for current needs, but to begin building up their reserve fuel so as to be on the safe side.

Retail demand is unusually active and current supply is inadequate.

Cumulative figures covering the output for the calendar year to Dec. 23 indicate an aggregate production of 10,902,500 tons, as against a potential capacity of 30,834,000 tons, or only 35 per cent operations.

Receipts of bituminous coal at Cleveland during the week ended Dec. 23 fell off 500 cars from the volume received during the preceding week. Total arrivals were 2,552 cars, of which 1,988 cars were for industries and 664 cars for retail yards.

PITTSBURGH

While the general average of car supplies may not be different from that of a month ago, there seems to be much more irregularity from day to day, and between divisions. The uncertainty seems to have an influence on market prices, which are stiffer, although the total demand is not materially altered. No definite information is available as to stocking of coal by consumers but there is reason to assume that there is a very fair volume of stocking, possibly more than there was a year ago.

Pittsburgh steam coal has sold both at $3 and $3.50 in the past few days, although there are no differences in tonnages or grade sufficient to account for so wide a spread. Youghiogheny gas is decidely higher, having brought as high as $4 for mine run. Gas slack is irregular, and generally quotable at $3@3.50.

Industrial consumption appears to be improving a trifle. The steel mills have run through December at their former gait, instead of curtailing as they usually do at the year-end. Prospects are for heavy operation through the first quarter.

DETROIT

With the holiday season at hand, other interests apparently are taking precedence over the business of buying bituminous coal. Sales are coming at irregular intervals. The buyers generally seem to be limiting their purchases to the smallest quantity that will provide for current requirements.

Receipts are not large. Jobbers say the shipments at present are scarcely equal to the quantity of coal moving into the city before the closing of navigation on the Lakes. The decrease is attributed to the effect of railroad embargoes, as well as to the transportation obstacles created by winter weather.

West Virginia or Kentucky lump and egg is quoted at $5.50, with mine run, $3.25 and slack, $3. Pittsburgh No. 8 lump is $4.25; mine run, $3.25; slack, $3; Hocking lump is $5.50; egg, $5; mine run, $3; nut, pea and slack, $2.90. Smokeless lump and egg is around $8, with mine run and slack, $5.75@$6. The supply of smokeless continues light.

Anthracite receipts are not increasing and little encouragement is given to hope for a more adequate supply.

COLUMBUS

The coal trade is showing considerable strength, even during the holiday period when the market is usually unstable. Prices are on the upgrade although advances have not been heavy.

Domestic trade is still the big feature, with retailers buying actively to rep'enish stocks. Householders are placing larger orders as the cold weather has apparently come to stay. Retail prices in Columbus are steady and the cutting of several weeks ago has disappeared. Only a small tonnage of smokeless is finding its way into the market.

Steam business is showing more activity in all localities. This has caused an advance of 15c.@25c. Assigned cars for railroad fuel comprise a good percentage of the output.

The car supply is not increasing and is estimated at from 35 to 40 per cent in the Hocking Valley, Crooksville and Pomeroy fields. Following Christmas there was a pretty fair run but some mines have not produced, owing to the disposition of miners to stay away from work.

BUFFALO

The market is decidely quiet, but the scarcity of cars has stiffened the prices some. A very heavy passenger business during the Christmas holiday seems to have taken up the motive power and when that drops off, as it will soon, the light demand is expected to restore prices to the old rather low level.

The labor situation comes in for a large amount of discussion now. There had been a general prediction of an April strike, but recent declarations from the union head that there will be no strike has set the speculation in a somewhat different direction. It is pretty plain that the meaning of the speech is that control of the situation can be held without a strike.

Consumers are not inclined to buy much coal against strike possibilities. The entire trade is becoming used to some sort of a struggle and is prepared, though not welcoming it.

Quotations are: $4.75@$5 for Youghiogheny gas lump; $4.25@$4.50 for Pittsburgh and No. 8 steam lump; $3.50@$3.75 for all mine run, and $3@$3.25 for slack, adding $2.09 to Allegheny Valley and $2.24 to other coals, to cover freight.

NORTHERN PANHANDLE

Owing to transportation conditions railroad fuel loading is larger than any other class of business. River shipments and local deliveries are helping to swell the sum total of production. More coal is being used in the iron and steel mills in the Wheeling district. Embargoes are interfering to some extent, however, with Western shipments. There is a steady demand in Northern markets.

Northwest

Free Dock Coal Scarce: Region Relies on Rails

Lake Shipping Brought Less Than Half Normal Supply—Extra Effort May Get Overland Anthracite—Demand for Coal Softens with Weather.

Now that Lake shipping is ended for the season there are many eyes on the dock coal stocks. A good deal of bituminous is on hand but most of it is railroad or contract fuel so that free coal is scarce indeed. Soft coal by rail is so easily available, however, that there is no worry about that. Anthracite is a different story. Extra and official effort is being made to get considerable hard coal by rail all winter.

The comparatively warm weather of the past week was been enough to return the market almost to its pre-cold snap lethargy so far as bituminous is concerned. Price concessions were resorted to again before the end of the week and surplus coal is on the market throughout the southern Lake country.

MINNEAPOLIS

With the close of the old year, the federal fuel distributor for the Northwest ceased his labors. At about the same time, the available stores of anthracite were exhausted in the hands of wholesalers. For the remainder of the winter, the Northwest must depend upon all-rail receipts. The season has seen between 40 and 50 per cent of a normal season's stock received and the carry-over would run the entire total up to perhaps 60 or 70 per cent.

The coal selling season is at its height and it will be up to the trade to worry along as best it may, until spring. There is a pronounced shortage of hard coal. How much cannot be determined, since it is so entirely a weather proposition. Undoubtedly the normal consumption has been reduced by mild weather and by the use of other grades.

The soft coal market is easier again. The weather moderated sharply after a few days of real cold. Consumption and buying took a sharp slump. During the severe weather, there was no surplus coal in the market, but it reappeared soon. It has not demoralized the market but price concessions have been forced. The dock trade found the severe weather a big help toward stabilizing its market, and has been able to present a fairly consistent market position for some days. But the market basically is weak.

MILWAUKEE

The market is quite active, as an aftermath of the recent zero weather. Local consumers of anthracite are forced to buy sparingly, as the dock companies are conserving stocks in order that they may be able to deal equitably with both the city and country trade. Soft coal and coke are in good demand. Western screenings are fairly plentiful, but the popular sizes of coke keep well sold out. There is a scarcity of screened Pocahontas but an abundance of mine run.

A real hard cold snap is bound to make business lively for everything burnable, as coal dealers have only been buying to meet immediate needs, notwithstanding the uncertainty of rail transportation in winter. The rail situation at present is about 50 per cent of normal. There have been no changes in prices.

The hard coal shortage is so acute that the state fuel authorities contemplate, in the event of prolonged cold weather, seizing of anthracite for adequate distribution. The State Legislature will be asked to give the coal authorities more power to dictate to coal distributors. With distribution centralized, it is believed every community will get its just share of hard coal.

Wisconsin has received only 29 per cent of a normal anthracite supply. Ample stocks of soft coal will tend to relieve the hard coal shortage. Gov. Blaine is using every effort to secure at least 250 carloads of anthracite daily during the winter.

Many complaints have been received by coal dealers of the poor quality of coal that is being marketed.

DULUTH

Estimated stocks on the docks here now come to 2,700,000 tons of bituminous coal. Of this, 1,000,000 tons is owned by the railroads and 1,000,000 tons is under contract. This leaves 700,000 tons free. The demand for both anthracite and bituminous has dropped off appreciably in the last week. Mild weather causes the anthracite slump. There are some hard-coal stocks still left on the docks but these are being apportioned out to satisfy the need, so there is really no free anthracite. Householders are using a good deal of buckwheat mixed with egg.

A notice of real suffering from lack of anthracite at Streeter, N. D., and Marble, Minn., has been received here from C. P. White, retiring fuel administrator at St. Paul. Mr. White asked that anthracite be shipped immediately and the order was complied with.

The slackness in bituminous coal comes from the fact that consumers have purchased well already, and are in the main overstocked for present needs. There seems to be no doubt that the Northwest will come through the winter on the stocks on hand and what will be shipped by all-rail.

A comparison of prices with last year in the bituminous market is interesting. Now soft coal is selling at $9.50 for lump, $8.50@$8.75 for run of pile and $6.25@$6.50 for screenings. Last year at this time bituminous coal was selling for $6 for lump, with a 50c. differential for run of pile and screenings. Pocahontas is in strong demand.

New England

No Let-up in Inquiry for Good Low-Volatile Coals

Prices Climb Steadily—Slow Delivery All-Rail from Central Pennsylvania Causes Some Declination of Commitments — Reaction in High-Volatile Sets In.

Due to heavy demand from householders, inquiry for all the favorably known low-volatile coals has by no means relaxed. Quotations advance every few days. Deliveries all-rail from Central Pennsylvania are very slow and in many cases operators have been obliged to decline making further commitments.

For a considerable period there was no appreciable increase in demand for coals in excess of 30 per cent volatile, but now there has set in a reaction in that direction as well. Grades that were selling at $2.75 per net ton at the mines a fortnight or so ago have sold recently as high as $4.50, and so long as the anthracite situation remains uncorrected there is every prospect that prices will continue to advance. It is notable that coals originating as far west as Pittsburgh and taking a relatively high tariff to this territory have been in demand, especially for screened sizes, and this is likely to continue well into January.

Pocahontas and New River remains in short supply at Hampton Roads. Car supply is erratic, but with most of the agencies prepared sizes are moving west rather more heavily than run of mine is reaching Tidewater. Shipments on contract are being made with fair regularity, but for spot shipment there is surprisingly little tonnage available, and correspondingly there seems no strong inquiry for the smokeless coals here in cargo lots. For Inland delivery, in restricted tonnages, there is an improving demand which is reflected in higher prices from week to week.

While the shortage of anthracite is almost a determining factor in the present bituminous market, yet the shortage of cars on the originating roads continues to be a serious consideration. Much more steam coal is being produced than would be necessary for the industries on their present basis and as soon as anthracite begins to flow in better volume it is probable that the change will be promptly reflected in spot quotations for all the coals that reach this territory via the all-rail route.

Cincinnati Gateway

Holidays Add Their Impetus to Upturn Of the Market

Railways Have Been Able to Clear Congestion Points of Most of Their Clutter of Cars but Empties Are Slow in Returning.

With production held at a low ebb because of the usual holiday lay-offs and with a small amount of free coal moving there has been quite a scramble for that which could be picked up as it passes through "the neck of the bottle" and another upturn of 25c.@ 50c. a ton has been the net result. So far as actual sales are concerned the steam grades are now practically on the same basis as gas and by-product coals.

The L. & N. is again allowing free movement through this gateway and claims to have its car accumulations pretty well cleared away. The N. & W. is said to be in better shape than for months, while the C. & O. seems to be neither better nor worse. The clearing of the congestion at Toledo is always a big help to this market, and, right now the Pere Marquette is said to be the only line that is clogged.

CINCINNATI

The volume of business for the holiday season has been rather surprising and would indicate that the hand-to-mouth process of supply this year will permit of no slowing up. Domestic coals have been in excellent demand and even with a large number of mines turning to this make it does not seem possible to keep pace with the demand. Good Kentucky block had no difficulty in bringing $7 while better grades of West Virginia were being quoted at $6.50@$7.

The smokeless situation has developed into an acute shortage. Chicago buyers and those of the Inland territory have been offering local jobbers a price that permits of an $8 bid for lump and egg, but little or no tonnage to be had at those fancy figures. Sales agents have not deviated from the $6-price, top and bottom, for everything from screening to lump, but with the narrowing of the shipments west their proratings have been smaller than for months. Little or no Dry Fork or New River is coming on the market now.

HIGH-VOLATILE FIELDS

Kanawha

On the eve of the Christas holidays the transportation situation was worse than it had ever been. The district is getting cars about every tenth day, so that the order directing that an excess of cars be turned over to the C. & O. by Western roads is not helping matters any after all, making it apparent that deficient motive power has much to do with the situation. The shortage of cars in conjunction with a somewhat heavier demand has stimulated prices.

Logan and Thacker

While the Logan region is suffering from a shortage of loading equipment many of the mines are able to continue operation since much coal is being stored. Increased demand in some quarters meant nothing to producers since they had no transportation facilities with which to increase shipments.

Mines in the Kenova-Thacker region are producing on a somewhat larger scale owing to a better car supply on the N. & W., yet the transportation facilities on that road preclude loadings in excess of 50 per cent of potential capacity.

Northeastern Kentucky

A slight improvement in the car supply does not permit the mines to produce more than 30 per cent or somewhat in excess of 110,000 tons a week. Indeed, the output hardly more than suffices producers to take care of standing orders. Retailers are actively in the market so that domestic is in prime demand.

LOW-VOLATILE FIELDS

New River and the Gulf

That part of the New River region dependent upon the C. & O. for a car supply is having an extremely limited output owing to inability to secure cars. Mines have been reduced to about one day's work a week so that as the year came to an end production was on a smaller scale than it had been at any time during that period, and when the demand was larger than it had been for some time, owing to increased consumption at Tidewater and in Inland East markets. Not only a scarcity of cars but deficient motive power were factors in retarding production.

The Virginian is able to furnish Gulf mines a somewhat better car supply and to get cars back to the mines more promptly since virtually all the coal is being shipped to Tidewater and Eastern markets. Gulf mines are producing at the rate of about 35 per cent of potential capacity.

Pocahontas and Tug River

The advent of the holiday season found the Pocahontas region producing more coal than during the earlier part of December, output being not far short of 300,000 tons a week. The greater part of the coal is for Eastern delivery, though Western movement has been increased to a small extent. Western shipments are limited owing to the small amount of equipment coming from the West and also owing to the limited ability of the N. & W. to handle coal destined west.

Much difficulty is experienced in getting Tug River coal through to Western markets. Then, too, there are not so many cars coming from Western connections. There is little spot coal available.

Coke

BUFFALO

Coke has about given out. The shortage is said to be on account of the poor car supply and as that is not improving now the coke consumer will have to wait. A little of it can be used to advantage with some fine anthracite, but so can soft coal in lumps, so the supply of substitutes is not cut off yet.

CONNELLSVILLE

Demand for coke for domestic distribution has continued, but there has not been much turnover in the market as the previous buying had absorbed all floating supplies. A new development is a bulge in demand for domestic coke from the West.

The demand, if it promised to continue merely for a few weeks, would justify the blowing in of many additional ovens, but operators in the main are quite indisposed to put on more ovens, being very doubtful as to car supply, while there is the fresh complication that sending so many cars east with coke, when the same cars were previously engaged in making short round trips to blast furnaces, may operate to decrease the total of car placements.

As high as $9.50 has been paid for coke for domestic distribution. Some operators have willingly sold at this price, while others are disposed to take care of the regular furnace trade, which cannot afford to pay any such price. It is understood that some first-quarter contracts have been made at $7@$7.50 as an accommodation to furnaces.

The *Courier* reports production during the week ended Dec. 23 at 123,810 tons by the furnace ovens, and 80,720 tons by the merchant ovens, a total of 204,530 tons, a decrease of 4 080 tons.

UNIONTOWN

Continued celebration of Christmas holidays as "wet" and bloody as any during pre-prohibition days cut sharply into the production of the Connellsville coal and coke region during last week. The restricted production came at a time when the coke market especially is very active and a firm demand also arising for coal, principally from railroad interests.

The coke situation at the closing of the year is without parallel in the trade. At a time when some blast furnaces were attempting to negotiate contracts to extend for the first three months of 1923 there suddenly appeared in the market an entirely new buyer for Connellsville coke, originating from the shortage of anthracite. Production was just being about sufficient to supply the demands of blast furnaces in operation and active price debate has ensued, with the custom coal interests leading the way. Some blast furnace interests have intimated that unless lower prices become available they will be forced to bank or blow out.

With the exception of inquiries for railroad fuel there is no concerted buying movement for bituminous coal. Scattered sales are made at $3@$3.25 for steam and $3.50@$4 for byproduct.

News Items From Field and Trade

ARKANSAS

The sale of the property of the **Arkansas Anthracite Coal Co.** near Fort Smith has been postponed to March 23.

COLORADO

Rumor has it that No. 3 mine of the **Big Creek Coal Co.**, near Kirksville, is to shut down indefinitely.

A. T. Hawkyard, P. J. Nusbaum, S. Blixt and others have incorporated **The Hub Coal Mining Co.**, of Montrose; capital, $50,000.

CONNECTICUT

Vincent Brothers Co., coal dealers, Bridgeport, recently increased their capital stock from $50,000 to $100,000.

ILLINOIS

Officers of the Central Illinois Coal Operators' Association have been elected as follows: President, H. C. Adams, Chicago (re-elected); George Soloman, Springfield, vice-president; R. I. Wilcoxson, Springfield, secretary-treasurer; Dan Clark, Springfield, commissioner. The following members were elected to the executive board: W. H. Leland, Chicago; D. A. Watson, Springfield; A. J. Moorshead, Chicago; C. W. Argest, Taylorville, and Forrest File, Decatur.

James Higgins, Chillicothe, has leased the Oscar Carlson farm, two miles south of Mineral, and has begun mining operations. This is another new mine for Bureau County.

The Bucyrus Co., South Milwaukee, Wis., announces the addition to its sales force of **John J. Gault**. Mr. Gault has had many years' experience as construction and locating engineer, having been assistant engineer on the Chicago & Northwestern, engineer maintenance of way on the Chicago & Alton, construction engineer for the United Fruit Co., and assistant engineer on the Chicago, Milwaukee & St. Paul. His last connection was with the International Harvester Co. as locating engineer on a railroad project. He will be attached to the Chicago office of the Bucyrus Co.

The Quartermaster Supply Officer at Chicago has called for **bids for coal supplies** as follows: For use at Columbus Barracks, Ohio, 4,700 tons run-of-mine, 1,300 tons over 2-in. screen; for use at Erie, Pa., 550 tons slack, 200 tons over 2 in.; for use at Fort Benjamin Harrison, Ind., 3,000 tons over 2 in., 500 tons run-of-mine; for use at Dayton, Ohio, 3,000 tons run-of-mine; for use at Fort Thomas, Ky., 1,200 tons over 2 in., 500 tons run-of-mine; for use at Jefferson Barracks, Mo., 5,000 tons over 2 in.; for use at Rock Island, Ill., 358 tons over 2 in.; for use at Selfridge, Mich., 1,000 tons over 2 in., 278 tons run-of-mine; for use at Fort Crook, Neb., 1,300 tons over 2 in.; for use at Des Moines, Iowa, 1,200 tons over 2 in.; for use at Omaha, Neb., 150 tons over 2 in.; for use at Fort Riley, Kan., 4,400 tons over 2 in., 626 tons run-of-mine; for use at Fort Robinson, Neb, 300 tons over 2 in. Bids will be opened at Chicago, Jan. 16.

The Willis Coal & Mining Co., of St. Louis, has given orders to **close down its mine at Willisville**, known as the "old mine," and all machinery, equipment, track, etc., will be immediately taken out of the mine. The order was made by Krause Bros., of St. Louis, large stockholders in the company. The mine is one of the oldest mines in that end of the state and for years has supplied large contracts to the Mobile & Ohio R.R., on which road it is located and by which it is served. The mine employed about 200 men.

The finishing touches are now being made on the **new three-story brick and concrete office building of the O'Gara Coal Co.** at Harrisburg. On the third floor of the building is a large and spacious assembly and reception hall to be used for social events. There also are two private bedrooms on this floor equipped with private bath and telephones to be used by officials of the company from Chicago, who are frequently in Harrisburg.

S. H. Wright, of the Chicago office of the Chicago, Wilmington & Franklin Coal Co., has returned after spending a short visit at the company's mines near Herrin.

James Forester, superintendent of the Paradise Coal Co., Du Quoin, recently spent several days on business with his firm in Chicago.

Edwin L. King has been appointed district sales manager of the **Reading Steel Casting Co., Inc.**, with headquarters in Chicago. He succeeds M. L. Chase, who resigned.

An accident at No. 11 mine of the Old Ben Coal Corporation at Christopher, Dec. 19, sent nineteen men to a hospital. The cage got out of control and dropped with twenty men to the bottom. One man jumped to safety just before the cage hit the bottom, the others sustained broken bones and internal injuries. The company immediately sent out a call to surrounding towns for doctors and other medical assistance. A special train was sent over the C. B. & Q. Railroad to the mine to take the injured to the Harrell Hospital, Christopher.

A. S. Austin, Sr., and A. S. Austin, Jr., both of Milwaukee, Wis., were in Du Quoin recently preparing to **open the Kanawha Fuel Co. mine there.** The company is headed by the former, while the younger Austin is superintendent of the mine. The pumps have again been started and coal will be hoisted just as soon as possible. The company operates under the name of the Old Abe Mining Co., DuQuoin, with the sales offices as Kanawha Fuel Co., Milwaukee, Wis.

A. W. Dix, of Buda, and **Edward Otis**, of Sheffield, have **purchased the Rollins mine,** three miles west of Sheffield. The property consists of 40 surface acres and 30 acres of virgin coal with buildings and mining equipment. This mine has been in operation for several years and during the last two years has been operated by Lamb and Pollack. About half of the coal is consumed locally, the balance being shipped. The property is now operated by C. M. Mapes and two associates. Mr. Mapes had charge of this mine during the war when it was owned at Spring Valley, Ill. There is a 4½-ft. vein of coal at a depth of about 60 ft. The roof is considered first class and the water problem has not bothered since the first year the mine was operated.

The Grant Coal Co., Pekin, has been incorporated with capital of $25,000. The incorporators are T. W. Karstedt, Hugh Kelly, Walter Grant, Fred Hebhardt, William Grant, Jr., David Grant and Albert Hoff.

The Bishop Hamlin Coal Co., Chicago, has been incorporated with capital of $50,000 and 1,000 shares of no par value, to deal in coal, coke, wood, oil and other fuels. The incorporators are J. Edward Bishop, Fred T. Hamlin and Francis H. Uriell.

The Shuler Coal Co. expects to begin shipping coal from the new mine south of Alpha about Jan. 15. The shaft is 225 ft. deep. The company's new office building is finished, the excavation for the track scales is complete, the truck and wagon scales have been installed and grading for the switch from the main line of the Burlington is done. The machine shop is nearly ready.

John Burpaugh, of Peoria, and associates plan the development of a coal field covering 3,000 acres in the southern part of Knox County, about 20 miles south of Galesburg. The field itself extends southeast from the new Burlington Lake to a point near DeLong. It is said that this field is underlaid with a 5-ft. vein of coal within 100 ft. of the surface. Coal tests are now being made. What is known as vein No. 2 of the Illinois series is a surface vein in that section of Knox County and has been mined by stripping. It is thought that at a depth of 100 ft. the Illinois vein No. 1 would be reached. In some parts of Illinois this coal is being mined extensively and the coal is of good quality.

The Tovey Mine No. 8, near Taylorville, broke all records for hoisting coal when 4,750 tons were raised on a recent day just before Christmas. The men at the mine say that they have an ambition to hoist 5,000 tons in one day.

INDIANA

Latest reports from local unions in Indiana assure the retention in office of the present officers and members of the executive board of District No. 11, United Mine Workers. The incumbents were running from two to three to one ahead of their competitors.

Francisco Mine No. 2, at Princeton, was struck because the men, who are being paid by the day, wish the company to pay according to tonnage. To do this it would be necessary for the company to put in scales. A representative of the company said that until the mine is completed and the tipple erected, the company does not wish to put in scales, which would be expensive and would have to be changed later. He said the mine had been operating day and night shifts, that a steel tipple, which would cost approximately $75,000, was ready for shipment to the mine, but in view of the strike it was probable the company would let the mine remain idle until April and send the contracts for coal elsewhere.

Among the measures to be supported by the **Indiana Retail Coal Merchants' Association** at the next session of the Legislature will be one to prevent unscrupulous dealers from misrepresenting the kinds and grades of coal they sell to consumers. It also is understood that the association will favor a larger appropriation for the state weights and measures department. J. H. Panabaker, of Kokomo, is president of the association; W. A. Dalton, of Gary, is first vice-president; Ray Macey, of Indianapolis, second vice-president; George E. Bruner, of Kokomo, treasurer, and R. R. Yeagley, of Indianapolis, secretary. The legislative committee is composed of Mr. Macey, Fred D. Stilz and C. F. Meyer, Jr., of Indianapolis; C. D. Cook, of Columbus, and C. C. Cochran, of Atlanta.

The Archer Coal Co. has been organized in Fort Wayne to deal in fuels of all kinds. The company has a capital stock of $10,000 and the organizers are L. H. Dunten, John Cashman and John Dehner, all of Fort Wayne.

Illegal shots were given as the **cause of an explosion** in December, in the **No. 8 mine of the J. K. Dering Coal Co.** near Clinton which killed William Davis, a shotfirer, at work near the shaft. The cages were damaged some by the force of the blast, but production was resumed after three days. This is an old mine, the shaft of which has been sunk to the No. 3 vein. Development in that seam is just well started and the mine's output is about 300 tons a day.

IOWA

M. F. Riordon, of Melrose, has been elected **president of the Gold Goose Coal & Mining Co.**, of Albia, to fill the vacancy caused by the death of L. T. Richmond.

The Sioux City Coal Exchange is trying to work out a method of licensing retail dealers so as to eliminate "snow birds" and dealers who cannot prove they are substantial.

The **Norwood-White Coal Co.** is getting coal from its new mine recently opened up at Herrold. This is a small producer and is electrically equipped. It is understood that additional operations are contemplated.

J. L. Hartstorn, Knoxville, has leased forty acres of coal land on the Elias Stierwald farm, one mile north of Flagler and now has about 50 ft. of entryway driven back into the vein which averages about 6 ft. in thickness. The location of the mine is near the Knoxville and Pella Road and the coal is equal to that found south of Knoxville, where the Andersonville and Pershing mines are in operation.

KANSAS

Large leases of strip coal land near Chetopa have been made by R. L. Hillegas to the **Cherokee Coal & Coke Co.**, of Kansas City. Deep shaft mining is possible on part of the tract.

Charging that miners working in the **Kansas State Prison mines have been removing coal from under his farm, John McCarthy**, a farmer living near Lansing, filed suit Dec. 20, 1922, against the board of directors of the prison, and M. F. Amrine, warden, for $6,000. Pending settlement of the suit, McCarthy obtained a temporary restraining order to prevent the removal of props and pillars from the tunnels he alleges are under his land, thus permitting cave-ins to obliterate signs of any operations.

At a dinner following a state first aid tournament at Girard, in December, **Ira Clemens** called attention to the fact that **since Oct. 1 there have been no strikes** in the southeastern Kansas coal district. Before this year the average was twenty-seven and one-half a month, he said. Mr. Clemens said that approximately **8,000 tons of coal is displaced each day by oil** in the district supplied by the Kansas field. He attributed the situation to public distrust of the ability of the mines to deliver because of past strikes and the threat of another strike April 1, and to high freight rates on Kansas coal. Mr. Clemens assured the miners that the use of mining machines would increase Kansas production without decreasing the number of men employed. First prize in the first-aid contest was won by a team composed of miners from various mines in the vicinity of Mulberry. Seventeen teams were entered.

KENTUCKY

The retail coal trade of the state along with all truck owners, farmers and trucking interests, has started a movement **to enjoin the state from enforcement of the Bright light load law,** which prohibits use of certain surfaced roads from Dec. 15 to April 15 except with specified weights and tire widths, which, it is asserted, prevents larger trucks from operating except with very limited loads. This, they say, would result in overloading of small trucks and more damage to roads.

A. C. Lackey, of Nashville, Tenn., and H. H. McBratney, of Louisville, Ky., president and vice-president of the **Dixie Fuel Co.,** jobbers with offices at Nashville, Louisville and Chicago, **have just closed a deal for the Phoenix Coal Co.,** a 35- to 40-car a day mine at Drakesboro, on the Owensboro & Nashville division of the L. & N. The name of the Phoenix company will be changed to the Phoenix Coal Mining Co., with A. C. Lackey as president and H. H. McBratney as secretary-treasurer. The Dixie Fuel Co. will be sales agents. The same interests own the Douglas Coal Mining Co., which was the White Coal Mining Co. prior to last August. Former owners of the Phoenix Coal Co. were James B. Torbert, P. D. Houston and Wilbur Nelson.

MARYLAND

Acting on the appeal of twelve striking miners from the decision of Justice John R. Workman, of Frostburg, who ordered them to vacate houses owned by the Consolidation Coal Co., Judge Albert A. Doud affirmed the action of the magistrate and **directed the issuance of a writ of restitution** of Sheriff Peter McFarland to restore possession of the premises to the Consolidation company and to assess the costs to the defendants. The houses are located at Eckhart, Zihlman and Hoffman. The tenants are strikers who refused to work and in most instances are back in their rent, being nominal amounts of from $2 to $3 a month. The company wants possession of the houses for men who desire to work in the mines.

MASSACHUSETTS

The Sanford Riley Stoker Co., of Worcester, has acquired the business of the **Ground Coal Engineering Co.,** of Chicago, which was incorporated in Massachusetts Dec. 23 as the Ground Coal Engineering Corporation, with headquarters in Worcester. R. Sanford Riley, of Worcester, is the president of the new corporation; Milton W. Arrowood, of Chicago, is vice-president; F. H. Daniels, of Worcester, treasurer, and David K. Beach, of Worcester, clerk. The company has a capital of $200,000 preferred stock and 1,000 shares of common stock of no par value.

MINNESOTA

C. P. White, Federal Fuel Distributor for the Northwest, closed his office in St. Paul, Dec. 30, and returned to Washington.

MISSOURI

Dickinson Bros., of Kansas City, are preparing to mine coal on a large scale at their new pit at Eve.

D. C. Crane, of Springfield, has opened up a strip mine near Creighton.

With the opening of the **Perry-Rice Coal Co.** mine at Rayville there is a boom on. There is an acute housing shortage developing as the coal tonnage increases.

In the last sixty days of 1922 upward of **15 new coal mining companies** were either opening or arranging to open that many new coal mines. Most of these are strip mines, but there are several small shafts. Tonnage from all of these mines will be small on account of the 3-ft. vein. These mines are to be opened because of the high prices of Kansas and Illinois coals. If this increase in Missouri coal continues a great part of the state will be able to get along without Kansas or Illinois fuels. Rapid strides have been made in this direction during the last year. Nearly all these new openings are non-union.

The Bonanza Coal Co. has changed its name to the Higginsville Coal Mining Co. with Nelson B. Good, of Kansas City, and H. C. Odel, of Potter, as principals; capital $15,000.

The **new mine** of the **Mosby Coal Co.,** near Mosby, is now hoisting coal. The J. E. Drysdale Coal Co., of Davenport, Iowa, has leases on 3,000 acres and is making test holes.

Coal-lease speculation is rife since the Gose & Austin Mining Co. hit a 3-ft. seam of good soft coal at 140 ft. near Spickard, with prospects of a 6-ft. seam 50 ft. further down.

NEW YORK

The Timken Roller Bearing Service & Sales Co. began operation Jan. 1, 1923. This new company adds the final link to the chain of complete control which the Timken Roller Bearing Co. exercises over its product from the raw material to the sale and maintenance of the finished bearing. Thirty-two direct factory branches are maintained.

The recapitalization plan of Burns Bros. has been formally approved by the directors. Under the new plan, by the retirement of the preferred and preference stock, there will be a saving from disbursements annually sufficient to give present stockholders a larger dividend, without taking any larger amount from current earnings. Earnings of Burns Bros. at present are of a very satisfactory character and arrangements were made to provide for additional stock, which may be distributed to stockholders as a stock dividend, when conditions warrant. Provisions also were made for further expansion.

A reorganization of the general manufacturing department of the General Electric Co. took place Jan. 1, 1923. H. F. T. Erben, heretofore manager of the Schenectady Works, becomes vice-chairman of the manufacturing committee and ranking a member of the general manufacturing staff. Charles E. Eveleth, who has been serving since September 1st as assistant works manager under Mr. Erben, is to succeed Mr. Erben as manager of the Schenectady plant. Mr. Eveleth will become works manager. J. A. Smith will continue as general superintendent and in the absence of Mr. Eveleth will be in charge of the works. The membership of the manufacturing committee and the appointment of a subcommittee to be known as a committee on appropriations, is also announced. The general manufacturing department will be as follows: H. F. T. Erben, vice-chairman of manufacturing committee and ranking member of the staff; J. T. Broderick, secretary of the manufacturing committee; L. G. Banker, general purchasing agent; M. C. Fitzgerald, manager of transportation department; W. C. Fish, manufacturing engineer; W. B. Curtiss, supervisor of production; G. S. Maxwell, supervisor of costs; E. Z. Steezer, supervisor of industrial relations.

The Rochester & Pittsburgh Coal & Iron Co., of Buffalo, is again operating its Walston mine in Jefferson County, Pa., which had been idle for some years. With a force of 40 miners, which is in prospect soon, the output will come up to about 200 tons a day.

The Lake season closed with the loss of only about 1,200 tons of coal in the upper Lakes' trade, which amount was jettisoned from the Buffalo steamer, J. J. H. Brown, lately ashore on Bois Blanc Island, in Lake Huron, near the Straits of Mackinaw. No vessels of account were lost and the loss of freight was merely small amounts from a certain small number of cargoes. This is a record breaker all around.

OHIO

Roy Heyser has accepted the position of manager of the Cincinnati office of the **Morrow Callahan Coal Co.** Mr. Heyser has resigned his position with the Semet-Solvay Co. to take on this new work. He has been located in Cincinnati for several years as fuel purchasing agent for Semet-Solvay and prior to that was with Eaton Rhodes.

Lee Hall has been re-elected president, **William Roy** vice-president, and **G. W. Savage,** secretary, of the Ohio division of the United Mine Workers of America.

All records of the Pennsylvania coal docks at Sandusky were surpassed during the navigation season just closed. During the 1922 season the Toledo division of the Pennsylvania system handled into Sandusky and dumped into lake vessels 2,246,800 tons of coal, or more than 49.5 per cent of the total amount of coal handled at Lake Erie ports by the Pennsylvania R.R. Of this amount 265,807 tons represented cargo coal, while the remainder was bunker coal. The volume of cargo coal dumped by the system at Sandusky represented approximately 41.1 per cent of the total amount of lake coal handled, or more than the combined total dumpings of Cleveland, Ashtabula and Erie, points under the jurisdiction of the central region.

OKLAHOMA

The **Red Oak Coal Co.** has been incorporated for $200,000 by Ray Morgan, James Hilling and V. Davis.

With the new acreage acquired around Edna by the **Central Coal & Coke Co.** it is estimated that close to **$175,000 has been spent in this field** for coal leases in the past six months. In the territory west of Welch the leases are going to local Oklahoma coal operators.

PENNSYLVANIA

Alberto Benturini, a coal operator of Allegheny township, Westmoreland County, was recently awarded a verdict of $4,408 in Federal District Court over A. N. Johnson, cashier of the First National Bank of Freeport, as **compensation for alleged breach of agreement** in connection with a large coal transaction. Benturini, who sued for $75,000 damages, charged that in May, 1918, he agreed to sell the output of his mine to Johnson, but that numerous deductions from the selling price caused him to lose heavily.

The Eastern Fuel Co., with main offices in the Frick Building, Pittsburgh, has opened offices in the Heymann Building, Philadelphia, temporarily in charge of C. W. Stone, of the Pittsburgh office. James F. Whelan has been promoted to the position of resident manager of the New York office, Frank W. Morton, formerly with the Underhill Coal Co. and the Tuttle Corporation, has joined the sales force of the main office.

Under the provisions of a lease, executed Sept. 29 last, and filed Dec. 26, the **Fair Coal Co. agrees to pay a royalty of $1 a ton** for all coal mined from a forty-seven acre tract in the Second Ward of Scranton, which for years has been known as the P. C. Griffin tract. Included in the lease are three separate tracts, known as the Dean, Winton and Livey tracts.

The Glen Alden Coal Co. has declared its first dividend since the company was organized a year ago. The dividend amounts to $1.50 for each share of stock. The Glen Alden Company was formed when the coal and railroad interests of the Delaware, Lackawanna & Western were separated.

State charters were issued recently to the following companies mining bituminous coal in Pennsylvania: **The Fire Coal Co.,** Dunlevy, with a capital stock of $5,000, J. H. Dunlevy, Pittsburgh, is treasurer, and the purpose of the corporation is mining, shipping, buying and selling coal and other minerals. The incorporators are Thomas T. Dunlevy, Pittsburgh; Etta N. Dunlevy, Dunlevy. **Morningstar-Schnars Coal Co.,** Philipsburg; capital, $12,000; S. Reed Morningstar, Philipsburg, treasurer, and an incorporator, the other incorporators being R. R. Schnars, Hawk Run, and H. Dixon, Hawk Run. Purpose: Mining, buying and selling coal and the products thereof. **Beadling Coal & Coke Co.,** Pittsburgh; $5,000; W. A. Beadling, Pittsburgh (treasurer); James Beadling, Beaver Falls, and William H. Beadling, Pittsburgh, are the incorporators. **White Oak Coal Mining Co.,** Johnstown; $50,000; Gordon C. Hutchison, Johnstown, treasurer. The treasurer, Thomas B. Allen, Nanty-Glo, and Toner S. Yoder Nanty-Glo are incorporators The purpose of the company is mining, selling and shipping coal and other minerals and the manufacture of coke and byproducts.

The Mid Valley Coal, Upper Lehigh Coal, Maryland Coal, Raven Run Colliery, Gerardville Mining and **Lykens Valley Coal companies,** all properties of the Wentz interests of Philadelphia, have been consolidated under the name of the Hazelbrook Coal Co., with a capital of $7,000,000. An official said the object of the merger was to facilitate management.

The Bertha Coal Co., Pittsburgh, is receiving bids for new shaker screen machinery and equipment which the company plans to install and have in operation by next April at the Bertha Mine, Dinsmore, Pa., on the Pan Handle; the Louise Mine, Louise, W. Va., on the Pittsburgh & West Virginia Ry.; the Gould Mine, Wilson, on the Pennsylvania R.R., and Rachel Mine, Downs, W. Va., on the B. & O. The new equipment will include loading booms and picking tables of the most modern type.

The Commission for the Reorganization of the State Government has sent a summary of legislation proposed, as the result of a year's study of the needs of the Commonwealth, to members of the 1923 Legislature. Among the proposals is one that **would combine the two mine inspectors' examination boards** into one board. The commission's summary contains the following paragraph: "Under the present law there are two mine inspectors' examining boards appointed by the Governor, one board for the examination of inspectors in the bituminous region and one for the examination of inspectors in the anthracite region. Under this system the mine inspectors seem entirely free from co-operation with the Department of Mines. The bill submitted provides for the consolidation of these two boards into one board composed of eight citizens to be appointed by the chief of the Department of Mines. The chief of the department is also an ex-officio member, giving the board nine members. By providing for the appointment in this manner and making the chief of the department a member of the board, it is believed that these inspectors will be tied up with the department more closely and strengthen the executive authority of that department."

SOUTH CAROLINA

The Pee Dee Coal Co. has been incorporated at Florence, and has elected the following officers: President-treasurer, E. K. Turner; vice-president-secretary, G. H. Turner.

TENNESSEE

The Independent Fuel Co. has been incorporated at Nashville by S. R. Hampton, C. B. Roberts and Cecil B. Simms.

UTAH

Announcement has been made by Wiggington E. Creed of final organization of a $20,000,000 corporation known as the **Columbia Steel Corporation**, to consolidate the plants of the Columbia Steel Co. in Pittsburg, Cal., and Portland, Ore., and the Utah Coal & Coke Co., of Utah. Construction of a large blast furnace between Provo and Springville, Utah, is promised in the near future. The plan of the company is to process steel on the Pacific Coast in as great an amount as possible, to save water and rail tariffs on this product from the East. Mr. Creed is president of the corporation.

About 250 acres of coal land in Carbon County **has been redeemed** from the delinquent tax sale in 1917 **by the Carbon Fuel Co.** The company paid to the state treasurer $6,812.62, representing the amount of the tax and the delinquent penalties and costs.

A. D. Pierson, formerly with the Utah Fuel Co., has been appointed railroad fuel agent for the U. S. Fuel Co., Salt Lake City. Mr. Pierson is regarded as one of the best informed coal men in the state.

VIRGINIA

Clyde Smith has leased coal mine properties at Pulaski, and will develop them at once.

The Richmond Coal Mining Co., of Richmond, has been incorporated for $25,000 with Sterling R. Jones as president and Sam Marcus as secretary.

The Jewell Ridge Coal Corporation, of Tazewell, has announced that it will increase its capital to $500,000.

WEST VIRGINIA

Manufacture of smokeless powder is to be undertaken on a large scale by the Main Island Creek Coal Co. Tests conducted at the Omar mines of the company have been so satisfactory that the company will build a powder plant at Omar. At the outset the company will manufacture powder only for use in its own mines, but after a time will place it in the general market.

The Ramona Coal Co., with a capital of $100,000, has been incorporated at Huntington by C. T. Egri, M. R. Tetman and E. M. Jones.

The Elkins Smokeless Coal Co., of Elkins, has been incorporated with a capital stock of $750,000. The incorporators are C. A. Parvin, of Chicago, and J. F. Bridwell and C. E. Williamson, both of Charleston.

Facilities for handling coal for river shipment on a large scale are to be provided by the **Philadelphia & Cleveland Coal Co.** at Huntington, through the erection of a large river tipple, the company having acquired 23 acres for the plant. It will be necessary to construct about 2,000 ft. of trackage from the C. & O. siding at the Camp Glass plant to the river tipple. The cost will be approximately $1,000,000. This will enable the company to handle twice as much coal as any other equipment in Huntington, but the company does not propose to restrict the use of the equipment to its own coal, having indicated that other coal companies would be permitted to use the tipple in loading coal for river shipment if they so desire.

In the case of the **Milligan Coal Co. vs. the Harvey Fork Coal Co.**, of Clay, tried in the Circuit Court of Kanawha County, Judge A. P. Hudson handed down a decision in favor of the plaintiff. The defendant admitted it was to purchase certain property of the plaintiff in Clay County for the sum of $85,000 but that there was to be no money passed at the time the defendant entered upon the possession of the property as a part of the agreement. The plaintiff in the case put forth the claim that the defendant had paid nothing for the property and had taken possession for the purpose of getting the property in shape to operate, but had failed to complete its part of the contract.

Certificates of increase in capital stock have been filed by the **MacAlpin Coal Co.** The company's stock is to be increased from 4,000 shares with par of $100 to 8,000 shares at the same value.

Teddy Arunski, Pennsylvania miner, has been found guilty by a jury of conspiring to incite striking miners to attack the Clifton Coal Co. plant during the strike last July in the Clintonville field.

The Vanbail Coal Co. has changed its general headquarters from Huntington to Charleston.

The Morgart Coal & Coke Co. and the **Carbon Hill Collieries Co.** have been dissolved as corporations and have surrendered their charters.

The Mandt Mining Co. has changed its name to the **Elrod Fuel Co.**

Foreign coal corporations recently authorized to do business in West Virginia include the **Blue Ridge Mountain Coal & Coke Co.**, of which Joseph Washington, of Cresson, Pa., is secretary; the **Barbour-O'Brien Coal Corporation**, of Delaware, of which Joseph Washington is also secretary, and the **Stevens Coal Co.**, incorporated under the laws of Delaware with offices on the North Side in Pittsburgh, Pa.

The Central Coal Mining Co., of Wheeling, is reported to have acquired 800 acres of coal land that lies close to its present properties at Wheeling. The present output of the company is 1,000 bushels of coal a week and it contemplates developing its new properties until this output is pushed to 2,000 bushels a week.

A jury in the criminal court of Harrison County found **three women guilty of participation in a riot** June 23 at Glady's Stop, in Harrison County, when a number of deputy sheriffs and non-union miners workers on their way to the Lewis mine of the Hudson Coal Co. were attacked by a mob of strikers. The jury recommended mercy. The defendants were Mrs. Daisy Simonetti, Mrs. Angelina Bassil and Mrs. Angelina Modo, the first named being the mother of Larry Simonetti, also convicted on the same charge at the same term of court. Before the trial of the three defendants began, their counsel moved for a change of venue, but the motion was denied by the court.

The Bell Creek By-Products Co. has been incorporated at Montgomery by J. E. Wilkinson, G. C. Humphreys and W. H. Thomas, with a capitalization of $50,000.

Engineers have been engaged by the **Slaters Creek Coal Co.**, of Charleston, to make surveys for large development of coal lands near that city.

F. S. Landstreet, Jr., M. F. Breslin and Herman Redd have incorporated the **Eldes Junior Coal Co.**, at Huntington, W. Va., with a capital stock of $100,000.

The Midland Smokeless Coal Co., which was recently incorporated at Ronceverte with a capital stock of $50,000, has perfected an organization with the election of the following officers: President, C. H. Thompson; vice-president, L. E. McClung; secretary-manager, B. M. Higginbotham. The company will soon install the necessary mining machinery to develop 800 acres of coal mining land.

Progress is being made by the **C. & O. in determining upon the best route into the Greenbrier County coal field**, surveyors now being at work in this territory with a view to definitely settling the question of the best method of reaching the large mines which have been opened in Greenbrier County within the last year. Although the junction point with the main line has not been decided upon, it seems to be generally accepted that the branch into the Greenbrier field will be started at Ronceverte, in which event it will become necessary to increase yard and shop facilities in order to take care of the increased traffic.

The Chafin-Jones-Heatherman Coal Co., operating in the Logan field, has not only been able to reach the production goal set ten months ago, when this company opened its mine, but this concern is planning now to double the capacity of its mines on Peach Creek. The company completed work on its tipple and finished driving several openings in the Alma seam on Feb. 1 of the present year, announcing at that time that it expected to reach a production of 1,000 tons per day. Since beginning operations the new company has extended its track up Peach Creek for nearly a mile and has made additional openings. Foundations have been built for another tipple and arrangements are being made to construct a 610 ft. conveyor from the tipple to the headhouse. The company began business with 41 miners' houses, to which have been added 25, and it is now proposed to build 50 more houses in the near future. Officers of the company are Don Chafin, president; W. T. Jones, vice president; Dr. K. J. Heatherman, general manager.

WISCONSIN

The State Fuel Administrators of Wisconsin, Minnesota, North Dakota and South Dakota wired C. E. Spens Dec. 19 urging priority order for shipment of 250 cars of anthracite daily to those states via ferry line routes to prevent suffering in the Northwest.

The Arpin Process Coke Co., of Wisconsin Rapids has been chartered, with these shareholders: J. P. Arpin, Charlotte C. Arpin and Paul H. Arpin.

CANADA

Frank T. Malone, formerly with the Century Coal & Coke Co., Ltd., Toronto, has severed his connection with that firm and **has organized the International Coal Co.**, with office on Bay Street, Toronto. The company will engage in the wholesale coal business.

Property Commissioner Chisholm, who is the new Fuel Controller in Toronto, is to put into immediate effect a regulation that every citizen must take **25 per cent of substitutes with hard coal.** It is believed that later on the proportion will be 50-50.

So bitterly is the United Mine Workers conducting the **strike in the northern Alberta field** that the **James Mulock**, Dominion Minister of Labor, has sent the following **telegram to Robert Livett**, one of the board of the union, who is conducting the strike in the field: "I shall lose no opportunity in condemning the strike as unlawful, and, so far as I can see, unjustifiable, since it appears to have no other purpose than securing a closed shop, an object that menaces alike the freedom of the individual and the welfare of the community. If you and those associated with you persist in maintaining the present situation, I shall most certainly hope to assist in framing some changed method or law that will prevent a recurrence of such an attitude on the part of those assuming to represent labor." There have been a number of outrages in the Edmonton coal field, including stoning and firing at men attempting to go to work in the mines. A number of officials of the union have been arrested and fined, and in one instance a jail sentence was given. The provincial police have been reinforced.

Alfred Odgers, a fireboss, and **Gilbert McBroon**, a pumpman, in the employ of the Western Fuel Co., were killed recently by an explosion of coal dust in the Wakesiah mine, Nanaimo, B. C.

One man is missing and property damage to an extent estimated at $300,000 as the result of a fire which destroyed the power house of the International Coal & Coke Co. at Coleman, Alta.

Nearly 400 coal mines were in active operation in Canada in 1921, working over an area of 713,000 acres, according to a report issued by the Dominion Bureau of Statistics. Approximately 30,000 men were given employment and the wage bill in 1921 amounted to $42,758,471. The total capital invested in the industry at the close of that year was $176,991,495.

Five new coal mines have been opened up along the Canadian Pacific Railway line from Acme to Drumheller. The coal mined is said to be of excellent quality for domestic use and is expected to aid considerably in relieving any coal shortage this winter.

WASHINGTON, D. C.

Coal or coal products imported from Canada, Spain, Japan and several other countries must pay a customs duty equal to the amount of duty such countries or dependencies impose upon coal and coal products from the United States, according to orders issued by the Treasury Department. This action was taken because of the retaliatory proviso of the coal paragraph of the new tariff act, which admits coal free of duty unless other countries impose a duty on coal from this country. The foreign tariffs on coal which are to be the basis of the countervailing duties to be collected on any coal from such countries imported into the United States, according to the Treasury decision, are:

Australia—Coke, 6s. per ton; coal, free.

British India—Coal, coke and patent fuels, 0.5 rupees per ton.

Canada—Anthracite, free; bituminous slack, such as will pass through a ¾-in. screen, 14c. per ton; bituminous round and run-of-mine, 53c. per ton.

Japan—Coal, free; coke, 5.65 yen per 10,000 kin (kin equals 1⅓ lb.); brick coal or briquets, 10 per cent ad valorem.

French Indo-China—Coal and coke, briquets, etc., 0.12 fr. per 1,000 kilos.

China—Coal 0.27 Haikwan taels per ton, coal briquets, 0.50 Haikwan taels per ton.

Brazil—Coal imported by undertakings manufacturing and supplying gas, 6.814 actual milreis per metric ton; imported by any other private firm or individual, 12.342 milreis; coke, free.

Chile—Coal and coke free; briquets, 3 gold pesos per ton.

Peru—Coal free; coke, 0.20 soles per 100 kilos, plus surtaxes if imported at certain ports.

Spain—Coal, coke, etc., 7.50 pesetas per metric ton.

Uruguay—Coal, 0.05 gold pesos per metric ton.

Duties are to be figured on conversion at current rates of exchange at the time of importation.

Reports to the U. S. Bureau of Mines from manufacturers representing about 90 per cent of the explosives industry in the United States show that **sales during October of black powder and permissibles were slightly below the September record, but sales of dynamite and other high explosives increased somewhat over the previous month.** The reports for October indicate total sales of 793,105 kegs of black powder, 4,692,060 lb. of permissibles, and 18,139,118 lb. of other high explosives. The total amount of explosives manufactured and used in the United States (excluding exports) during the first ten months of 1922 was as follows: Black blasting powder, 4,725,343 kegs; high explosives other than permissibles, 148,515,562 lb.; permissible explosives, 29,788,377 lb. These totals compare with 4,416,848 kegs of black blasting powder in the corresponding months of 1921 and 8,362,994 kegs in the same months of 1920; 129,097,684 lb. of high explosives other than permissibles in the first ten months of 1921 and 185,437,738 in the corresponding period of 1920; 30,564,538 lb. of permissibles in the first ten months of 1921 and 45,116,720 lb. in the same period of 1920. Distribution by uses during the first ten months of 1922 was as follows:

JANUARY TO OCTOBER, 1922

	Black Blasting Powder, Kegs	High Explosives Other Than Permissibles, Lb.	Permissible Explosives, Lb.
Quantity used for:			
Coal mining	3,964,443	16,084,987	27,084,559
Other mining	143,355	58,736,437	1,345,900
Railway and other construction work	244,547	18,156,936	118,862
All other purposes	372,998	55,537,202	1,239,056
Total, first 10 mos., 1922	4,725,343	148,515,562	29,788,377

Traffic News

Rates on coal from Dines, Wyo., to numerous Western points are held to be unreasonable in a tentative report submitted by Interstate Commerce Commission Examiner T. J. Butler. The rates were attacked by the Colony Coal Co.

Complaints have been filed with the I. C. C. alleging that present carrier rates from Lake Michigan docks and from Illinois fields in shipments of coal in carload lots to Wisconsin and Lake Superior points are unjust and unduly prejudicial to Illinois shippers and that the rates to Michigan destinations are unduly preferential to Lake Michigan dock operators. The complaints place the coal rate situation in such a shape that it will be necessary for the I. C. C. to conduct a general investigation of rates on this commodity in the western trunk line territory.

The Illinois Commerce Commission has issued an order directing the Peoria and Pekin Union Railroad Company and the Peoria Railway Terminal Company **to reduce the cost of hauling coal into Peoria by 24c. a ton.** This will effect a saving of $50,000 a year to the people of Peoria. This saving will be effected on actual hauling rates alone. Should it mean that the city will now be able to purchase, through lower rates, coal from their own nearby mines, it will mean a far larger saving. The Peoria Association of Commerce has been active on this reduction for several years. The association is particularly anxious to see local coal used, as much of the coal is now hauled from distant mines. It is believed that the reduction of freight rates on coal transported by the Peoria local terminal railroads will result in more Peoria coal being used in the city.

Obituary

William Stephan, Sr., president of the Stephan Coal Co., of St. Louis, died suddenly on a street car on his way to his office. Heart disease was the cause of his death. Mr. Stephan, who was 67 years old, was born in Germany and at the age of 19 settled in St. Louis, where he had made his home since. He recently returned from a trip abroad with Mrs. Stephan, at that time visiting the scenes of his childhood. He is survived by the widow and two sons, William Stephan, Jr., recently elected president of the Retail Credit Men's Association of St. Louis, and Oscar H. Stephan, both of whom were associated with him in the coal business.

Don H. Bacon, formerly president of the Tennessee Coal & Iron Co., died at his home in St. Augustine, Fla., on Sunday, Dec. 17. He had been ill for about a year. Mr. Bacon had been president of the Minnesota Iron Co. before the United States Steel Corporation was organized.

Dwight R. Higbee, a well known retail coal dealer of Minneapolis, head of the Northern Fuel Co., died at his home Christmas night without warning. He had celebrated the day, and had driven with his family around the city. They returned home, and he complained of not feeling well. Death followed soon after. He had been a resident of the city since 1882.

Publications Received

The Preparation, Transportation and Combustion of Powdered Coal by John Blizzard, Mines Branch, Department of Mines, Ottawa, Canada. Pp. 131; 6x9 in.; illustrated. Describes plants where powdered coal is being used and gives some interesting tests and costs.

Analyses of Kentucky Coals. Bureau of Mines, Washington, D. C. Technical paper 308. Pp. 92; 6x9 in.; tables.

Fusibility of Ash from Coals of the United States, by W. A. Selvig and A. C. Fieldner. Bureau of Mines, Washington, D. C. Bulletin 209. Pp. 119; 6x9 in.; illustrated. Contains tables giving softening temperatures of coal ash from coals of the United States.

Value of Coke, Anthracite and Bituminous Coal for Generating Steam in a Low-Pressure Cast-Iron Boiler, by John Blizzard, James Neil and F. C. Houghton, Bureau of Mines, Washington, D. C. Technical paper 303. Pp. 56; 6x9 in.; illustrated.

Lessons from the Granite Mountain Shaft Fire, Butte, by Daniel Harrington, Bureau of Mines, Washington, D. C. Bulletin 188. Pp. 50; 6x9 in.; illustrated. Describes rescue work at time of mine fire in 1917.

A Study of Explosions of Gaseous Mixtures, by A. P. Kratz and C. Z. Rosecrans. Engineering Experiment Station, University of Illinois, Urbana, Ill. Bulletin No. 133. Pp. 104; 6x9 in.; illustrated. Contains tests on study of the physical phenomena involved in the explosions of various mixtures of illuminating gas and air, including determination of the effect of differently shaped explosion vessels and of turbulence at time of ignition, as well as a study of the heat loss from the burning mass of gas. The bulletin also contains an historical review of the principal researches made in the study of explosions of gaseous mixtures.

Coal-Dust Explosion Tests in the Experimental Mine, 1913 to 1918, Inclusive, by George S. Rice, L. M. Jones, W. L. Egy and H. P. Greenwald. Bureau of Mines, Washington, D. C. Bulletin 167. Pp. 639; 6x9 in.; illustrated.

A Study of Coal Mine Haulage in Illinois, by H. H. Stoek, J. R. Fleming and A. J. Hoskin. Engineering Experiment Station, University of Illinois, Urbana, Ill. Bulletin No. 132. Pp. 136; 6x9 in.; illustrated. Describes evolution of mine haulage and the progress in mine-haulage equipment. Also gives detailed accounts of mine-haulage problems in Illinois, including the handling of cars on shaft bottom, main-line and gathering haulage, underground haulage costs, haulage accidents and accident prevention measures.

Trade Literature

W. A. Jones Foundry & Machine Co., Chicago, Ill., has now ready for distribution its catalog No. 26 on spur-gear speed reducers. This catalog contains technical and practical information, complete descriptive matter and illustrations of typical drives. Dimensions, weights and horsepower ratings for complete speed reduction sets are shown.

Portable Electric Tools and Shop Equipment. The Black & Decker Mfg. Co., Towson Heights, Baltimore, Md. Catalog No. 5. Describes the advantages of design and construction of their portable electric drills, electric screwdriver and socket wrench, post and drill stands, attachments for portable electric drills, electric grinders. Two pages are devoted to telling how to grind drill bits, and the five remaining pages describe their No. 2 lectroflater electric compressor. The book contains 30 pp., is 8 x 11 in. and well illustrated.

Railway Supplies. General Electric Co., Schenectady, N. Y. Catalog 6002. Pp. 505; 8x10 in.; illustrated. Mine locomotives, railway and mine haulage motors, controllers, resistors, switches, protecting devices for mine equipment, trolleys for mine locomotives, incandescent headlights for mine locomotives, cables, rail bonding, clamping ears for mines, are among some of the mining equipment described. The book is indexed for ready reference and is accompanied by a price supplement for estimating purposes only, being subject to change without notice.

Roberts & Schaefer Co., Chicago, Ill., have issued a four-page folder illustrating and describing their **"Perfection" Cone Stove Sand Dryer and Beamer Patent Steam Sand Dryer.** Bulletin 48.

Coming Meetings

American Engineering Council will hold its annual meeting Jan. 11 and 12 at the headquarters of the Federated American Engineering Societies, 24 Jackson Place, Washington, D. C.

Northeast Kentucky Coal Association will hold its annual meeting Jan. 23, 1923, at the Ventura Hotel, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

Northern West Virginia Coal Operators' Association will meet Feb. 13 at Fairmont, W. Va. Secretary, G. S. Brackett, Fairmont, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

Engineers' Society of Western Pennsylvania will hold its annual banquet Monday evening, Jan. 22, 1923, at Pittsburgh, Pa. Secretary, K. F. Treschow, Pittsburgh, Pa.

Hazard Coal Operators' Exchange will meet on Jan. 12, 1923, at the Phoenix Hotel, Lexington, Ky. Secretary, R. A. Hord, Lexington, Ky.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

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Coal Commission Goes Beyond Fact Finding

LAST week was important in the annals of labor history in the bituminous-coal industry. In the Chicago conferences between the United Mine Workers and the operators from all organized bituminous-coal fields three outstanding positions were taken by three strong groups. The outcome of three days' deliberation was the apparent elimination of two of the three.

The conference, it should be understood, was the preliminary round to the negotiations for a scale and contract to cover the period beginning April next. It was concerned with a decision as to how the two parties were to come together for negotiations. The old Central Competitive Field supposedly was scuttled last August in the settlement of the 1922 strike, when a mixed group of small proportions—operators from scattered fields—signed the contract dictated by the union. With the outward semblance of reorganization after the rout of last summer, the operators entered the Chicago conference on Jan. 3 with agreement on one program—district settlements, the battle cry of 1922. When the expected resistance and outright refusal of the miners was again manifested, the operators divided. The plain, unvarnished district plan was buried.

As of old, the operators divided as between the old Central Field and the "outliers." Those who throughout the past have been without the fold, who have never been permitted to enter the council chambers of the "Big Four"—Illinois, Indiana, Ohio and Pittsburgh—fought, and fought hard, for the initiation of a new day—for a national wage policy for the bituminous-coal industry.

Conservatism of the old, old school triumphed over the new thought—for a national wage policy is a new thought for the operators. In our present state of knowledge and experience it is the only way in which there can be district settlements. But with both rejected, and apparently decisively, there remains only the old base for wage making—the Central Competitive Field. Fifteen districts—"diversity of interest and divergence of opinion"—proved too much for a majority of the operators.

The situation is far from hopeless. It is in fact quite hopeful. Of the constituent parts of that historic group it is clear that eastern Ohio, Illinois and Indiana are strongly in favor of a settlement on the old basis. Pittsburgh and southern Ohio are holding aloof, giving as one reason their fear of the pending indictments of 1921 that hold them in violation of the Sherman law for such interstate contracts as are again proposed and contemplated.

Undoubtedly the interjection of the Coal Commission into the situation has had its effect. The country at large will approve, for the country does not want a strike. The commission has gone beyond fact finding when it suggests and urges as a basis for settlement the preservation of the status quo for another year. The commission has, to all appearances, a firm hand on the wheel, and even if it be not the precise wheel that Congress designated it is one that the public expected the commission to grasp.

Opinions may differ as to the advisability of the specific action taken by Mr. Hammond and his associates, but all will concede that if, as now appears at least likely, there be no strike, then a measure of credit belongs to those who dared step into a situation that has singed those in Washington who heretofore have come to grasp with it.

The Public's Own Doing

WHEN the mines work irregularly it usually is because the public does not buy. This is trying to the operator, but he makes no complaint. He has been in the habit of buying material when he pleased, and in common justice he cannot condemn the coal buyer for doing the same.

But when charged with the irregular time of the mine worker, who, in contradistinction to the mine owner, loudly and vigorously complains, the operator does feel he is justified in resentment, for he realizes that it is an attempt on the part of the public to blame him for its own misdoings. The great mass of the people complacently directs its way without a thought of the common interest and then is angered that certain individuals producing public necessities have not victimized and penalized themselves to take care of those people who have been indifferent both to their own and the community advantage. If the average consumer of coal would give a few minutes to introspection he would realize that he himself and not the operator is to blame for irregularities in production. If he persists in pursuing his irregular way, buying when he will, then he should cease to upbraid the operator for pursuing a like path and working his mines at his own pleasure and convenience.

These are platitudes, of course, but the public sometimes find them inconvenient and consequently not so obvious as they might be if they told a different kind of story.

Europe at Work

EUROPE generally is pictured as being in such a bad way that one is somewhat surprised to note the activity abroad in coal. The rate of production and consumption of coal is an index of industrial activity in Europe as it is here. Since the middle of July the weekly rate of coal production in Great Britain has been consistently above that of 1920 and 1921. For four months the rate has been above 5,000,000 gross tons per week and in December it passed 5,500,000 tons. Demand for British coal is heavy from all the foreign markets—South America, Continental Europe

and the widely scattered coaling stations. Prices are not so sensitive as here and have climbed but slowly, being now but little above the low point of last year. The mine workers, operating under the sliding scale of wages put into effect following the strike of 1921, are receiving the minimum rate. Wages in December were based on October returns. Early next year they will derive the benefit from the better trade of last month.

In France the coal demand is active. Home collieries are working at a better rate than for many months. Reparation coals from Germany, imports from England and Belgium are in demand. Coal for coking—a sign of industrial activity—and gas coals are in particular demand. In Germany the rate of coal production in the Ruhr has been pushed up to pre-war levels through overtime shifts and increased man power. The Silesian fields are working at a high rate of speed, largely to meet the requirements of the German market.

Europe is sick indeed fiscally but quite convalescent industrially. The Secretary of Commerce last week said: "In the large view the world has made distinct economic progress during the past year and the conditions are very favorable to continued progress during 1923. There are in exception three or four states in Europe which give continued anxiety, but these exceptions should not obscure the profound forces of progress elsewhere over the whole world. In the main even in these areas of uncertainty the difficulties are to a large degree fiscal and political rather than commercial and industrial."

Restraining Prices and Equalizing Distribution

REVIEWS of the stirring events which centered in and around the coal industry during 1922 are beginning to appear. When the large consumers of coal get around to chronicling a retrospect of the situation during that year from their viewpoint, there is reason to believe that they will feature the accomplishments of the administration in restraining prices and effecting equitable distribution of such coal as was available. The public utilities and the large consumers are thought to have been particularly pleased by the manner in which these things were accomplished. It was done without resorting to mailed-fist methods. Co-operation to an extent believed impossible in peace times was obtained. It is believed that many consumers will take advantage of the ending of the year to voice a high regard for the achievements of the administration in this particular. It is always true that commendation of this character in no way keeps pace with the flood of destructive criticism.

In this connection it will be pointed out that in spite of a much worse situation in 1922, the disturbance in the coal market and in distribution was nothing like as great as during and following the 1919 strike. In 1920 563,000,000 tons of bituminous coal was produced and distributed. In 1922 the production of bituminous coal was 415,000,000 tons. Moreover, to this great decrease in production of 148,000,000 tons must be added a great shortage in anthracite. In spite of this, 1920 coal prices averaged more than 600 per cent higher than the average for 1913. Even during the peak, in August and September, prices in 1922 were only some 400 per cent greater than the 1913 average.

Economical Humidification

VERY interesting was the suggestion of J. W. Paul at the Coal Mining Institute of America that it might be possible to economize in the humidification of mines by steam by passing the air through old workings, thus effecting the necessary heating of the ventilating current without using for that purpose the heat in the steam, to which would be left only the work of bringing the heated current of air to the saturation point.

Yet it might seem that the project is not without difficulty. Unless the workings through which the current is passed are so wet that the air could not possibly dry them up, the effect of passing low-temperature air unhumidified through such air passages would be to dry them and the dust in them so greatly as to create a hazard.

It is true, humidification at the end of the passages doubtless would put a moist barrier between them and the active workings such as an explosion would fail to cross. In fact with the active workings well moistened, as Mr. Paul suggested, the explosion, unless one of gas, could not be originated. This doubtless he assumed, for otherwise he could not well have advanced his proposition.

Assuming, then, that no fear need be felt that an explosion can spread over the area devoted to the preliminary air treatment, other difficulties yet have to be met. If the point chosen for humidification is far from the main entry it might be difficult to provide coal to a boiler at that spot. The location might be unfavorable also by reason of depth. Taking a steam pipe down a deep borehole would result in much condensation.

However, if with this plan the point of humidification is nevertheless not far from the mine entrance or is at some point remote from it where the cover is light or where artificial cover is provided to resist the entry of outside air, then except for the preheating of the current it would be better to take in air at the point where the humidification is provided. To pass the air through several thousands of feet of roadways would be unnecessary and a prodigal waste of ventilating power. It must not be forgotten that such airways have to be maintained and that this would involve no slight expenditure. It would seem better to take in air, even ice-cold air, and heat it with steam than to drag it through thousands of feet of roadway needlessly.

Mr. Paul said nothing about the possibility in flat seams of flooding the airways in which the current was being warmed and thus partly at least humidifying as well as heating the air in the process. Unfortunately this would make it necessary to have a longer stretch of airway, for air below zero would freeze the water in the roadways and so put a layer of non-conductive ice between the warm coal measures and the entering air. In consequence the current would be heated satisfactorily only in those sections beyond the icy belt.

It might be wished that Mr. Paul had gone more deeply into the relation between the heat gains and friction losses of such entering air. The suggestion opens up opportunities for thought, but without pretending to have made the extensive calculations the problem merits it is safe to say that it is a plan not without many counterbalancing drawbacks to offset its apparent advantages.

Ideas That Prove Profitable To Columbus Mining Co. May Fit Your Conditions

Short Rooms Lower Costs — Nine-Position Cutter Chains Save Power — No. 2 Cable Displaces No. 3 — Knife Switch Stops Button Conveyor When Unsheaved — Car Retarder Lands Cars at Rotary Dump

By A. F. Brosky*
Pittsburgh, Pa.



ALL three of the workable seams, Nos. 4, 6 and 7, of the Hazard (Perry County) field in Kentucky are being mined by the Columbus Mining Co. It is one of the few concerns in that field working all the seams of operable thickness. The company has four mines, Nos. 3, 4, 5 and 6. They all lie close to Hazard, which town is a sort of nucleus for the plants in the Hazard field. The capacity of these mines aggregates 50,000 tons monthly.

No. 5 mine is in No. 6 and No. 7 seams. The other mines are in No. 4 seam, the thickness of which at these plants varies from 38 to 46 in. Under this seam is a shale measure known as the "jack rock" which is from 8 to 14 in. thick. This is underlaid, fortunately, by 2 to 5 in. of coal in which holes readily can be drilled when the bottom is to be lifted to make height for mine cars. If it were not for the thin bed of coal the bottom rock could not be removed with economy. In rooms and entries this jack rock is removed to a width of 6 ft.

The small band of coal, of course, is not loaded out but gobbed with the shale. Above the jack rock the seam is clean and free of partings. The roof of this bed in most places is of sandstone but in some places it is of slate.

Room-Widths and Pillars Made to Suit Roof

In the Hazard field many divergences are found as to width of rooms and pillars and as to the length of the rooms. These differences are found not only for different seams but often for the same seam. Though some of these variations may be explained by personal preferences, in many instances the differences are due to sound considerations as to the best method of working.

In seam No. 4, which is thin, the Columbus Mining Co. drives wide but short rooms and maintains wide pillars, these latter being roughly twice as wide as the rooms. The rooms, which when completed are 175 ft. long, are driven 22 ft. wide on 60-ft. centers, giving a width of pillar of 38 ft. By driving the working places wide plenty of space is left for the stowing of the lifted rock and more coal can be obtained from each room, thus concentrating the area under operation. Of course, no such width could be carried except under sound roof such as is found in these mines. In thicker coal the need for a wide room would not be so apparent, as no rock would have to be stowed and the tonnage in each place would be greater for any given width of working face.

Most mines working the Hazard No. 4 seam adopt a greater room length than is provided at these operations of the Columbus Mining Co. It is, therefore, interesting to note that in Mine No. 5, where two seams are operated, Nos. 6 and 7, the rooms are made even shorter, being only 150 ft. long. This company long ago ceased driving long rooms and for good reasons.

Why Rooms Are Made Unusually Short

By shortening the rooms the length of temporary track to be maintained is diminished without appreciably affecting the permanent trackage. Room track always is roughly laid and that difficulty probably will never be entirely eliminated. The shorter the haul on this temporary track the less will be the chances of derailments. Moreover, the less room track, the smaller the investment in track equipment. The trackage in rooms consumes much steel, and it is well to keep it down to a minimum.

Furthermore, with short rooms the gathering motors can handle larger tonnages per shift and if the cable-reel type of locomotive is used for haulage less cable has to be reeled and unreeled, less weight of cable has to be carried and a smaller reel can be used. The cutting machines also have shorter distances to travel to and from the face and they also require less cable. Not only is time saved in the reeling of cable by having short rooms but a short cable is more easily handled and is less likely to be injured than a long one. The cost of replacement of cable is reduced out of all proportion to the diminished length and the reduced voltage drop with a short cable, though small, perhaps, is worth considering.

The shorter the room the less roof left unsupported. As the area deprived of support is reduced, less timbering per square foot of unsupported area need be provided. Should a squeeze occur, only the smaller area is affected and the ill effects are soon stopped. Thus it

*Bituminous coal editor, *Coal Age*.

Note—Headpiece shows tipple, conveyor shed and supply track at mine No. 5 of Columbus Mining Co., at Allais, Ky. Note the dip in the conveyor, a condition almost beyond elimination but one which favors the jumping of the button conveyor from the sheaves on which it is stretched.

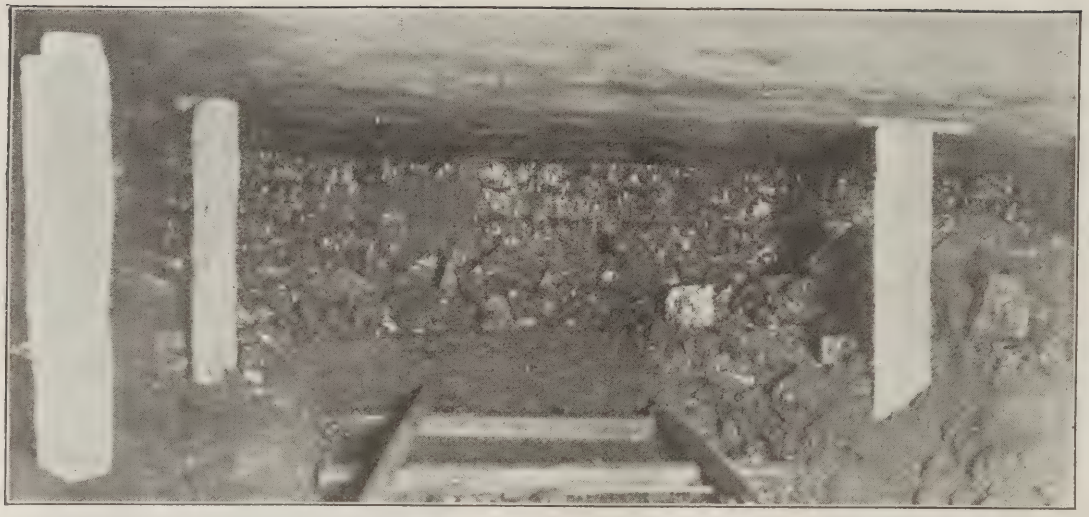


FIG. 1.

Hazard No. 4 Seam

Note the hard "jack rock," which cannot be feazed with an ordinary drill but which, being underlaid by a thin sheet of coal, can be readily drilled under and shot. Much of this material is gobbed in the rooms.

is that, though with short rooms more butt entries must be driven for any given output of coal and more track must be laid down and pulled up, the countervailing advantages may more than compensate for doing away with the long room. This is acknowledged and has been for years. Otherwise rooms would tend with experience and consideration to become longer, which by no means has been true.

In the recovery of coal from any mine there always is an appropriate ratio between the first-mined tonnage and retreat tonnage. What this ratio shall be depends entirely upon local conditions. Certainly it is cheaper to take as little as possible in the first mining, but this often makes expensive and more laborious the recovery of pillars. Driving shorter rooms and more room entries decreases the area taken in first mining, advantages warrant the change.

At this mine entries are driven 15 ft. wide to provide gob space for the bottom taken up in them. The mine is laid out in panels with the main entries on 50-ft. centers and the cross entries and room entries on 40-ft. centers. Cross entries are at intervals of only 800 ft. Barrier pillars, which are 150 ft. wide, are left on either side of the mains, which in every case consist of two haulageways and two air courses.

Upper Seam Slid Down to Lower in Chute

At Allais, Ky., all three seams of coal are worked. The coal from the Hazard No. 4 seam is dumped and prepared on its own tipple. Above, with an interval of 265 ft., lies the Hazard No. 6 seam, and 65 ft. above that the Hazard No. 7 seam. Coal from the upper opening, because of its extreme hardness, is dropped down in a chute, with little breakage, to the level of the Hazard No. 6 seam, where it is discharged from a feeder pan to the rope-and-button conveyor which handles also the coal from the intermediate seam.

The middle seam, Hazard No. 6, which runs from 7 to 8 ft. thick, also is worked on the room-and-pillar system. The mains on the two-entry system are driven from these and a 150-ft. barrier pillar is left on either side. The entries are made 11 ft. wide on 40-ft. centers. The entries are provided with a thinner chain pillar than in Hazard No. 4, as the cover is not as heavy. The rooms are mined 20 ft. wide on 50-ft. centers. Because of the small interval between Hazard Nos. 6 and 7 and because of the weakness of the sandstone, as is evidenced by the drumming sound it sometimes emits when struck, care is taken in working No. 6 not to drive places or pull pillars in advance of workings in the upper seam.

Until a year ago the same room-and-pillar system was used in both seams, but now the new workings in the upper seam are laid out on modifications of the "Elkhorn" system. Little space will be used here to go into details of this scheme of mining, for at a later date other mines will be described in which the true "Elkhorn" plan and its modifications will be explained.

Big and Small Room Pillars Alternate

It may be said briefly, however, that in the upper seam of No. 5 mine the entries are driven 10 ft. wide on 40-ft. centers and a barrier pillar is left on either side 100 ft. wide. The smaller pillars well suffice to sustain the lesser loads resultant on lighter cover. The rooms are driven systematically as follows: Two 16-ft. rooms on 29-ft. centers are succeeded by two 16-ft. rooms on 80-ft. centers. Their length usually is 150 ft., but in the irregular coal areas characteristic of seams outcropping high above stream level these may be increased near the crop so as to complete the work of mining some outstanding coal area. Rooms are driven off both room entries. In the pillar drawing, which is on the advance, a wide and an adjoining narrow pillar are brought back as one unit.

In a later story the merits of the system with alternate wide and narrow pillars will be detailed. Experience has revealed to this company that the system provides an almost absolute control of roof action and a greater flexibility of mining—that is to say, in robbing the wide pillar, crosscuts may be driven through it and the portions of the pillar thus cut off mined as desired.

In No. 5 mine three men load from one pillar set which, as stated, consists of a wide and a narrow rib. Eight cars may be spotted for loading at one time in the cuts of the wide pillar but only one can be placed for the loading of the narrow pillar. Two men load their first car from the former while the third man loads his from the latter. Then this third man loads his second and third cars from the wide pillar, working with the first two men. It is evident that as a result the coal operations are concentrated so that fewer gathering motors are needed for any given tonnage.

In all three seams of these mines shortwall mining machines are used. Each 6½ ft. cutter bar has a nine-position cutter chain, power being conveyed to the machines through a No. 2 all-rubber cable. These features are maintained as standard by the company.

Much may be said in favor of the nine-position cutter

chain, and the argument is sustained not only by reasoning but by a period of experimentation. The greater the number of bit positions the more complete the cutting action of the cutter chain. The paths of adjoining bits with a nine-position cutter chain leave little or no clearance between them, so that no ridges are left between the channels to increase the rubbing surface and add to the friction. Breaking off these ridges and working along their flanks is the cause of much unnecessary friction and loss of power.

Though no power readings have been taken to ascertain the current saved, the physical manifestations in cutting clearly point to that saving, for the machine cuts more easily, as is proved amply by the decreased tension in the feed ropes.

All cables used on shortwall machines in these mines are of the concentric, all-rubber type. The size in general use for this particular class of cutting machine is a No. 3, but the Columbus Mining Co. contends that this size is too small and that a No. 2 cable should be preferred. The Elkhorn division of the Consolidation Coal Co. is in full sympathy with this point of view. It recommends using a size larger than will carry ordinary machine loads.

The Columbus Mining Co. has tried the No. 3 cable in its mines long enough to conclude that a No. 2 cable is more desirable. The smaller size deteriorates rapidly on this machine, so that after short service it is prone to break down. The copper area in the smaller cable is too small to carry the excessive power needed when a piece of hard cutting is encountered. It may serve the purpose for a while but not for any long period of time. The excess heat generated under the rubber cover is not dissipated, and the cable is likely to burst asunder. The voltage drop from the feeder to the machine when No. 2 cable is used is less than that with the smaller cable.

Use Many-Position Cutters and Big Cable

The two changes described, the nine-position cutter chain and the large cable, cause the machine to work with greater facility, and more places are cut in a shift. The more generous cutting surface of the chain removes much of the wrack and strain on the pinions, bevels and other gears. The result of these two precautions is to diminish the heating of the motors and increase the cutting efficiency correspondingly. With the usual shortwall equipment, in the No. 7 seam of the No. 5 mine of the Columbus Mining Co., the best record was ten to twelve places per shift. Under the same conditions and in the same mine, with the alterations noted, the machine will cut fifteen to eighteen places per shift; hence the capacity of the machine is increased 33⅓ per cent.

The adjoining mine is equipped with four shortwall machines, two each of two different makes. Make No. 1 was equipped with a five-position cutter chain and make No. 2 with one of seven positions. The men preferred the latter machine because with it more places could be cut in a shift. Then the company removed the five-position chain from make No. 1 and put on one having nine positions. Thereafter the cutters showed preference for make No. 1, which proves conclusively that the change is beneficial.

The mine is equipped on the surface with a rope-and-button conveyor. This is provided with an electric knife switch which is in the circuit of the no-voltage release on the oil switch and which will break the circuit should the rope jump the sheaves. The device was originated by A. F. Barbieux, general superintendent of these mines.

Under certain conditions the rope conveyor is likely to jump from the idling or take-up sheave at the bottom of the hill. It happens that the conveyor line curves downward between the headhouse and the tipple, and the rope, accordingly, is left slack so as to fit the curve. This frequently has to be arranged in designing a conveyor line, as the level at which the conveyor is brought into the tipple is rarely at the same height as the regular hill slope at that point and therefore the slope of the conveyor must be eased up at its end. During a chilly night the conveyor buttons may be frosted to the trough and, until the finger of the motor control has turned to the fourth or fifth point, may refuse to start up for the day's run. The rope then starts with a jerk, takes up the slack suddenly and may whip the rope off the idling sheave.

Even when the conveyor is started in warm weather the rope may jump from the sheaves if there is a load in the conveyor trough, for the conveyor may refuse to budge until more than three units of resistance have been cut out. Throwing the motor handle still further, a heavier current passes through the motor and the rope then starts with a jerk. This lifts it above the level of the conveyor trough, only to fall again, coming in contact this time not with the metal sheeting of the trough but with the coal. This causes the takeup truck on which the lower idling sheave is mounted to move toward the hill, giving the rope play enough to clear the sheave. Though the rope has left the lower sheave, the motor continues to function and much damage may be done.

Only two of the reasons why the rope leaves the

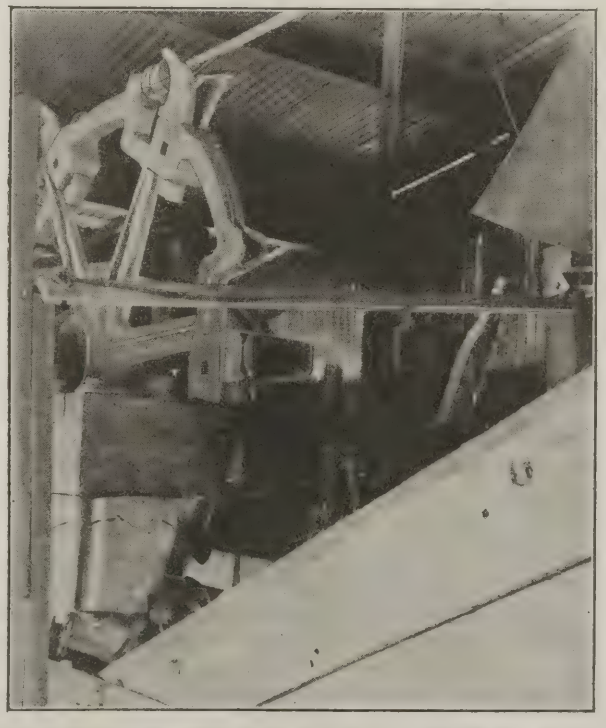


FIG. 2—KNIFE SWITCH AND IDLER SHEAVE

A two-wire conductor is taken down the conveyor gallery to the point shown. Here a knife switch is inserted. This switch is simply a board across which is carried one end of the circuit, the terminal of which rests against a knife plate, to which the other end of the circuit is attached. If the rope leaves the sheave the switch is knocked out, thus breaking the no-voltage release circuit. This trips the oil switch, stopping the motor. Note the wire-broom arrangement for cleaning the rope and buttons as they pass.

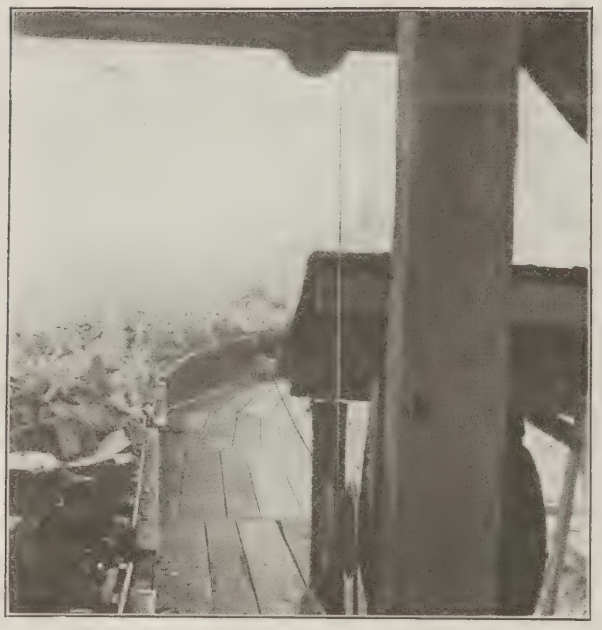


FIG. 3—RAILROAD-CAR RETARDER FEEDS MINE CARS

The gradient on the loaded track is such as to permit cars to gravitate freely to the dump. These cars are then controlled in their passage to the rotary dump by a railroad-car retarder which itself is regulated by the dump operative from his control platform. The cars, as is usual in Kentucky, are equipped with roller bearings. They have a capacity of 2½ tons. The angle-iron edges at the tops of the cars hold the wagons in place when revolved in the dump.

sheaves have been mentioned. There are others, however, and they do not occur always on starting, so to prevent damage a man would have to be stationed to watch the rope, for it comes loose at the sheave farthest removed from the motor control. To station a man for this purpose would be expensive, and no assurance could be placed on his keeping steadily on the job. Much damage might be done in the brief period before the motor is stopped.

The no-voltage release on the oil switch controlling the 25-hp. slip-ring motor by which the rope conveyor is driven is carried from the headhouse through the conveyor gallery to a point near the bottom idling sheave, which is supported on a takeup truck. At this point a large knife switch is inserted in the circuit. This knife switch is mounted between two upright supports, one on either side of the rope and at a height to allow the knife switch to lie horizontally a little higher than midway between the upper and lower course of the endless rope. If for any reason the rope jumps the sheave on the lower end, it drops down and breaks the circuit leading to the no-voltage release and the oil switch is tripped. The motor stops instantly and cannot be started again unless the rope is put in place and the knife switch reset.

Another use for the friction-drum railroad-car retarder has been discovered at the No. 4 mine of the Columbus Mining Co. The load side or the approach to the dump is on a grade sufficient to cause the loaded mine cars to gravitate to the tipple from the knuckle where the locomotive uncouples. The grade is steep enough to allow the cars to run freely, but they are held back by a friction-drum car retarder operated by the man who controls the rotary dump. The same man takes checks also.

The retarding rope passes over a ground sheave between the tipple and the knuckle point and the end is attached to as many cars as occupy the intervening distance to the rotary dump. When these cars are discharged the end of the rope has progressed to the dump. It is then uncoupled and carried back to the sheave and coupled up to another string of mine cars. One man can feed the cars, take the checks and dump as much as 1,000 tons of coal in eight hours. The crowning merit of this scheme of car feeding is that each car may be spotted accurately on the rotary dump by the dump operative, so that the procedure, while mechanical, has human intelligence controlling it.

What to Watch in Running a High-Lift Centrifugal Mine Pump

FROM A BRITISH CORRESPONDENT

AS A result of its compact design and adaptability to electric drive, the centrifugal pump has largely displaced older and more cumbersome designs. The types formerly used always were likely to give trouble underground, for the floor movements threw the different parts of the equipment out of alignment, thus causing hot bearings or fractured castings. Although the general theory of centrifugal pumps is well known, their practical operation has not received the attention its importance warrants. Especially is this true where the pump has to be operated under a high head, as in deep mines. The following notes apply more particularly to large units of this description, but much of that which makes for satisfactory operation in a large high-lift machine also applies to smaller installations.

It is well known to those acquainted with the practical operation of the centrifugal pump that unless both the casing and suction column of such a machine is fully primed—that is, completely full—it will not "catch" the water and begin pumping. Trouble from this source usually can be traced to a defective foot valve. Of all the valves connected with a pump, this one probably is the most important. Being of a non-return design, it allows the passage of water in one direction only, namely, toward the pump.

CONDITION OF FOOT VALVE MOST IMPORTANT

The condition of the foot valve is highly important, especially when priming the pump preparatory to starting. If the valve seat is defective, the water for priming leaks past it and into the sump. In most cases the quantity of water that the bypass makes available is limited and if the foot valve leaks badly the water runs away more rapidly than it can be supplied, so that it is impossible to fill either suction column or pump. Under exceptional circumstances the main valve on the delivery column may be slightly opened, but this should be done only in an emergency when it is imperative to start a pump to prevent the sump from overflowing.

It is difficult to begin pumping under such conditions and often the pump may have to be started several times before it will catch water. This continual restarting throws much unnecessary wear and tear on the controlling apparatus. A fruitful cause of a pump's failing to catch water is too rapid priming. A high-lift machine necessarily is built with several stages, and the cavities in which air may become trapped are numerous.

If by opening wide the bypass valve a large quantity of water is forced into the pump under the pressure of the discharge column, the air has little opportunity to escape, even assuming that the air cock upon each stage has been opened. The pump should be primed slowly. If the foot valve is in good order, little of the water remaining in the pump and suction column

when the machine was stopped will have leaked back into the sump. Under such circumstances the pump should need for starting only a small quantity of water. A foot valve, though normally subjected to only slight water pressure, should be designed to withstand the full head of the delivery column. Of course a check valve should be installed at the bottom of every column and immediately above the pump, so that as the machine slows down and the flow of water ceases this valve will close automatically and prevent the water in the column from running back through the pump and into the sump. Where a high head must be dealt with it sometimes is advisable to put two of these valves on the delivery column, thus providing against the failure of either.

If by accident or necessity the water column becomes empty, great care is necessary when starting. When a pump is working under its normal head, the quantity of water handled is restricted. If, on the other hand, the column is empty or only partly full, it offers little or no resistance and the pump will pass an abnormal quantity of water if the delivery valve is wide open. Consequently, when starting under such conditions, the delivery valve, after the pump has been brought up to speed, should be opened slowly, careful attention being given meanwhile to the ammeter reading, which should not be allowed to go above normal full load. As soon as the column is full, which will be indicated by the ammeter not exceeding the full load reading, the valve may with safety be opened to its fullest extent.

Dangers From Pump Running Short of Water

It is dangerous to allow a centrifugal pump to run more than a few minutes when full of water unless this is actually passing through the machine. The temperature under such circumstances rises rapidly, evaporation begins in a few minutes and the pump may be ruined soon unless brought to a standstill. While running this condition may be brought about by either of two contingencies; the water level in the sump may fall below the foot valve, thus depriving the pump of water, or an accumulation of refuse in the sump may, through the absence of a suitable screen, block the valve and thus prevent the water from reaching the pump. To forestall these possibilities safeguards should be provided on every pumping unit. A suitable float should be placed in the sump indicating within the pump room at all times the level of the water; at low water this should automatically shut down the pump motor. As an additional safeguard a watertight fire alarm should be fitted to the pump itself, so arranged as to cut off the motor current in the event of an undue rise in temperature.

The bearings of a centrifugal pump require constant supervision, because any journal running at, say, 1,500 r.p.m. develops trouble with extreme rapidity when once things begin to go wrong. Pump bearings, of course, become warm soon after starting, even though they are water-cooled. They should not be permitted to reach a high temperature, and anything over about 100 to 120 deg. F. should be treated seriously. A bearing developing this temperature should be opened and examined at the first opportunity.

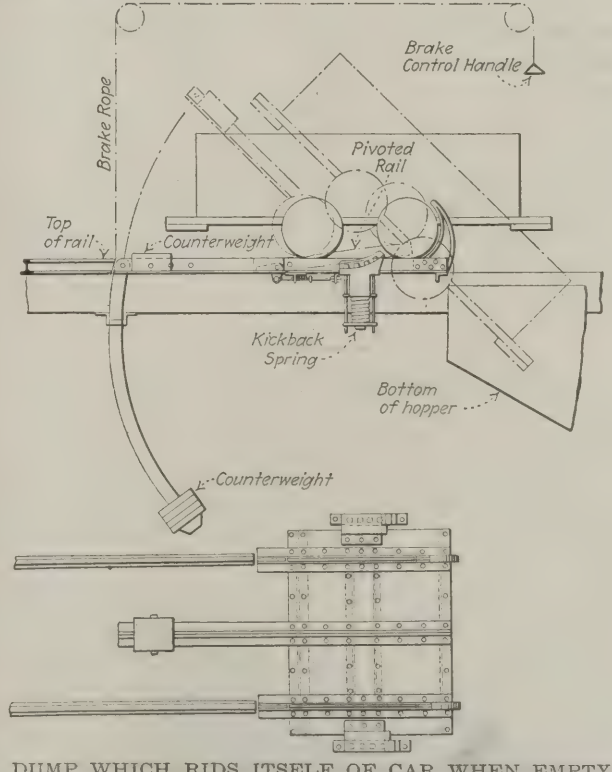
To obtain satisfactory life from bearings and freedom from overheating they must be supplied with suitable oil. Once having made a selection the same quality and grade should be habitually used except under unusual circumstances. Heavy oil should not be employed because of the difficulty in maintaining its free circulation through the bearings and journals, a failure in which results in overheating and excessive wear. On the other hand, use of an extremely light oil should be avoided, as it provides insufficient body between the bearing surfaces. Furthermore, when raised in temperature because of its low viscosity, abnormal quantities are carried into the bearings by the oil rings. This may result in splashing and leakage.

It is perhaps unwise to rely altogether on the pump attendant to keep a constant watch on the bearings. For this reason it is advisable to install a suitable fire alarm on each, working in conjunction with the one on the pump itself. All three may be arranged to interrupt the motor circuit in case of any excessive rise in temperature.

Dump That Ejects Empty from Platform

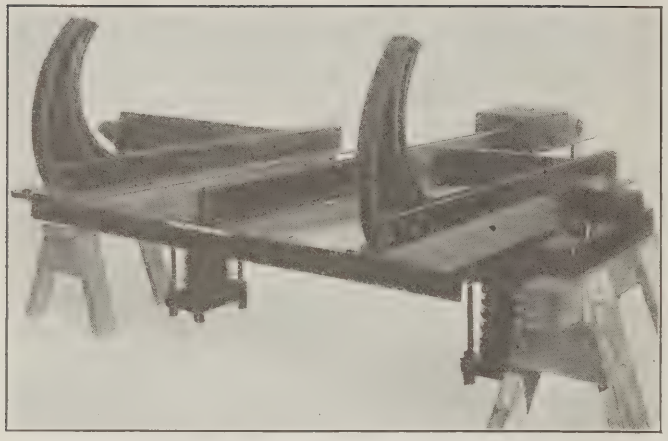
DUMPING, or the discharge of a car's contents, while admittedly a minor operation in coal producing, nevertheless is one of such importance that it often requires close attention. Many schemes and devices have been invented to accomplish the desired result. One of the latest of these is shown in the accompanying illustration.

This dump, which is of the kickback type, is designed to afford some of the advantages and speed of the crossover dump. As may be seen in the accompanying illustration, the device embodies a combination of tilting platform and tilting rail sections. The tilting rails are attached to steel springs, the tension of which is adjustable and may be made such that a loaded car will depress them whereas they will rise under the weight of the same car when empty.



DUMP WHICH RIDS ITSELF OF CAR WHEN EMPTY

"Kickback dumps" when they return the car to the horizontal give it little if any movement backwards. For this reason they are ill termed "kickbacks." They are so-called only because if they kick anyway they should kick back but they don't really kick at all, and the men who handle the car are relied on to move it to the nearby empty track. This dump has pivoted rails that the car before dumping depresses. After the car is dumped and righted the rails rise so that the coal rolls off the dump without the interposition of a hand.



DUMP SHOWING SPRINGS WHICH MOVE PIVOT RAILS

When the car comes on the dump the wheels force down the pivot rails which sink to the level of the rails on the dump platform. After the car is dumped it is too light to hold down the pivot rails and they spring up putting the car on a grade steep enough to hurry it off to the empty track where the grade, there provided, will take care of its further movement.

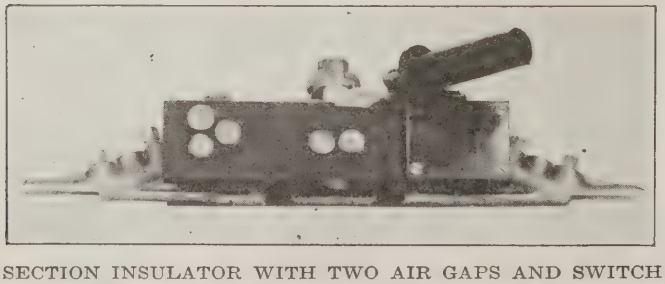
In operation when a car comes into this dump it depresses the tilting rails against the tension of the springs till the rails reach the level of the angle irons between which the tilting rails move. Here these rails are locked in their depressed position while the bed or platform, tilts upward to the dumping position of the car. The dump may be held in the up-tilted position as long as desired by means of a brake lever bearing against the sword bar which projects downward from the end of the dump arm.

When the sword is released, however, the dump returns to a horizontal position, upon attaining which the tilting rails are unlocked. The tension of the springs under the ends of these rails is sufficient to force them upward now that all that resists their upward movement is the weight of an empty car. Accordingly the car is given a decided impetus backward off the dump and through the kickback switch. From this point onward arrangements may be made for the free movement of the car under the action of gravity.

Because of its construction and method of operation it is claimed by the makers, the Charleroi Iron Works, of Charleroi, Pa., that this dump is not only strong, simple and positive in operation but that it permits greater speed in dumping and is not as destructive to cars as dumps of the ordinary type.

Double-Gap Section Insulator with Parts Renewable Without Removal from Line

AS THE electrification of coal mines has resulted in the construction of an extensive overhead network of charged wires and as the mining industry, like many others, employs in the main relatively unskilled laborers for the handling of these uncovered conductors, it is necessary to have a means of protecting these men while they are performing their duties. This protection usually is afforded by section insulators, the use of which in most states is required by law.



SECTION INSULATOR WITH TWO AIR GAPS AND SWITCH

The two beams, one on each side of the arcing tips leave a clear space above. Thus there is no charring, the arc tending to be blown out instantly when the switch is opened under load.

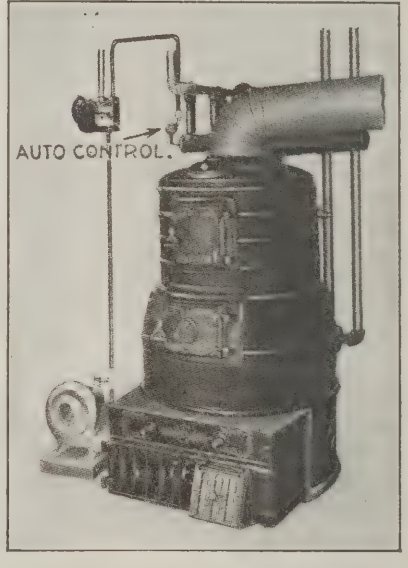
The Westinghouse Electric & Manufacturing Co. has developed a double-gap section insulator which meets all service conditions and also fulfills the requirements of the mining laws.

It is a double-beam insulator having two air gaps as insulating mediums and a hand-operated switch mounted on the top of the wooden beams. It is intended for use in mines where the operating voltage is 600 or less. The arcing tips, castings and approaches are made of bronze and can all be renewed without removing the insulator from the line. The switch contacts, on top of the end casting, also are renewable.

The two beams, one on each side of the arcing tips, leave a clear space above, and no trouble is caused from the arc charring the beam. This arrangement also has the advantage of giving a blowout effect on the arc when opening the switch under load. Another advantage which is especially appreciated in low mines is the small overhead room required.

Grate for Domestic Use of Bird's-Eye Coal

SUFFICIENT effort seems hardly to have been made by producers to induce the domestic consumer to use fine sizes of anthracite. There are two parties interested in the sale of fine sizes, the producer and the consumer; the retailer is not affected much either way. The producer finds sale for an otherwise waste product and the consumer gets a coal that is delivered to him at a rate below the cost of product plus freight and handling. It will be interesting, therefore, to note that the New England Fuel & Supply Co., of 73 Water St., Boston, Mass., is prepared to supply a grate for burning Schuylkill bird's-eye (No. 2 and No. 3 buckwheat) with the necessary electric fan blower, electric control and cleaning tools. The grate is perforated with slots measuring $\frac{3}{16}$ x $\frac{1}{16}$ in. and is laid on the top of the grates already installed. The fan is of a special composition aluminum and has six to ten blades operating in a cast-iron case. The electric control cuts off the electric current when the temperature of the hot water on the heater or furnace pipes reaches the desired point and starts the fan going as soon as the temperature falls to another suitable level. When running the fan keeps the ashpit under a steady pressure.



BIRD'S-EYE MAY YET BE A DOMESTIC FUEL

By the use of a special grate, an electric fan blower with electric control bird's-eye coal can be used in connection with the ordinary household furnace.



Some Recent Developments in Scraper Loading Methods*

Scraper Used for Storage and Reclaiming of Coal on Surface—Self-Transporting Chute for Loading Cars Underground, with Equipment for Operating Scraper and Illuminating Face—Keeps Ropes off Heading

By J. S. Housman
Chicago, Ill.

THOUGH mechanical loading has made much progress, the art still demands a close co-operation between operator and manufacturer. Much exceptional work has been and is being done both in mine and factory. In this article will be detailed the experience of the Goodman Manufacturing Co., of Chicago, Ill., in loading coal by mechanical means under widely varying mining conditions.

Mechanical loading may be said to divide itself into two principal classes: (1) That in which the material to be loaded is put into cars immediately at the point where it is loosened from its original location, and (2) where the material is transported a distance from its original place and put into cars by a scraper, conveyor or some other means. The first class may be termed that of face loading, the second that of entry loading.

It is with the scraper method of entry loading that this paper has to deal. This method was selected as the most desirable point of attack in the solution of the general loading problem because it seemed to require the simplest and least expensive form of apparatus and to be capable of great flexibility in operation.

The most usual form of scraper loader is so well known in the industry that it is unnecessary to give here more than the briefest description. It consists in principle of a bottomless scoop, or scraper, moved by a head rope and a tail rope and guided by sheaves and deflectors suitably located and actuated by a two-drum winding engine. A chute, or runway, is built at the outlet of each working place served, so that the scraper may deliver its load over the edge of the car.

As the winding engine usually is located in the entry and the scraper operates at the face, a signal system must be installed between them. The illustrations herewith make apparent the manner in which the scraper operates.

It has been ascertained by experience that a scraper loader of this type is best adapted to the following mining systems: (1) Longwall, either advancing or retreating; (2) panel work; (3) room and pillar, where wide faces, say 60 ft. wide or wider, are available; (4) pillar drawing, where the same general plan is used as in longwall work.

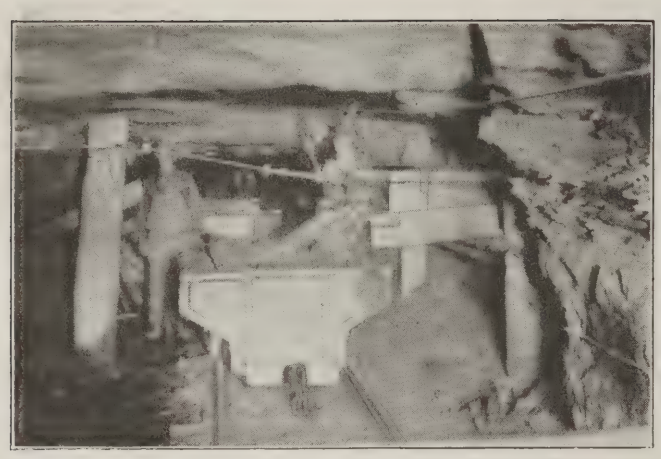
Cost of Hand and Scraper Loading Compared

Data have been procured showing the cost of mining and loading coal by hand and with the aid of the loader at various mines, each using some one of the foregoing systems. The method adopted for comparing hand with scraper loading is based upon the assumption that both start at the same point—that is, at the face which has been undercut and is ready to shoot. The governing factors for hand loading are as follows: (a) Loading rate per ton of coal, usually including drilling, shooting and powder; (b) yardage per ton of coal loaded.

The items for loading with the mechanical scraper loader are: Comparative mechanical scraper loader cost, including the following items: (a) Total labor; (b) powder; (c) power; (d) rope renewals; (e) miscellaneous repairs and supplies; (f) depreciation; (g) interest. The cost of building chutes and preparing places might be added but is paired against the saving in gathering and in track.

As typical installations of the equipment may be cited: First, a mine in West Virginia which has two

*Article presented at annual meeting of Alabama Mining Institute, Birmingham, Ala.



SCRAPER LOADER DISCHARGING COAL INTO MINE CAR

A chute is built on the entry to permit the scraper to get over the top of the car. This shows the condition where entry height has been made by taking down top. The chute is not moved till the place is worked out. With this arrangement cars can be loaded in full trips. As soon as one car is loaded another takes its place, something entirely unknown where the loading is done at the face.

scraper loaders in operation. The thickness of the coal seam in this mine varies from 24 to 28 in. The coal is covered with 4 in. of drawslate that comes down when the face is shot and is gobbed by the loader crew. The work is done on a 175-ft. face and the men load approximately 60 tons per day at a saving of 53c. per ton. The hand-loading costs are:

(a) Loading rate, per ton	$0.75
(b) Yardage, per ton	.45
Total, per ton	$1.20

The mechanical loading cost per ton is 67c.

Second, a room-and-pillar mine in Kentucky which has three of these loaders in operation, working a coal seam 40 in. thick which is overlaid with from 2 to 10 in. of drawslate that comes down with the coal. The room faces are about 50 ft. wide. During the month of July the scraper-loader coal was cut and loaded, the slate gobbed and the places timbered for 90c. per ton.

Third, a mine in West Virginia with coal 30 in. thick, working a 150-ft. longwall face. There are five men on the loader at a contract price of 40c. per ton, a saving over hand loading of 42c. per ton. The hand loading costs are:

(a) Loading, per ton	$0.70
(b) Yardage, per ton	.12
Total, per ton	$0.82

The illustrations indicate the possibilities of the loader in underground work. It also is being used successfully in surface work such as stockpiling and the loading of coal into railroad cars and trucks.

Some time ago a general manager of a coal company in West Virginia determined to put his coal into a stockpile when short of railroad cars. This plan not only would enable him to keep his mine in daily operation with a certain degree of independence of car supply but also would provide a reserve stock of coal that could be drawn upon at any time to take advantage of a rising market.

The natural conditions lent themselves readily to the general scheme. The drift opening of his mine was high up the side of a mountain, giving plenty of height for dumping and storage. The slope of the mountain caused the coal to flow readily down to the pathway of the scraper loader.

The loader he is using consists simply of a tandem two-drum winding engine and a scraper of one-ton capacity. The engine or hoist is placed at one side and near the foot of an inclined runway which he caused to be constructed between the tipple and the foot of the slope of the stockpile. Here the operator of the hoist has full view in both directions and can thus respond to any signals made to him from the tipple or the scraper loaders.

The scraper runway is built temporarily of planks, but is to be replaced by concrete. The incline to the tipple is 100 ft. long and has a pitch of 27 per cent. The scraper discharges into a bin in the tipple, where the coal may be loaded direct as mine-run or passed to the screens for sizing.

Two men operate the apparatus, one being at the winding engine and the other at the stockpile, where he can guide the scraper while loading. A letter from one of the men connected with the installation gives the following data:

"I have not as yet been able to run a full day on account of shortage of railroad cars, but the following will show some of the results obtained:

Date	Railroad Cars	Time
Aug. 1	3 (two of 55 tons one of 70 tons)	
Aug. 5	4 (all 55 tons)	
Aug. 10	3	5½ hr.
Aug. 14	3	4 hr.
Aug. 21	2	2½ hr.

I have loaded three 55-ton cars and one 70-ton car in 5½ hours and can load 300 tons in eight hours with two men to help me."

A later letter gives the following operating results:

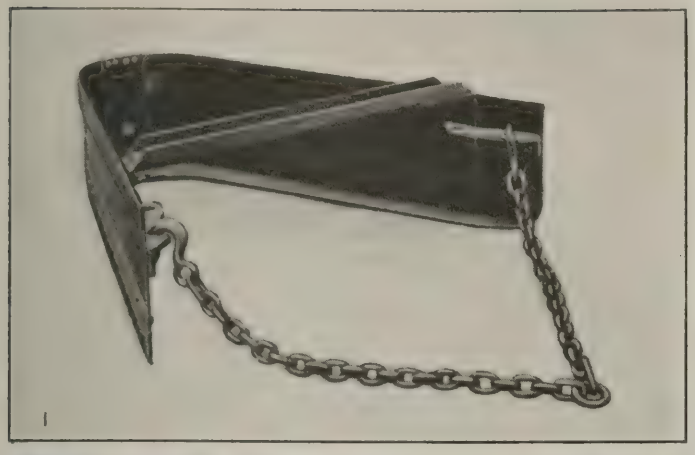
Date	Tonnage	Time
Sept. 4	150	3 hr. 26 min.
Sept. 6	165	3 hr.
Sept. 13	100	2 hr. 18 min.
Sept. 16	120	2 hr. 12 min.
Sept. 17	305	6 hr. 17 min.
Sept. 25	220	4 hr. 30 min.
Sept. 29	225	4 hr. 10 min.

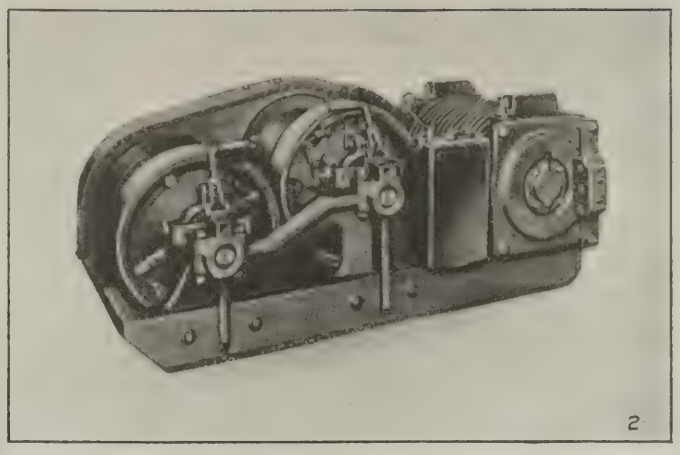
Storage as Essential as a Flywheel

The advantages to be gained by an installation of this kind are: (1) Steady operation of the mine, affording all the economies of regular working, reduced overhead expense per ton produced, greater efficiency from men and machinery and improved mine conditions. (2) Better organization of men due to steady work. (3) Reserve stock for shipping on a rising market. (4) Maintenance of uniform daily shipments regardless of late delivery of cars. (5) Maintenance of uniform daily mine output, despite any delay in production due to trouble underground. (6) Increased allotment of railroad cars resultant on increased ability to load them quickly.

This method of operation is not confined to mountainous country alone, for at an operation in Kentucky the coal is dumped on the level, the loader apparatus doing both the stockpiling and car loading. This machine has handled 320 tons in 8 hours—that is, it has placed on a stockpile 195 tons and loaded 125 tons in trucks and wagon.

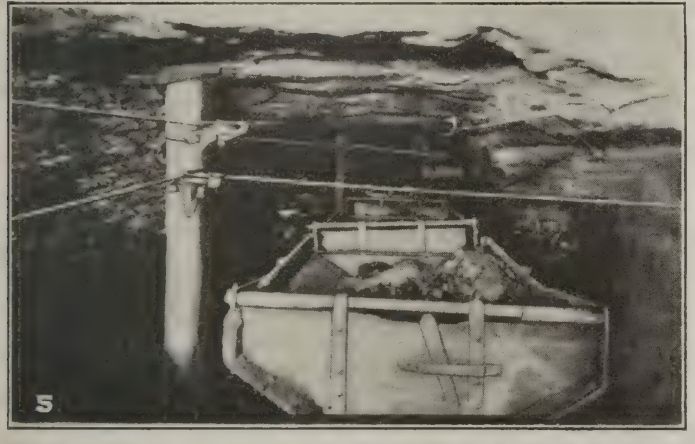
To obtain even greater flexibility and reduce the "dead work," or time required to maneuver the equipment about the mine, another type of scraper loader having the same functions as that described but which has further advantages has been devised. The same





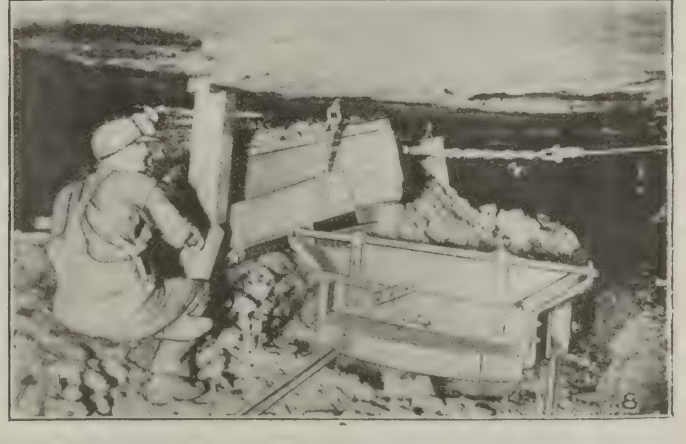












SCRAPER LOADER WITH STATIONARY HOIST SET IN HEA DING

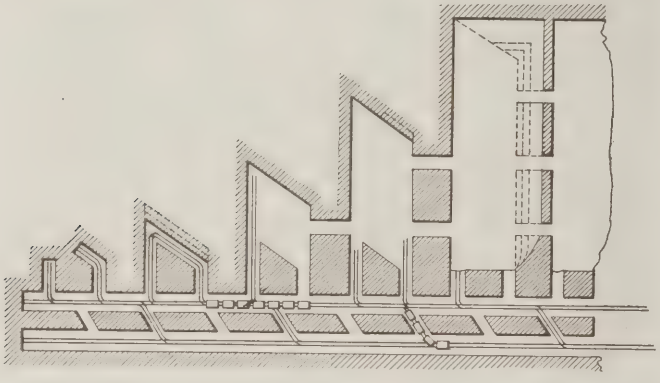
(1) Bottomless scraper 18 in. high with a capacity of 1,000 lb. The scraper is pulled into the coal by the chain shown and returned empty by a rope attached to the rear of the scraper. (2) This scraper hoist has a height of 27 in. and is equipped with a 35-hp. motor. (3) Winding engine on entry ready for scraping. It is held from moving forward by the two props in front and from tipping up by a piece of timber driven between the motor and the roof. Any comparatively level spot will serve. (4) Winding engine with center sheaves. (5) Ropes and post sheaves. The ropes lead from the center sheave to those in the foreground. The tail rope is the lower one. The pull rope can be seen crossing the entry further up. (6) Filling up a scraper with coal. The seam is 28 in. thick. (7) Scraper seen from behind. (8) Scraper discharging coal into car in a longwall mine. Here bottom is lifted in the roadway, and a mere apron serves to elevate the coal instead of a more lengthy dragging plane.

bottomless scraper, closed sheaves, jacks, deflectors and signal systems are used on both types of loaders.

This type of loader is somewhat more complicated than the first, and the impression might prevail that sight has been lost of the fact that simplicity is the prime requisite in scraper-loader apparatus. It is quite true that any combination of two or more mechanical devices interdependent in operation usually produces complication, yet in this case it was felt that the advantages to be derived would more than compensate for the problematical disadvantage referred to, and so it has proved in actual operation.

As to the costs of running this type of scraper loader may be cited the results in a mine in Kentucky which is working a coal seam 72 in. thick. The roof is of limestone above 7 in. of drawslate which comes down when the coal is shot and is handled by the loader crew.

There is also a 2-in. blue band in this coal bed about 24 in. from the bottom of the seam. This bottom is



ROOM-AND-PILLAR SYSTEM WITH DIAGONAL FACES

This plan shows how the diagonal faces finally can be squared up and the pillars worked away till only a narrow pillar remains between rooms.

of a very soft fireclay. The following data have been obtained from actual experience acquired in the operation of one of these machines over a period of a number of days:

Capacity of cars, tons	2
Total daily output of mine, tons	1,198
Daily output of loader, tons	72
Average time worked daily by loader, hr.	4.7
Average output per hour by loader, tons	15½
Average number hand loaders in mine	129
Average output per day per man hand loading, tons	8¾
Average output per day per man with loader, tons	18
Theoretical average output per man loader working full shift, tons	31
Hand loading rate per ton	$0.76
Cost per ton with loader	0.46
Actual saving per ton	0.30
Theoretical saving per ton on loader working full shift	0.50

A full shift log kept by the general superintendent of the mine shows that the total time from start to end of shift was 7 hr., 26 min. This time was divided as follows:

Loading cars	4 hr. 36 min.
Cleaning track	25 min.
Loader delay	38 min.
Pulling down coal	46 min.
Moving loader device	55 min.
Miscellaneous delays	10 min.
	7 hr. 26 min.

Total output from three 30-ft. places was 114 tons. The average lading per car was 1.7 tons.

2 cars averaged		1 min. per car
7 cars averaged		2 min. per car
19 cars averaged		3 min. per car
23 cars averaged		4 min. per car
5 cars averaged		5 min. per car
2 cars averaged		6 min. per car
3 cars averaged		7 min. per car
2 cars averaged		9 min. per car
2 cars averaged	(cleaning up places)	10 min. per car
1 car averaged	(cleaning up places)	15 min. per car
Total 66 cars		4 hr. 36 min.

Average time per car 4.2 min.

Total delay 172 min. of which there was chargeable to loader 38 min.

This particular run showed a saving of approximately 50c. per ton.

Another room-and-pillar mine in Kentucky is working a coal seam 40 in. high which has drawslate approximately 7 in. thick, that comes down when the coal is shot. The faces of the rooms are 40 ft. wide. A crew of four men gobs the drawslate and loads the coal for a contract price of 50c. per ton. The hand loading price is 81c. per ton.

This company also has a large acreage of slightly pitching coal which cannot be recovered profitably by hand, due to excessive yardage costs and the refusal of the miners to push the cars up the pitch without compensation. Both factors are problems eliminated by the use of the scraper loader.

Advantages of Locomotive Chute-Hoist

It is claimed from experience that scraper loaders can be operated successfully either by day work or on contract. The following are outstanding features of the scraper loader just described: (a) The hoist is self-propelling. (b) The chute is mounted over a hoist, thereby saving the cost of wooden chutes. (c) The system is flexible, because the hoist, being self-propelling and self-contained, is not tied up to a restricted area. (d) The operator is in position to see the scraper both when being loaded and when dumping into the cars, as the hoist is set in the room neck. (e) The equipment can be operated with one man less than is required with the first arrangement. (f) The rope at the face is sheaved automatically by the operator of the hoist, thereby eliminating the labor of sheaving the rope. (g) One less jack and sheave are used at the face and the center sheaves and all post sheaves on the entry also are eliminated. (h) No chute aprons are necessary; a complete chute and apron are part of the hoist. (i) It is not necessary to stop on the straight rib when coming out with the loaded scraper, production thereby being speeded up; this, of course, is due to the automatic rope-sheaving device. (j) Little work is necessary in making a new installation, as there is no need to build chutes nor set props for sheaves on the entry. (k) Speed is made in moving from place to place; thus at a mine in Pennsylvania a place was finished, the loader was moved and the scraper loader was operating in the next place within 15 minutes. (l) When ready to move to a new working place, the scraper and other accessories are pulled into the chute by the hoist, thereby reducing the manual labor of handling the scraper and accessories. (n) The scraper can be worked successfully in low coal on a 40-ft. face. (o) The room neck and switch are left open for the mining machine when the loader leaves.

The following advantages and savings may be

effected by any mechanical loader: (a) The haulage system is concentrated; in other words, the daily output of coal loaded mechanically will be obtained in from one to four places, depending upon the length of the face and whether the system in use is a longwall, panel or room-and-pillar working. (b) The locomotives travel less territory for the same quantity of coal due to the concentration, thereby reducing the haulage costs. (c) A new mine could confine all operations to one definite section; after working out this part of the mine, the same steel, ties and trolley wire could be moved over to the new working faces; this, because no such scattered territory as is required by hand loading is necessary with a mechanical loader. In other words, there is need for only about one-fourth the number of working places for the same tonnage, consequently the extra development is not necessary. It readily can be seen that the saving in steel, ties, trolley wire and maintenance would be considerable if this system were followed. (d) The concentration of the workings due to the use of the mechanical loader means higher efficiency from the cutting machine, as the time lost in moving from place to place would decrease. The time gained could be utilized in actual work, thereby increasing the tonnage profits from each piece of cutting apparatus, as the only time it is making money for the owner is when the machine runner's helper is shoveling bug dust. (e) Places are worked out faster, which is an advantage when a mine has a tender top. The greater the speed of working out the place, the less the time for the roof to give trouble. (f) The chance of having to pay compensation is reduced from a minimum of one in two to a maximum of one in five. This, of course, all depends on the increased tonnage per man at any particular installation, for the fewer the men the less chance of injury. (g) The tonnage per man has been increased in many cases from the familiar figures of from 4 to 10 tons per man per day in hand loading to from 20 to 25 tons per man per day with the mechanical loader. (h) The decrease in the number of men for a given production also means that the present equipment of miners' houses and other facilities will serve for a large percentage of increase of output.

Where Scraper Has Advantages of Its Own

A scraper loader not only gives the foregoing advantages applicable to any mechanical loader, but in addition to these, the following: (a) The gathering haulage cost by use of scraper loader is further reduced as the mine car never leaves the entry. (b) A larger mine car can be used with the scraper loader, especially in low coal, as it always remains outside the working place. This not only means more tonnage per car and a saving in haulage cost, due to the larger car, but it also makes savings in oil, grease and maintenance, as there are only four wheels on a 3-ton car whereas there are twelve on three 1-ton cars. The initial investment would be less, because fewer cars are needed in a concentrated mechanical loading area than would be necessary in the scattered hand-loading territory. (c) The use of the scraper eliminates all necessity for track in the room for haulage purposes. This does away with the time lost due to wrecked cars on poorly laid room tracks. (d) The yardage cost is practically eliminated, for the scraper itself is only 18 in. high and as this is the largest moving part that enters the working place, no bottom need be lifted or top brushed in any room in which a man would be able to crawl to the face. (e) In dipping rooms the need for a small hoist to pull the loaded car from the face is obviated. The trouble caused by the miner losing control of an empty while going into a room also is eliminated. (f) In rooms driven to the rise the gathering locomotives need not enter the working place. The danger of a car getting away while being loaded also is eliminated. (g) More lump coal can be loaded in low coal seams where the height between the top of the car and the roof is small. This, of course, is due to the fact that the scraper pulls all the coal to the entry, where there is more height. The breakage of the coal due to the transporting in the scraper is practically nil, as the first few scraper loads in a new working place are composed of bug dust from the cutting machine, a small quantity of which will fill up any unevenness in the runway and act as a cushion for the remainder of the coal. (h) If a place caves at the face, there is no possibility of losing any part of the apparatus except possibly two jacks and sheaves, which may be replaced at low cost. (i) The time lost in replacing a loaded car with an empty is negligible, being made between the trips of the scraper. (j) The design can be kept simple, as a scraper loader does not need the multiplicity of moving parts necessary in a piece of apparatus which picks up and loads its own coal.

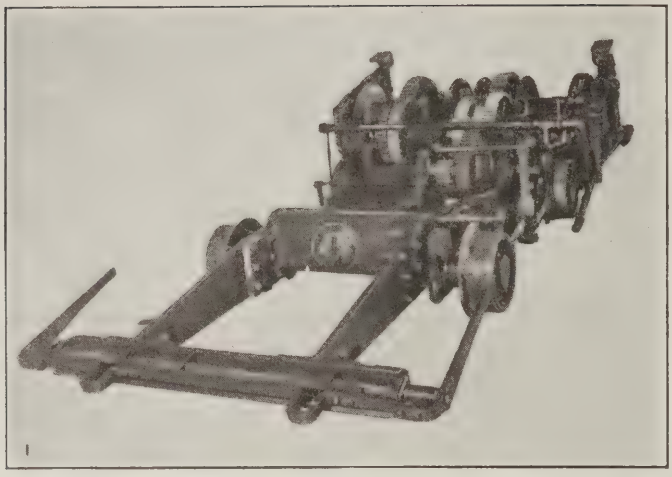


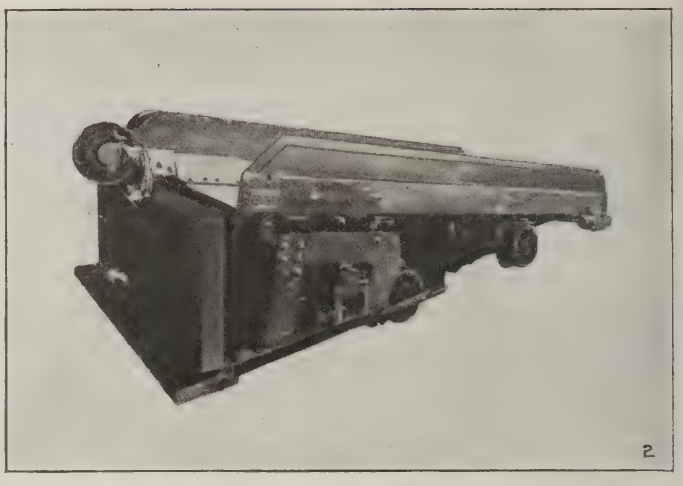
RECLAIMING STORED COAL BY SCRAPER LOADER

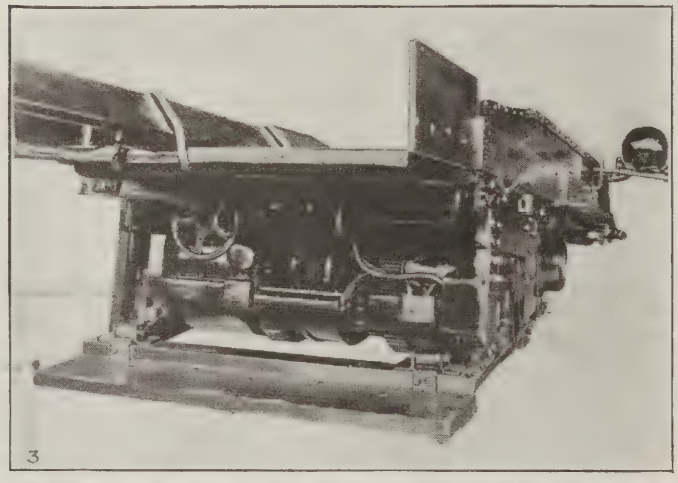
The coal can be not only reclaimed but also stored with a scraper loader. In this illustration the scraper can be seen pulling coal up to the chutes to be delivered by them to the cars in the ordinary manner. With this arrangement no slack cars need be left over from one day to the next.

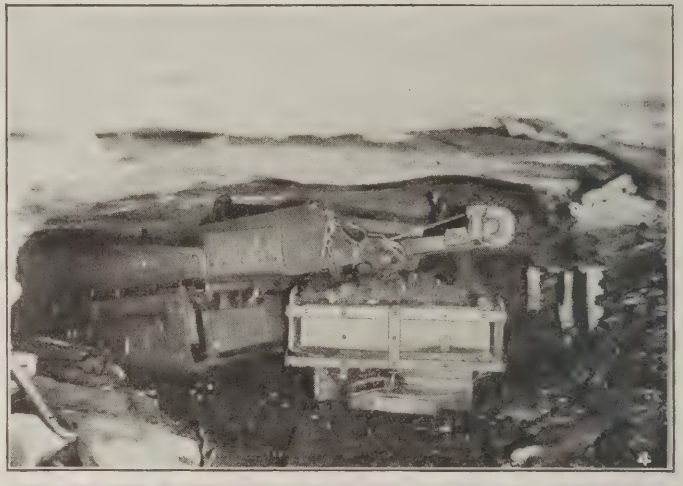
The following are the conditions that will limit the production of mechanical loaders: (a) Impurities in coal seam so located that they mix with the coal when shot, thus delaying the loader; (b) inadequate car supply; (c) lack of proper support from mine officials. This failure to provide mechanical loaders with the facilities that should be afforded them can be attributed to the fact that a loader generally is installed in a section of the mine to itself. The bulk of the coal in most mines at the present time comes from the hand-loading section of the mine, hence where there is a shortage of cars the mechanical loader suffers, as it is natural for the mine foreman or haulage boss to throw all the favors to the sections producing the most coal. Later on, as the loader becomes established, the mechanical device will get its share of the cars. In other words, the more mechanical loaders there are, the better will be the service they will get.

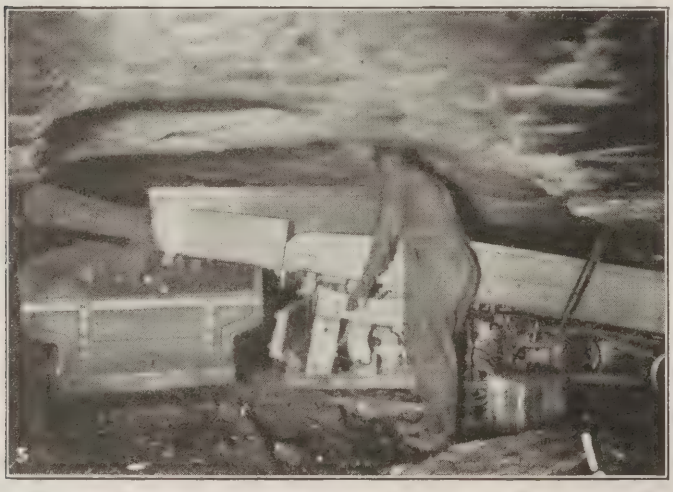
The history of the development of the scraper loader



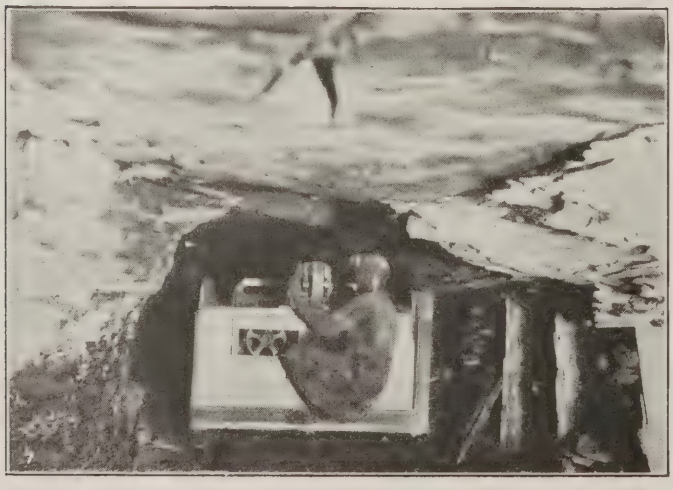












SCRAPER LOADING WITH LOCOMOTIVE CHUTE AND HOIST

(1) Gearing of hoist with chute removed. (2) Chute with head-pulley arm telescoped. This is a view of the completed hoist in its traveling position. It is self-propelling and self-contained and automatically sheaves the rope. (3) Loader with arm extended as seen from the heading side. Note the headlight on the machine which enables the operative to see the coal face. (4) Loading coal into car, the scraper being pulled up to the head pulley. (5) Hoist in position. Two short jacks hold the machine in place while loading. One of these can be seen in the illustration. (6) Loader leaving room neck carrying scraper. For transportation the scraper and other accessories are pulled into the chute by the winding engine. (7) Chute-hoist in the entry making its trip from room to room.



SCRAPER GATHERING COAL FOR SHIPMENT
Another view of the storage pile shown on a previous page. At this mine the operator during the depression had dumped 5,000 tons of coal in a pile which he was able to load out during the strike at a good profit.

is a repetition of the history of other mining machinery. The cutting machines passed through the same process of evolution and education. In the early days, to the skeptical mind, undercutting by machinery was impracticable, but today practically two-thirds of the coal produced in this country has been undercut by a mining machine.

The scraper loader has successfully passed through these various stages, and one point has been thoroughly demonstrated: To make a success of a loading machine in a mine, every effort must be made to keep the equipment working. Tonnage lost by any delay is irretrievably lost, because a loader loads at its maximum efficiency at all times. In other words, there is no possibility of speeding it up and regaining lost time.

With proper co-operation there is no doubt of the complete success of scraper loading. It has already proved its adaptability to widely varying sets of conditions.

The headpiece of this article shows a scraper being filled with coal. The illustration exhibits also how the sheave is placed by which the scraper is directed. The return rope can be detected at the rear of the scraper.

Reports and Investigations State Geological Surveys and Mining Bureaus

Coal Reserves in Armstrong County, Pa.

By John F. Reese

ARMSTRONG COUNTY, Pennsylvania, has six coal beds that are now of economic interest. In order of present importance as shipping coals they are the Upper Freeport, Lower Kittanning, Upper Kittanning, Lower Freeport, Pittsburgh and Brookville.

The extensive development and outcrop of the Upper Freeport bed throughout the county have furnished many measurements of its thickness, making possible an accurate estimate of quantity.

The percentage of this bed that can be recovered is governed by the sequence in which the Upper and Lower Freeport coals are mined. If the Lower Freeport bed is worked first and pillars are drawn, the overlying rocks will cave and break the Upper Freeport bed, thereby causing a partial and in many places complete loss of that coal. The Upper Freeport bed contains the second greatest reserve within the county and is the largest producer, yielding about 3,500,000 tons yearly.

Throughout the townships in the northern half of the county where the lower Kittanning coal outcrops a fair amount of information as to its thickness and persistency is available. For the townships in the southern half data are meager for purposes of calculation and a general average based on thicknesses in surrounding areas was adopted and a low percentage of recovery allowed because the extent and thickness of this bed are not known. This bed contains the greatest coal reserve within the county and ranks second in production with a total of over 1,500,000 tons annually.

Little information as to the extent and thickness of the Upper Kittanning bed is available, except from its recognized outcrop and development in a few localities. This bed is extremely variable as to section and thickness, attaining great height in local troughs or channels 200 to 300 yd. in width and thinning to 12 in. or less at trough limits. It is known as the "Pot Vein" because of this peculiarity. The Upper Kittanning bed in these troughs is a cannel coal, with 24 in. or less of bituminous coal under the cannel. Where available measurements show sufficient thickness for mining, the presence of small workable areas contiguous to the place of measurement has been assumed. The quantity of coal was computed from the average thickness of the bed in that vicinity. A low percentage of recovery has been adopted owing to the extreme variability of this bed and lack of knowledge of persistency and extent.

A fair number of measurements of the thickness of the Lower Freeport coal are available from its outcrop and development, making possible a fairly accurate computation of quantity. Little is known as to the extent and thickness over large areas and a general average based on thicknesses in surrounding areas has been used in calculations. A low percentage of recovery was adopted for this reason and because of the general "faulty" condition of the bed where this coal is mined.

The extensive development and outcrop of the Pittsburgh bed furnish a fair number of measurements of its thickness, thus making possible a reliable computation of quantity.

For some localities no information is available as to the mined-out areas of the various beds computed herein. For these places an estimate of probable depletion has been made based on age and size of operations, or on the difference between original areas and statements of acreages remaining unmined.

The result of computing the coal reserves within this area based on the latest maps, engineering data and methods is shown in the accompanying table.

COAL RESERVES IN ARMSTRONG COUNTY *

Bed	(In Net Tons) Original Deposit	Mined Out	Recoverable
Pittsburgh	17,500,000	13,900,000	2,800,000
U. Freeport	1,288,300,000	60,350,000	943,000,000
L. Freeport	607,000,000	5,000,000	387,100,000
U. Kittanning	131,500,000	4,500,000	69,900,000
L. Kittanning	1,541,200,000	23,510,000	1,001,000,000
Brookville	165,200,000	30,000	87,300,000
Total	3,750,700,000	107,290,000	2,491,100,000

* The area of Armstrong County is 682.2 square miles.

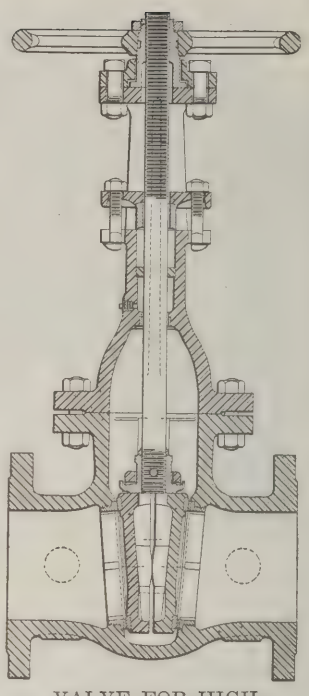
Steel Cast Valve with Monel Metal Parts For Use with High-Pressure Steam

INCREASING use of high pressure and superheat in modern power plants has been responsible for various improvements in the design of valves and fittings employed in the transmission and control of steam during recent years. In many instances not only has the design itself been improved but the substitution of materials better adapted to the purpose in hand than those ordinarily employed has resulted in a marked increase in utility.

The valve shown in the accompanying illustration is a case in point. In this valve a steel casting has been substituted for the cast iron usually used. No gaskets are employed, all joints under pressure being made with metal to metal surfaces. Aside from the fact that the body of this valve is a steel casting and all bearing surfaces coming in contact with each other within the valve body in controlling the flow of steam are made of monel metal, certain other details increase the utility of this piece of equipment. Among these might be mentioned a monel metal collar rolled into the upper portion of the bonnet against which the gate nut bears when the valve is open and a stuffing box of generous proportions, the gland being drawn down by means of bolts instead of the ordinary studs.

On this valve even the hand wheel is of steel casting with a rim so shaped and knurled as to give a firm hand hold.

Making the hand wheel of steel not only provides against breakage during shipment but also against breakage of the wheel when in use.



VALVE FOR HIGH PRESSURE STEAM

All joints under pressure have metal to metal surfaces, no gaskets being used.

Valves of this type, which are manufactured by the Reading Steel Castings Co., of Bridgeport, Conn., are made from steel of the following properties: Tensile strength 70,000 lb. per sq.in.; elastic limit, 35,000 lb. per sq.in.; elongation in 2 in., 30 per cent; reduction in area 25 per cent. The analysis of this material is approximately as follows: Carbon, 0.25 per cent; silicon, 0.35 per cent; manganese, 0.65 per cent; phosphorus, not over 0.045; sulphur, not over 0.040 per cent.

With a valve body of this type, should the piping in which it is placed be subjected to excessive stresses, the valve will throw such stress on to the expansion joints where it belongs. If these are not present, however, the valve is capable of assuming a certain amount of distortion without danger of failure. Valves of this kind are built for a working pressure of 350 lb. with a total temperature not exceeding 800 deg. F., or for a working pressure of 500 lb. at a temperature not exceeding 100 deg. F.

British Coal Mines Show Operating Loss In Figures for Quarter Ended in June

As a counter argument against the demand of British coal miners for increased wages the operators have issued figures for the quarter ended June this year, showing operating losses. The figures are as follows:

	Total	Per Ton
Proceeds of sales	£45,875,798	18s. 11.41d.
Net costs	45,910,483	18s. 11.58d.
Deficit	£34,685	0s. 0.17d.

Totals and the amounts per ton of the profits or losses in the different areas:

PROFITS

	Total	Per Ton
Northumberland	£92,480	0 8.18
Durham	411,398	1 1.41
South Wales	175,308	0 4.13

LOSSES

Yorkshire, Nottingham, Derby, Leicester and Warwick	£224,644	0 3.65
North Wales	48,840	1 8.02
Lancashire, Cheshire and North Staffordshire	168,775	0 8.78
South Staffordshire and Shropshire	43,903	2 8.99
Cumberland	36,306	1 10.58
Bristol	12,269	4 2.45
Forest of Dean	7,920	1 2.64
Somerset	8,048	1 2.09
Kent	14,667	3 4.80
Scotland	148,499	0 5.03

Production costs (in which wages were by far the largest item) varied considerably. Scotland was lowest with 16s. 3½d. per ton, and Bristol highest with 26s. 5d. For the country as a whole the figures are:

	Total	Per Ton s.	d.
Wages	£30,540,289	12	7.39
Stores and timber	6,005,714	2	5.77
Management, repairs, etc.	7,884,887	3	3.08
Miners' welfare fund	221,688	0	1.10
Royalties	1,477,190	0	7.32
Total costs	£46,129,768	19	0.66
Less proceeds of miners' coal	219,285	0	1.08
Net costs	£45,910,483	18	11.58

Numbers of employees and the output and earnings per man-shift worked during the quarter:

	Numbers Employed	Per Man Shift Worked: Output Cwt.	Earnings s.	d.
Northumberland	55,469	17.54	8	9.20
Durham	154,840	17.59	9	1.15
South Wales	211,009	16.77	9	8.29
Yorkshire, Nottingham, Derby, etc.	301,897	20.00	12	7.05
Lancashire, Cheshire and North Stafford	135,049	14.32	9	2.18
North Wales	15,708	12.82	8	0.19
South Stafford and Shropshire	6,651	16.13	7	4.27
Cumberland	10,164	13.94	9	11.31
Bristol	2,055	10.34	8	0.81
Forest of Dean	3,907	13.15	7	8.25
Somerset	4,503	13.05	8	9.12
Kent	1,511	20.73	12	9.35
Scotland	122,829	20.01	9	7.95
Great Britain	1,025,592	17.80	10	2.51

The total number of man-shifts worked during the three months was 59,831,062, and the number lost which could have been worked was 4,677,252.

THE COALS OF EASTERN KENTUCKY, when mixed with the proper proportion of low-volatile coal, are peculiarly suited to the manufacture of byproduct coke, states the Bureau of Mines, in Technical Paper 308, just issued. An investigation made by the engineers of the U. S. Fuel Administration showed that in 1917 87 per cent of the northeast Kentucky production, 52 per cent of the Hazard production, and 44 per cent of the production of southeast Kentucky was suitable for making such coke. Largely as a result of the expansion of the byproduct coke industry, the production of coal in eastern Kentucky has grown by leaps and bounds. In fact the field has developed more rapidly than any other major field. The average output for 1916-1920 was more than 13 times as great as the average for 1890-1900, whereas the growth in bituminous output as a whole during the same period was less than fourfold. One consequence of this extraordinary growth has been a development of mine capacity far in excess of the ability of the railroads to transport, so that eastern Kentucky is the scene of transportation difficulties whenever the demand for coal is active.



Problems of Operating Men

Edited by James T. Beard



Investigate Records of All Applicants for Certificates of Competency

Thoughts Suggested by Recommendations of Bureau of Mines Regarding Certification of Mine Officials — Investigation of Candidates' Records Needed

HAVING read with deep interest the various letters discussing the certification of mining officials and particularly the letter of Robert A. Marshall, *Coal Age*, Nov. 16, p. 799, regarding recent conferences on mine-safety-problems, I would like to offer a few comments on the subject.

The letter of Mr. Marshall refers to a circular that was recently issued by the Colorado Fuel & Iron Co., containing certain recommendatoins of the U. S. Bureau of Mines bearing on the matter of the certification of mine officials.

From the reading of the circular, as quoted by Mr. Marshall, it appears that the Bureau of Mines advocates the revoking of certificates of competency every five years. While this may be a good thing, it seems to me that some plan might be worked out by which certificates would be granted, to men who deserve them, without requiring repeated examinations.

Investigation of Candidate's Record Most Effective Plan

My opinion is that it would do more good to adopt some such plan than to require that the men shall submit to an examination, as to their fitness and qualification, each five-year period. This would, of course, require the careful investigation of the record of each certified official.

There is no question but that many incompetent men now hold certificates of competency that have been granted them by regularly appointed examining boards. If an investigation was to be made in regard to this condition, I think that much blame would be found to rest on the shoulders of the state authorities, including the members of examining boards.

Recommendations of Little Value

It will hardly be denied that, in the great majority of cases, very little investigation is made of the previous records of candidates who present themselves for examination. The recommendation as to character and habit, required by law in many states, is generally easily obtained and sufficient attention is seldom given as to its authenticity.

Would it not be well if all such recommendations were required to be properly certified before a justice of the peace, who would be responsible for its authenticity and correctness regarding the facts stated in respect to the character and habits of the applicant.

Examining Board Must Determine Capabilities of Candidates

One of the first questions that an examining board should consider, in acting on the application of a candidate for a certificate of competency, is the question of whether he is a capable man and has had the practical experience claimed. What is needed is men of practical experience, in addition to their theoretical knowledge of mining and reputable character and habits.

Allow me to suggest that the Bureau of Mines would do much good by establishing a short course in mining, conducted by correspondence. I believe such a course would help many worthy men in their struggle to obtain certificates of competency.

In reference to the proper investigation of the character and experience of candidates, it is my belief that the state mining department should make a rigid investigation of each man's record. To that end, the applicant for a certificate should be compelled to file his application with the mining department, say one year before he intends taking the examination.

Many Attempts Made to Deceive Examining Boards

One man with whom I was formerly acquainted, desiring to secure a first-class certificate and not having had the required experience in gaseous mines, undertook to substitute for that experience a subterfuge, by exposing himself, in a closed room, to an atmosphere charged with gas produced by the use of carbide and water placed in the room.

The idea of this man was to study the action of gas on the flame of a safety lamp and claim that his knowledge was obtained through actual experience in a mine generating gas. A little later, the man passed the examination required by law and received his certificate, which would not have been possible had a proper investigation been made of his previous record.

Another instance is that of a young man, a railroad employee who was out of employment, applying to the superintendent of a mine who was a friend of his and gave him work. In eight months' time the young man went before an examining board and was granted a first-class certificate. Had the examining board made any attempt to investigate the man's record and experience, the certificate would not have been given him.

Other cases could be cited showing the need of the rigid investigation of the records of all applicants for certificates; but I will only mention one more. A certain large coal company had a number of assistant foremen who they desired should secure certificates. About two months before the examination, in some mysterious fashion, these men received the questions to be asked and the maps to be ventilated by candidates in the coming examination. Strange to say these men passed the examination and were granted certificates.

In closing, let me say that if more attention was given to the qualifications of candidates for certificates our certified men would not need to have their certificates revoked and pass another examination at stated periods.

W. H. Perdue.

Chattaroy, W. Va.

Electric Cap Lamp in Firebossing

Conditions requiring the use of cap lamps by firebosses—Safety lamp for testing, but electric lamp for light.

MOST firebosses will disagree with the statement made by O. G. Sharrer, writing in *Coal Age*, Nov. 30, p. 879, where he contends that "any official whose duties require him to test for gas in the mine should carry no other lamp than an approved testing lamp."

In this respect, Mr. Sharrer confesses that he is possibly out of date. He acknowledges that a large number of firebosses, today, carry electric lamps in their caps. The conditions under which he has been employed must have been decidedly different from conditions in the mine where I am working.

In my particular section, the chambers or chutes are very steep, pitching from 30 to 70 deg. In climbing these pitches, it is practically impossbile to carry a safety lamp in such a manner as to throw the light ahead and avoid

danger. When going up or down these chutes, one must use both hands to keep himself from falling.

These conditions require a man to carry a good light in his cap and there is no better lamp for that purpose than the electric cap lamp. An open light, would, of course, be out of the question for a fireboss. He must also have his safety lamp attached to his belt and use it for making the test for gas when he has reached the face.

Even when traveling the gangway, a fireboss can inspect the condition of the roof better and detect danger more quickly when he has a good cap lamp on his head. To my mind, for a fireboss to discard the electric cap lamp, in examining a mine, is to deprive himself of one of the best means of avoiding danger and making a thorough examination of his section.

During the past six years, my constant practice has been to carry an electric cap lamp on my head when making an examination of a mine. I believe this is as important as carrying a good safety lamp for testing for gas.

Before closing, allow me to say that I am opposed to the use of a flashlight in any place where firedamp may possibly exist. It is my opinion that every miner and mine laborer should be equipped with an electric cap lamp, since that will afford him the greatest degree of safety in his work.

Shickshinny, Pa. FIREBOSS.

Another Letter

REFERRING to the question of firebosses examining a mine when carrying an electric cap lamp on their heads, exception to which is taken by O. G. Sharrer, in his letter, *Coal Age*, Nov. 30, p. 879, I want to say that my previous claim of such being the present-day practice of a large number of firebosses can readily be confirmed by any who care to investigate further.

It was always my practice, while firebossing in a certain mine that I am safe in saying will certainly prove a difficult proposition for firebosses in the future. The roof in that mine was very poor, as it was in all the mines, in that district, working the same seam. Little attention was given to the future development of the mine and it required no prophet to see breakers ahead and know that a large amount of coal would be lost beyond recovery.

ELECTRIC CAP LAMP AN ESSENTIAL REQUIREMENT

Under the conditions prevailing throughout that district, it is my claim that one essential requirement of firebossing, in those mines, was to provide the best possible light and carry that light on the head, where it would be in the best position to reveal the condition of the roof and enable a fireboss to detect any loose top, faults and other dangers.

The following are some reasons why a good light is essential in firebossing. First, it is necessary to insure the man's own safety; and, second, it is absolutely necessary to the making of a thorough inspection of the mine that will make it safe for work.

The best testing lamp in use gives but a poor light as compared with that of an electric cap lamp. Moreover, the form of a safety lamp is not convenient for throwing the light on the roof where it is most needed in the detection of dangers such as a fireboss is seeking to find. In canting a safety lamp to one side so as to better throw the light on the roof, there is danger of smoking or cracking the glass.

Of all those who work in coal mines, the fireboss has the most need of a good light and the electric cap lamp best meets that requirement. If only for the purpose of lessening the strain on the eyes and avoiding the disease known as "miner's nystagmus," which is so common among firebosses, an electric cap lamp should always be carried when making an examination.

FAILING EYESIGHT OF FIREBOSSES

How many firebosses, on reaching forty or fifty years of age, find themselves incapacitated by reason or their failing eyesight. To such an extent has this been the case in Great Britain, that it is not uncommon for the older firebosses, in that country, to be ordered to get employment on the surface; and, in some cases, I believe, they have been pensioned. These older men, by reason of their mature judgment and experience are needed in the work of firebossing. Young firebosses are apt to be overconfident and make mistakes that the older men have learned through sad experience to avoid.

Some time ago, I was engaged with another man in repairing some stoppings that had been blown out by an explosion. Observing that I kept a watchful eye on my safety lamp, hanging on a timber nearby, my buddy asked the reason and I explained to him how the lamp was my friend, warning me of the danger should gas be present. In another way, though equally true, I have found the electric cap lamp a friend.

When making a test for gas, in order to avoid the bright glare of the light interfering with the accuracy of observing the flame cap in the safety lamp, my practice was to hide the electric light under the bib of my overalls. This became a natural habit of mine when making a test for gas.

Linton, Ind. W. H. LUXTON.

Herrin Murder-Trial Jury

Correcting a wrong statement regarding personnel of jury as being one-half miners. Jury said to include but one miner.

IT WAS with much surprise that I read the statement in *Coal Age*, Dec. 14, p. 964, regarding the make-up of the jury that is to try the men indicted for murder in connection with the Herrin massacre last June.

Speaking of the jury as completed, it is stated, "The twelve are more than half miners." Living in this vicinity as I do, it is my privilege to know, personally, the majority of the men on this jury and their several occupations.

In justice to the county officials and the honor of the State of Illinois, it should be known that the statement quoted above is very wrong. To my knowledge, there is but one miner on the jury, in spite of the efforts made by the defense to pack the jury with such men.

To corroborate this fact reference is made to the clerk of the court, at Marion, Ill. I know that *Coal Age* will gladly correct this error.

Benton, Ill. C. E. CHILDERS.

Mine-Track Switches

Providing a good roadbed — Size of track ties and rails important—Keep all switches clean to avoid derailment of cars.

LOOKING through the pages of *Coal Age*, from week to week, I have found it a great help to me in my work. The inquiry in regard to calculating the dimensions of switches and turnouts was of particular interest, Nov. 16, p. 801.

My experience in reference to mine-track switches leads me to suggest that it is of the utmost importance to provide a good roadbed. The track must be well ballasted and kept drained, if the best results are to be secured. Without these requirements, it is not possible to maintain good track conditions.

The size of the track ties and weight of rails used are also important, depending on the weight of the locomotives employed and capacity of the mine cars. With a 10-ton locomotive, hauling 2-ton cars, we are using 35-lb. steel rails laid on 4 x 6 in. ties. The frogs of all switches are made to match the rails.

One thing that must not be forgotten is the importance of keeping all mine switches clean and free from coal that falls from the cars. Unless this is done, good equipment will not suffice to prevent the derailment of cars or locomotives. ELBERT ROE.

Fork Ridge, Tenn.

Trackage in Mines

Many accidents due to poor mine tracks—Delays owing to derailment of cars cause loss in production—Instance of a mine visited.

FEW items affect both the tonnage and the cost of production of coal to the same degree as the trackage system in a mine. One cannot fail to be impressed with the importance of this fact, in reading D. C. Ashmead's account of what is being done in anthracite mines to lessen derailments, *Coal Age*, Nov. 30, p. 872.

An examination of the conditions existing in a majority of our coal mines will disclose to the most cursory observer the hindrance that a bad trackage system is in the operation of the mine. The trouble may be due to an insufficient number of ties to support the rails; or the use of too light

rails for the weight of locomotives and cars hauled over them.

Bad bonding of rails, cars in poor condition, lack of efficient arrangement of tracks, or want of a proper schedule in haulage may each or all play their part in the final result. An improperly laid track is a great drawback in the production of coal. When a car is derailed the entry may be blocked for an hour or more before the car can be again placed on the track.

Good Track Ties Important

Trouble is often due to the track ties being spaced too far apart; or they are too light for the traffic. My practice has been to space the ties not more than 4 ft. apart, in rooms, and from 2 ft. 8 in. to 3 ft. apart, on the main roads. Wherever the track is curved and on all turns and switches, the ties should be placed nearer together, say not exceeding 18 in. or 2 ft., cen. to cen., at the most.

All track ties must be of sound timber and my preference is to use sawed ties, instead of round timber. An important consideration is to use good cars mounted on good rolling stock. In laying track, it is always bad practice to use too sharp a curve.

Under favorable conditions, where proper attention has been given to the planning of a good trackage system and a good schedule is maintained in haulage, there is no reason why a maximum output should not result. There is no economy in attempting to save expense by using poor material or too small an amount of it when installing a trackage system in a mine. The entire system must be planned with respect to the desired output and the equipment in use.

A Poorly Managed Mine

Not long ago, I visited a mine that had a daily output of about 1,200 tons. On the main road, from the inby parting to the shaft bottom, the track was in good condition and could not be improved. On the cross-entries and on all the gathering hauls, however, the track conditions were very poor.

In this portion of the mine, the ties were not only of inferior quality but they were spaced too far apart, particularly as they were of hewed timber. It seems strange to me that, with the main road in such excellent condition, in this mine, more attention should not have been given to the tracks in the workings.

It will cause no surprise when I say delays in the mine were frequent and prolonged, because of the inability of the drivers gathering the cars at the face, to put the coal on the parting as quickly as the locomotive hauled it to the shaft bottom.

In my opinion, had proper attention been given to the tracks on the cross-entries and the gathering hauls, the output of this mine could have been increased from 1,200 to 1,400 tons a day. No argument is needed to press home the lesson the incident teaches.

Hillside, Ky. O. Kennett.

Inquiries Of General Interest

Calculating Weight of Water in Air Current

Humidity of Intake Air Estimated from Reading of Dry- and Wet-Bulb Thermometers—Weight of Water, Per Cubic Foot of Air, Determined by Temperature and Degree of Saturation

RECENTLY we have been much interested in determining what weight of water is carried into our mine by the air current, under varying conditions. A current of 150,000 cu.ft. of air per minute is passing into the mine. Readings taken with the hygrometer, in the intake airway, on different occasions, gave the following results: Dry bulb, 50 deg. F.; wet bulb, 48 deg. F.

Again, the readings taken were: Dry bulb, 44 deg. F.; wet bulb, 43 deg. F. I am anxious to ascertain the manner of calculating the percentage of moisture, or degree of humidity of the air and the actual weight of water carried into the mine as indicated by these readings. Also, let me ask, what portion of this moisture will be deposited from the air on its passage through the mine?

Lochgelly, W. Va. Mine Foreman.

The percentage of moisture in the air, or the degree of humidity, is the ratio that the actual vapor pressure bears to the saturated vapor pressure, at the given temperature. In order to make this calculation, in any given case, it is necessary to have at hand a table showing the saturated vapor pressures, for different temperatures. Such a table is found on page 77, *Mine Gases and Ventilation*, second edition.

Having this table, the actual vapor pressure, for any given temperature, can then be calculated from the saturated vapor pressure given in the table. The actual pressure is always less than the saturated pressure, by an amount that varies with the barometric pressure and the difference in the temperatures indicated by the dry- and wet-bulb thermometers. The calculation is made by the use of the following formula:

$$p_v = p_w - \frac{B}{30}\left(\frac{t_d - t_w}{88}\right)$$

Applying this formula to the first set of readings given by the correspondent and assuming a barometric pressure, in this case, of $B = 29.4$ in., the saturated pressure taken from the table, for the wet-bulb temperature, being $P_v = 0.3352$ in., we have for the actual vapor pressure,

$$P_v = 0.3352 - \frac{29.4}{30}\left(\frac{50 - 48}{88}\right) = 0.3129 \text{ in.}$$

In this case, therefore, the saturated vapor pressure for the dry-bulb temperature (50 deg.) being $p_{50} = 0.3610$ in., the percentage of moisture or degree of humidity of the air is, $H = (100 \times 0.3129) \div 0.3610 = 86.68$ per cent.

For the second set of readings, dry bulb 44 deg., wet bulb 43 deg., we will assume a barometric pressure of 29.5. In this case, the corresponding saturated pressures, as taken from the tables, are $p_{44} = 0.2885$ in.; and $p_{43} = 0.2777$ in. Then, the actual vapor pressure is

$$p_v = 0.2777 - \frac{29.5}{30}\left(\frac{44 - 43}{88}\right) = 0.2665 \text{ in.}$$

In this case, therefore, the percentage of moisture or degree of humidity is $H = (100 \times 0.2665) \div 0.2885 = 92.39$ per cent.

It now remains to calculate the weight of water vapor, per cubic foot of air. For this purpose, the formula giving the weight of a cubic foot of air is multiplied by the specific gravity of water vapor (0.6235); and the actual vapor pressure is substituted for the barometric pressure. Thus, for a dry-bulb temperature of 50 deg. and an actual vapor pressure of 0.3129 in., we have for the weight of water contained in a cubic foot of air,

$$w = 0.6235\left(\frac{1.3273 \times 0.3129}{460 + 50}\right) = 0.00051 \textit{ lb., nearly.}$$

Under these conditions, an air current of 150,000 cu.ft. per min. will carry into the mine $150{,}000 \times 0.00051 =$ say 76 lb. of water per minute; or $(60 \times 76) \div 2{,}000 = 2.28$ tons per hour.

Again, for the second set of readings, dry bulb 44 deg., actual vapor pressure 0.2665 in., the weight of water vapor, per cubic foot of air, is

$$w = 0.6235\left(\frac{1.3273 \times 0.2665}{460 + 44}\right) = 0.00044 \textit{ lb., nearly.}$$

Under these conditions, the weight of water vapor carried into the mine by an air current of 150,000 cu.ft. per min. is $150{,}000 \times 0.00044 =$ say 66 lb. per min.; or $(60 \times 66) \div 2{,}000 = 2$ tons nearly.

In neither case, will the moisture carried into the air by this air current be deposited in the mine. First, the air is not saturated at the temperatures given. Again, the mine temperature being generally higher than that of the air entering the mine, the capacity of the current for absorbing moisture will be increased, with the result

that the air will exert a drying action in the mine and absorb more moisture in its passage through the workings.

In the humidification of a mine, attention to which has been drawn, recently, in *Coal Age*, the only practical method is to raise the temperature of the intake air by causing it to pass over steam coils installed in the airway. At this higher temperature, the steam issuing from the pipe is rapidly absorbed by the air, which thus becomes saturated at a temperature much higher than that of the mine. As a result of being cooled in its passage through the workings, the air current will then deposit much of its moisture in the mine.

Examination Questions Answered

Indiana Hoisting Engineers' Examination, Indianapolis, 1922

(*Selected Questions*)

QUESTION—*What do you consider the proper level at which to carry water in a boiler? Give reason for your answer.*

ANSWER—The water level in a boiler should show about a two-thirds glass. That will give an ample margin between a high- and a low-water mark. If the water level in the boiler is too high, not only may priming result, by which is meant the passage of some of the water over into the cylinders of the engine; but the steam space above the water is reduced and the steaming capacity of the boiler correspondingly lessened. On the other hand, if the water level is too low there is danger of the overheating of the boiler plates, exposed to the heat of the furnace, above the water line.

QUESTION—*What effect does the size of the drum have on the life of a hoisting rope?*

ANSWER—Increasing the size (diameter) of the drum lengthens the life of the rope, by producing a less bending stress when the rope is wound on the drum. The bending stress forms part of the live load that the rope must carry. Therefore, as the bending stress is increased, the net load hoisted is proportionately decreased. It is a good rule to make the diameter of the drum from 75 to 100 times the diameter of the rope. A hoisting drum on which a six-strand, nineteen-wire, steel hoisting rope is to wind, should be at least sixty times the diameter of the rope.

QUESTION—*Where should a rope be most carefully watched and how would you examine a hoisting rope to determine that it is safe?*

ANSWER—That portion of the hoisting rope next to the coupling by which it is fastened to the cage requires the closest inspection, owing to its being subjected to harder service and more severe strains than other parts of the rope, especially when starting the cage from the bottom of the shaft too suddenly. A hoisting rope must be carefully examined, at brief intervals, to detect any possible broken wires. For that purpose, the engineer should be instructed to hoist the cage slowly, while the inspector allows the rope to pass through a bunch of waste held in his hand. At the same time, any undue wear of the wires forming the strands must be observed closely.

QUESTION—*Explain what is meant by alternating current and how it differs from direct current, as applied to electric power.*

ANSWER—An alternating electrical current is one where the arrangement is such that the direction of the current is changed, at regular short intervals. Direct current is one in which the flow is continuous in one direction. The former is capable of giving a more severe shock to the human system and requires less copper, for the transmission of the same power over equal distances, than what is required in the use of direct current.

QUESTION—*What causes scale in boilers and what means would you adopt to keep the same from accumulating?*

ANSWER—Scale is formed in boilers by the consolidation and hardening of the sediment and other impurities contained in the feedwater. The impurities are most commonly the carbonates of lime and magnesia, together with the sulphates of these elements and the sulphide of iron.

The formation of scale in boilers is greatly reduced by purifying the feedwater before it enters the boiler. Much of the impurities can be precipitated by heating the water in feedwater heaters. Where feedwater contains much sediment this may be removed by filtration or precipitation. Again, to prevent the accumulation of scale, boilers in constant use should be blown off, partially, at regular short intervals. Mud drums are most effective in collecting the sediment contained in the water and removing it from the boiler.

QUESTION—*What are the dangers to be watched for in boilers producing scales?*

ANSWER—Where scale forms readily, in boiler practice, there is always danger of overheating the boiler plates. The scale formed within the boiler impedes the transmission of the heat of the furnace to the water in the boiler and lessens the production of steam. This has a tendency to forcing the fire under the boiler and burning the plates or forming blisters that are dangerous. Excessive firing, under these conditions must be carefully avoided.

QUESTION—(*a*) *What is meant by an open circuit?* (*b*) *A closed circuit?* (*c*) *A grounded circuit?* (*d*) *A short circuit?*

ANSWER—(a) An open circuit is a wiring system in which the flow of the current is prevented by reason of an open switch.

(b) A closed circuit is any system of conducting material through which a current of electricity is flowing. It is immaterial whether the conducting material is wire or the ground, or other substance, just so the current will flow through it.

(c) A grounded circuit is one where a portion or all of the current passes into the ground through a connection with the wiring system. In many instances, a ground current is made to take the place of the return wire of the system.

(d) A short-circuit is any failure of the current to traverse the entire system intended, owing to an accidental connection being made at some intermediate point in the system, whereby the length of the circuit is shortened.

QUESTION—*Give five reasons why a steam pump will not discharge water out of a mine.*

ANSWER—Assuming the pump is located in the mine, there are numberless reasons to account for its failure to discharge water from the mine. The sump may be dry. There may be a lack of adequate steam pressure to overcome the water head and the friction head, against which the pump must operate. The pump may need to be primed, in order to start its action. The pump may need repacking to reduce the excessive slippage of water past the piston. Sediment in the water may have choked the valves, or the valve seats may need regrinding to prevent leakage. There may be an obstruction in the discharge pipe, or in the suction pipe; or these may not be of sufficient size or badly corroded.

QUESTION—*Give five reasons why a hot-water feedpump will not pump water into a boiler.*

ANSWER—The chief source of trouble in pumping hot water is due to the vapor pressure in the hot water counteracting, to that extent, the barometric pressure and thus reducing the suction lift of the pump. The pump may not be properly designed to enable it to force water into the boiler against the boiler pressure, when using the latter to operate the pump. A feedpump may be set too low, thereby increasing the head of water against the pump. The pump valves may not be working properly, or otherwise obstructed. The pump may be set too far from the boiler and unable to overcome the friction of the pipe connecting it thereto.

Electric Power Spreads in Coal Fields Of Eastern and Western Kentucky

One of the most interesting developments in 1922 in the coal districts of both eastern and western Kentucky was the spread of power and lighting service by companies supplying current to numerous small mines, at a big saving in cost of mining equipment. The Kentucky Utilities Co., which is operating in both the eastern and western Kentucky coal fields, has made great progress in developing mine-power facilities.

The company reports that in Harlan and Bell counties alone it has a 30,000-hp. connected load, and with the throwing of a single switch could stop 30,000 tons of daily production. One power plant is at Varilla, Ky., on the Cumberland River, and another at Pocket, Va. This represents seven years of development and about 500 miles of transmission line.

In western Kentucky 23 miles of additional transmission line is being completed, giving the company close to 200 miles there. Besides other plants the company is taking the surplus power from the St. Bernard Mining Co., which has a fine new 6,000-kw. power plant, and the surplus of the W. G. Duncan Mining Co.'s 6,000-kw. plant. These mines consume only a small portion of their capacity and sell the balance, in turn buying from the power company current for distant mines. These plants are of the latest type, turbine equipped.

Ninety-two miles of transmission line has been placed in service in western Kentucky in the last fourteen months. The Kentucky Utilities Co. is now serving mines, towns, farms, etc., over a wide area, 80 per cent of the power furnished being for purposes other than city service. Such towns as Greenville, Farlington, Madisonville, Hickman, Fulton, Clinton, Central City, Drakesboro, Bevier, Irvington, Dawson Springs, Hopkinsville and Princeton are now getting their power from this company.

In the larger units in both eastern and western Kentucky power is being produced at the mouth of the mines. Coal is chuted or dumped direct from cars to magazines or hoppers at the power house, saving all transportation charges and giving a ready outlet to a considerable amount of screenings in some instances, as the plants are equipped with modern stoking devices for handling small sizes.

Accidents in November Killed 365 Miners, 6.80 per Million Tons Produced

Accidents at coal mines in November caused the death of 365 men, according to reports received by the U. S. Bureau of Mines from state mine inspectors. This number includes 181 deaths in four major disasters that occurred during the month. The fatality rate for November was 6.80 per million tons of coal produced, as compared with 3.46 per million tons produced in October, 1922, and 3.60 per million tons for November a year ago. The average fatality rate for November during the past nine years (1913-1921) is 3.79 per million tons, based upon an average of 183 fatalities.

During the year 1922, to the end of November, 1,762 men were killed by accidents at coal mines, as compared with 1,823 fatalities during the first eleven months of 1921. The smaller number of lives lost during 1922 was due to the five-months' closing down of all mines affected by the miners' strike which lasted from April to August. In relation to the quantity of coal produced, the eleven-month death rate in 1922 was 4.34 per million tons, as against 3.89 for the same period in 1921.

The increased fatality rate in 1922 was due almost entirely to the heavy loss of life in explosions of gas and dust. The rate for this group of accidents was 0.742 per million tons as compared with 0.192 in the corresponding eleven months last year. The eleven-month rate for falls of roof and coal was 1.962 for 1922 and 2.004 for 1921. The rate for haulage was 0.749 as compared with 0.685; that for electricity was 0.166 as against 0.164. Fatal accidents from explosives have declined from a rate of 0.318 per million tons in 1921 to a rate of 0.201 during the year just closed.

COAL-MINE FATALITIES DURING NOVEMBER, 1922, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface								Total by State	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1922	1921
Alabama	4	....	1	....	90	..	....	..	..	....	....	....	95	....	....	....	....	....	....	....	....	....	....	....	....	....	95	6
Alaska	....	....	....	....	....	..	....	..	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Arkansas	....	....	....	....	....	..	....	..	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Colorado	7	....	1	....	....	..	....	1	..	....	....	....	9	....	....	1	..	1	....	....	....	....	....	....	....	....	10	5
Illinois	5	....	3	1	....	..	....	..	..	....	....	....	9	....	....	....	..	....	....	....	....	....	1	..	1	....	10	16
Indiana	5	....	3	....	....	1	....	..	..	....	....	....	9	1	....	....	..	1	....	....	....	....	....	....	....	....	10	7
Iowa	2	....	....	....	....	..	....	..	..	....	....	....	2	....	....	....	..	....	....	....	....	....	....	....	....	....	2	2
Kansas	2	....	....	....	....	..	....	..	..	....	....	....	2	....	....	....	..	....	....	....	....	....	....	....	....	....	2	0
Kentucky	1	....	2	....	....	..	....	..	..	....	....	....	3	....	....	....	..	....	....	....	....	....	....	1	1	....	4	7
Maryland	1	....	....	....	....	..	....	..	..	....	....	....	1	....	....	....	..	....	....	....	....	....	....	....	....	....	1	1
Michigan	1	....	....	....	....	..	....	..	..	....	....	....	1	....	....	....	..	....	....	....	....	....	....	....	....	....	1	0
Missouri	....	....	....	....	....	..	....	..	..	....	....	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	0	0
Montana	....	....	1	....	....	..	....	..	..	....	....	....	1	....	....	....	..	....	....	....	....	....	....	....	....	....	1	1
New Mexico	2	....	....	7	....	..	....	..	..	....	....	....	9	....	....	1	..	1	....	....	....	....	....	....	....	....	10	2
North Dakota	....	....	....	....	....	..	....	..	..	....	....	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	0	0
Ohio	10	....	1	....	....	1	....	1	..	....	....	1	14	....	....	....	..	....	....	....	....	....	....	1	1	....	15	10
Oklahoma	1	....	....	....	1	..	....	..	..	....	....	....	2	....	....	....	..	....	....	....	....	....	....	....	....	....	2	2
Pennsylvania (bituminous)	15	5	11	77	....	3	....	..	..	....	....	2	113	....	....	....	..	....	....	....	....	1	....	3	4	....	117	24
South Dakota	....	....	....	....	....	..	....	..	..	....	....	....	....	....	....	....	..	....	....	....	....	....	....	....	....	....	0	0
Tennessee	3	....	....	1	....	..	....	..	..	....	....	....	4	....	....	....	..	....	....	....	....	....	....	....	....	....	4	0
Texas	....	....	....	....	....	..	....	..	..	....	....	....	....	....	....	1	..	1	....	....	....	....	....	....	....	....	1	0
Utah	1	....	....	....	....	1	....	..	..	....	....	....	2	....	....	....	..	....	....	....	....	....	....	....	....	....	2	2
Virginia	2	....	....	....	....	..	....	..	..	....	....	....	2	....	....	....	..	....	....	....	....	....	....	....	....	....	2	1
Washington	2	....	....	....	....	..	1	..	..	....	....	....	3	....	....	....	..	....	....	....	....	1	....	....	1	....	4	1
West Virginia	17	1	7	....	....	..	....	1	..	1	....	1	28	1	....	....	..	1	....	....	....	2	....	....	2	....	31	20
Wyoming	3	....	1	....	....	..	....	..	..	....	....	....	4	....	....	....	..	....	....	....	....	....	....	....	....	....	4	1
Total (bituminous)	84	6	31	86	91	6	1	3	..	1	....	4	313	2	....	3	..	5	....	..	3	1	1	5	10	328	108
Pennsylvania (anthracite)	15	2	4	2	....	11	....	..	1	....	....	2	37	....	....	....	..	....	....	....	....	....	....	....	....	....	37	50
Total, November, 1922	99	8	35	88	91	17	1	3	1	1	....	6	350	2	....	3	..	5	....	..	3	1	1	8	10	365	....
Total, November, 1921	75	5	27	10	....	15	....	6	..	2	....	4	144	1	....	4	..	5	1	1	5	....	....	2	9	....	158

I. C. C. Issues Service Orders 33 and 34

Due to failure of the Baltimore & Ohio R.R. to furnish adequate cars to the West Virginia Northern R.R. Co. and the Indian Creek Valley Ry. for the shipment of coal for the U. S. Navy the Interstate Commerce Commission issued on Jan. 6 Service Order 33, effective Jan. 9, directing that the B. & O. assign cars to certain mines, to be counted against their allotment, as follows: Three cars per day for nine consecutive working days to the Lucky Jack Mine of the Lucky Jack Mining Co., Snyder, W. Va.; ten cars per day for nine consecutive working days to the Lambert Mine of the Bonafield Coal Co., Tunnelton, W. Va.; two cars per day for nine consecutive working days to the Victory Mine of the Victory Coal Co., Tunnelton, W. Va.; four cars per day for nine consecutive working days to the Freeport Mine of the H-D W. Coal Co., Tunnelton, W. Va.; eight cars per day for nine consecutive working days to Borgman Mines No. 1 and 2 of the Borgman Coal Co., Tunnelton, W. Va.; three cars per day for nine consecutive working days to Borgman Mine No. 3 of the Borgman Coal Co., Tunnelton, W. Va.; five cars per day for twenty-seven consecutive working days to the Kimmel Mine of the Howard Coal Co., Davistown, W. Va.

In Service Order No. 34, issued Jan. 6 effective Jan. 9, the Pennsylvania R.R. is instructed to assign eight cars daily for fifteen consecutive working days to the Ann mine of the Oakville Coal & Coke Co., at Latrobe, Pa. The coal is for Army use. The cars are to be counted against the mine's allotment.

Searles Heads Pennsylvania Coal & Coke Corporation; Watkins Resigns

J. W. Searles, who was vice-president and for several years in charge of sales of the Pennsylvania Coal & Coke Corporation, has been elected president of that corporation to succeed T. H. Watkins, who resigned. This announcement was made on Jan. 3 when it also was stated that as a result of negotiations extending over a period of several months, the Pennsylvania Coal & Coke Corporation has acquired all the property and assets of the Watkins Coal Co. It also was announced that T. H. Watkins has disposed of a large amount of his stock in the Pennsylvania Coal & Coke Corporation. His son, C. Law Watkins, will act as vice-president in charge of operations.

A. G. Edwards, secretary and treasurer, who has been associated with T. H. Watkins for more than thirty years, also retired, being succeeded by E. B. Houser. Mr. Watkins also retired as a director of the corporation.

The Pennsylvania Coal & Coke Corporation owns in fee or has under lease more than 40,000 acres of coal in Cambria, Blair, Indiana and Clearfield Counties, Pennsylvania, and negotiations have been about concluded for the acquisition of other lands which, with the Watkins Coal Co. properties, will give the corporation ample reserves.



J. W. SEARLES

Mr. Searles has been with the Pennsylvania Coal & Coke Corporation and its predecessors for more than twenty years, having joined the staff of the Webster Coal & Coke Co. in 1901. In June, 1921, he was made vice-president in charge of sales.

Summary of Statistics of Coal in West Virginia, Fiscal Years 1921 and 1920

	For Year Ending June 30, 1921	For Year Ending June 30, 1920	Increase of 1921 Over 1920	Decrease of 1921 Under 1920
Counties in which coal is mined on a commercial scale	35	35	.....	.....
Firms operating on a commercial scale	993	882	111	.....
Openings of all kinds subject to the mining law	1,570	1,440	130	.....
Gross tons pick-mined coal from commercial mines	21,028,617	22,937,433	.....	1,908,816
Gross tons machine-mined coal from commercial mines	59,032,987	56,053,883	2,979,104	.....
Total gross tons of coal from commercial mines	80,061,604	78,991,316	1,070,288	.....
Estimated gross tons of coal from small mines	700,000	1,000,000	.....	300,000
Total gross tons of coal from all mines	80,761,604	79,991,316	770,288	.....
Gross tons of coal converted into coke	1,257,065	1,872,355	.....	615,290
Net tons of coke manufactured	836,728	1,172,217	.....	335,489
Total value of coal at the mines (gross tons)	$375,541,458.60	$271,970,474.40	$103,570,984.20	.....
Total value of coke manufactured (net tons)	$8,015,854.24	$7,455,300.12	$560,554.12	.....
Value of a ton of coal at the mines (gross tons)	$4.65	$3.40	$1.25	.....
Value of a ton of coke at the ovens (net tons)	$9.58	$6.36	$3.22	.....
Mining machines in use	3,847	3,542	305	.....
Average number of coke ovens in use	3,955	4,232	.....	277
Days mines were in operation	155	182	.....	27
Days ovens were in operation	144	162	.....	18
Pick miners employed in commercial mines	17,140	14,385	2,755	.....
Machine operators and miners employed in commercial mines	45,574	34,547	11,027	.....
Underground laborers in commercial mines	32,778	28,052	4,726	.....
Outside employees connected with commercial mines	20,184	19,237	947	.....
Coke employees	1,050	1,205	.....	155
Total persons employed at commercial mines and coke ovens	116,726	97,426	19,300	.....
Persons killed	346	320	26	.....
Persons injured non-fatally	842	848	.....	6
Persons employed for each man killed	338	311	27	.....
Persons employed for each man injured	139	115	24	.....
Tons of coal mined in commercial mines for each fatality	231,392	246,845	.....	15,453
Tons of coal mined in commercial mines for each non-fatality	95,085	93,150	1,935	.....
Wives left widows	103	177	.....	74
Children left fatherless	232	385	.....	153
Acres of coal worked out	10,405	9,618	787	.....
Tons of coal produced in commercial mines per miner, pick and machine miners included	1,227	1,615	.....	388
Average earnings of each pick miner per year	$1,165.65	$1,451.45	.....	$285.80
Average earnings of each pick miner per month	$97.14	$120.95	.....	$23.81
Average price per gross ton of mining run-of-mine coal	$0.95	$0.91	$0.04	.....

Commission Urges Continuance of Present Wage Scale Until 1924, if Necessary to Avert Mine Tie-Up

By Paul Wooton
Washington Correspondent of *Coal Age*

By far the most important step taken by the President's Coal Commission was its action on Jan. 4 in telegraphing P. H. Penna and William Green, chairman and secretary, respectively, of the joint wage conference in Chicago, asking for the continuance of present wage scales for one year if efforts to reach an agreement should fail. The text of the commission's telegram follows:

"The Congress of the United States, charged with the duty of legislation for the general welfare of the American people, has created the United States Coal Commission to investigate the coal industry and to report the facts which it may find and to make recommendations to assist the legislative branch of our government in its efforts to guarantee justice to all concerned, to stabilize the industry and to keep the mines in uninterrupted operation.

"This commission has not yet had time to ascertain the facts nor to reach any conclusions as to the merits of your controversies, but it is satisfied that delay in reaching an agreement is bad for the whole country and that every interested party would suffer a greater economic loss by the closing of your mines even for a comparatively short period than would be sustained by a continuance of your present agreement until April 1, 1924.

"If, therefore, all other efforts to reach an agreement fail, the commission urges you, in the interest of the common welfare, to continue your present arrangement until April 1, 1924, by which time this commission expects to have found and reported fully all the facts over which your disagreements have arisen, with recommendation to the Congress, and by which time the Congress will have had opportunity to consider and take such action in the premises as it may deem wise."

Penna Replies to Hammond Telegram

To this message Mr. Penna replied as follows:

"Your telegrams dated Jan. 2 and Jan. 4 addressed to the joint Reorganization Committee of Bituminous Coal Operators and Coal Miners were given serious consideration by the operators in their meeting here today, after they had failed in their effort to reach an agreement with the miners upon a method for future wage-scale making. The joint conference made earnest, serious and sincere effort to reach an agreement. The cumbersomeness of a nation-wide conference of bituminous-coal operators and coal miners representing fifteen producing districts made success impossible. The diversity of opinion and the divergence of interests in such a gathering is obvious to any competent observer. The operators' proposal to the conference was the only one upon which agreement could be reached among themselves. We believe further it offered a practical and practicable solution of our difficulties. We regret that the miners could not agree with us on this proposal. No other solution could come from this conference. As to renewal of the present arrangement with the miners, as requested by your telegram dated Jan. 4, a reading of the Cleveland agreement with the miners dated Aug. 15, 1922, will disclose that the present conference has no power, jurisdiction or authority to take such action. The conference or conferences to consider this matter comes subsequent to the adjournment of this meeting. The arrangement of such conferences is being given consideration at this time."

The text of Mr. Green's answer follows:

"Your telegram directed to me as secretary of the Reorganization Committee was read to the conference of coal operators and miners. Each side decided to make reply. Both groups decided to make separate reply thereto. The United Mine Workers representatives were profoundly impressed with the advice and suggestions transmitted through your message. Unfortunately because of the diversity of interests represented in the conference it was impossible to reach an agreement upon the form and character of a wage-scale conference. You can be assured, however, that the situation is not hopeless but on the contrary it is reasonably certain that a wage-scale conference will convene before the end of this month. The United Mine Workers will diligently endeavor to reach a settlement of the wage scale at the earliest possible date."

Opinion is much divided as to the wisdom of the action of the commission in sending its telegram. Some operators are of the opinion that a continuance of the existing scale of war wages represents the maximum which the mine workers hope to get. If the commission sides with the mine workers in that demand, there is little question as to such an agreement being made, it is argued. The continuance of the existing wage scale, however, these operators say, precludes the possibility of the public's getting cheaper coal and means that many operators in the union field will be forced into bankruptcy. It can be said, however, that this appears to be the minority opinion. Apparently the majority of the operators and most of the public prefer the continuance of the present wage scale rather than to take chances with a strike at a time when the country will be without reserves of coal.

Telegram Was Result of Careful Consideration

It is known that the commission carefully weighed the probable effect of its telegram before it was sent. On the day following the despatch of the telegram it was evident that Commissioners Hammond, Marshall, Smith, Alschuler and Howell, who were present at the conference with the newspaper men on that day, had no cause to think that a mistake had been made. They were strengthened in that attitude by the telegram from a coal operator in whom the members of the commission have the greatest confidence. That telegram read: "The commission's advice to the conference has had a definite, sobering effect and will culminate in the acceptance of your recommendation shortly."

There are those who look on the action of the commission as the beginning of mediation in the wage dispute. The first act of any mediator is to try to maintain the status quo. That is what President Harding did last summer. It is admitted generally that it constitutes a departure from fact finding and may alienate some of the co-operation which has been forthcoming from the operators. The full co-operation of each side undoubtedly could be maintained were the commission to stick religiously to fact finding. Commissioner Howell stated positively, however, to the correspondents that the principal aim of the commission thus far has been the prevention of a strike on April 1. Each of the five commissioners present emphasized on several occasions during the interview that the probabilities all favor an agreement of some kind that will prevent the strike.

Chairman Hammond stated that he sensed in the public mind a suspicion that an agreement would be delayed as long as possible so as to continue the uncertainty and make it possible to sell coal at higher prices. He declared, however, with apparent determination that the commission would pillory any interest responsible for delaying an agreement so as to affect prices. He made the point that the commission is not suggesting how an agreement is to be reached but is interested in action which will prevent a strike next April.

Commissioner Howell made the point that an analysis of the present price of coal would reveal that any reduction in the wage scale, within the range of possibility, would form a small item going into that cost.

Governor Marshall made a plea for constructive handling of the coal situation and of the commission's doings in the articles written for publication. He asked the correspondents not to throw a monkey wrench in the machinery

in the hope of obtaining big headlines on what they write.

Although the administration has been watching events closely, especially efforts to bring coal producers and miners together amicably for settlement of a wage scale and working conditions this spring, it has no intention of injecting itself into these negotiations at this time, it was stated at the White House Friday.

The White House spokesman said that while the administration anxiously hopes that a way will be found to bring about peace in the coal world, it does not consider the time opportune to exert pressure by the national government on the representatives of the bituminous-coal industry and of the workers, who have been conferring at Chicago.

Utilities Representatives Outline Problems To U. S. Coal Commission

Representatives of the public utilities, the central stations, gas companies and the street railways appeared before the U. S. Coal Commission on Jan. 3. The Joint Fuel Committee, representing the National Public Utility Association, of which John W. Lieb of New York is chairman, is composed of M. H. Aylesworth, of the National Electric Light Association; O. S. Fogg, of the American Gas Association; A. P. Lathrop, Lucius S. Storrs, J. W. Welsh and J. P. Jackson. The committee held an informal discussion with the commission throughout the entire day. In a printed brief made public after the meetings were over the public utilities set forward their position and function in the welfare of the country and urged that nothing be done to prevent the expansion of the utilities. After pointing out the large economies in the use of coal made possible by large-scale operations, especially in the central power stations, the brief points out:

"(1) Necessity for absolute continuity of operation to prevent public catastrophe and interruption of industrial production.

"(2) The difficulty experienced in obtaining dependable and adequate contract coal supplies in times of railroad or mining emergencies.

"(3) The difficulty, by reason of the unresponsiveness of governmental or commission control of rates, of paying the prices required to buy 'spot coal' in times of emergency.

"(4) Difficulty in obtaining the grades of fuel best adapted to the uses for which they are required.

"(5) The increased cost of utility operation and danger of suspension of service where it becomes necessary to use improper grades of fuel."

The occasional "serious and extraordinary financial burdens" placed on the utilities and passed on to the public through high-priced coal, especially in 1922, was discussed at length. It is pointed out, for instance, that last autumn manufacturers could get coal and utilities could not. The brief continues with a résumé of the difficulties experienced by the utilities in recent years, "particularly in 1919 and 1920 and during the spring and summer of 1922," in obtaining supplies of coal from their contractors; of the high prices they were obliged to pay for spot coal, of their experience with priorities and of their difficulties with poor qualities of coal.

The following extract appears in the brief under the caption—"Contracts fail to secure adequate coal supply":

"The difficulties the utilities have had is largely due to the fact that, when there is shortage of coal or of coal cars, the supply they receive on their contracts is prorated proportionately with the other customers of the mines. If the mine is contracted for to its normal capacity, and it finds itself able to supply but a portion of its output, the utilities under contract with it suffer with other contract customers.

"A typical illustration of the result of this condition is that of a Middle West medium-sized electric-power company, which during two weeks in October, was only able to obtain 2,000 tons, or 16 per cent, needed coal upon its term contracts during the fall of 1922. It was therefore compelled to buy 'spot coal' to the amount of 10,000 tons, which made up the deficit. Not only was this company under necessity of appealing to the Joint Fuel Committee to aid in relieving it from the imminent danger of shutting down, but it was compelled to pay an excess of $27,000 for its coal, obtained during the two weeks, over the amount which would have been necessary had it received its full supply on its contracts.

"To provide for deficit of coal on contracts in 1920, one large power company was compelled to bid for spot coal at such rates that it paid out over $900,000 beyond the amount which would have been necessary had it received one hundred per cent on its contracts, and paid for a similar purpose nearly $300,000 in 1922. Bituminous coal was purchased by a utility in 1920 at over $16 per ton delivered at a plant in New York. This was much higher than the average prices paid, but indicates the serious straits of the utilities in times of emergency when their contracts are not to be depended upon.

"In the case of a Southern power company an actual reduction of power to the extent of 15,000 k.w. occurred in 1922, because it was unable to get sufficient coal at any price though it had contracts for approximately ten times the coal needed. This caused serious trouble over a wide territory, crippling industrial production and contributing to labor unemployment.

"Another large utility which had contracts for 45,000 tons of coal for August, 1922, received 1,125 tons, and in November received only 42 per cent of contract amounts. The result was a continual lessening of its reserve even though it has bought 'spot' and foreign coal at high prices.

"Even the purchase of mines by the utilities does not always relieve them of much of the difficulty suffered by those who contract for their coal. Thus, a large and important Ohio valley utility reported on Dec. 5, 1922, that, of the 11.2 cars per day needed to equal the rating of its mine —in accord with the rules of the Interstate Commerce Commission—it was supplied with an average of only 2.8 cars per day in November.

"These examples can be multiplied by innumerable others."

Commission Issues Further Instructions on Form L-1, Covering Labor Earnings

The U. S. Coal Commission last week issued further instructions (B) relating to Form L-1, which covers earnings of labor, as follows:

"Referring to the original 'Instructions for filling out details on Form L-1,' the first three paragraphs of these instructions are modified as follows: Any company that so desires may leave blank the lines following: (1), (2), (3), (4) and (5) on the Form L-1, and transmit to the commission along with this form the information requested on lines (1), (2), (3), (4) and (5) *on a separate sheet.* The actual sheet will then be identified by code marks in the offices of the commission and the information given under these numbers will be held confidential.

"Under (2) in the original instructions for filling out details in Form L-1, the instructions directed, in the case of tonnage workers, to give on the line 'D/H' the number of days the tonnage workers were at work in the mine in that pay period. As indicated in the letter of Dec. 18, answering questions relating to Form L-1, this does not mean the number of full days that a tonnage man worked during a pay period, as it is fully understood that the number of full days cannot be ascertained. The word 'day,' in so far as it relates to tonnage workers, is to be understood as meaning 'starts.' In other words, enter on the line marked 'D' the number of days on which such workers actually started work; and this is to be determined, as already stated, by crediting a tonnage worker with a start for each day that a car of coal comes out with his check mark on it. Again, as has been already stated, it is clearly understood that this will in many cases give credit for a start where no actual start was made; but this will be explained in the report.

"The point that it is intended to make clear in the foregoing paragraph is that with tonnage workers the days given under the various payroll periods represent starts and the total days given in column 49 for such workers also represents starts and is not understood or intended to be full working days."

Chicago Conference Fails, So Next Move Is Parley Of Central Field in New York Jan. 17

The Chicago conference of miners and operators, Jan. 3-5, failed to agree upon any method of future negotiation in the coal industry. In three days of struggle on the part of various operator factions to put across their various programs and in three days of absolute refusal on the part of the miners to agree to anything less than four-state negotiation, only one concrete result was produced. That was a tacit agreement that another conference will be held in New York City between Jan. 17 and Jan. 22. It is highly probable this will open as a Central Competitive Field conference, as operators in that field are the only ones to be invited. President Lewis, of the miners, however, declined to admit that the outlying districts were not to be asked in. The invitation is to go out from Mr. Lewis as president of the United Mine Workers, and Phil Penna as an individual. Mr. Penna, who is secretary of the Indiana Bituminous Coal Operators' Association, was chairman of the Chicago conference and is ardently in favor of four-state negotiations.

What may happen after the New York conference convenes and what sort of negotiations may proceed are indeed problematical. It is not certain that the operators and miners will agree upon a continuance of the present wages and conditions for another year, as the U. S. Coal Commission, through Chairman Hammond, openly suggested to the Chicago conference on its second day. However, if anything can be said to be likely in so tangled a situation as present-day labor relations in the coal industry, the one-year plan is likely.

There is little doubt that Illinois, Indiana and northeastern Ohio will hasten at once to the New York conference. Southern Ohio is not so willing. Western Pennsylvania, the other unit in the Central Competitive Field, balks unless the four-state plan is officially and openly advocated by the U. S. Coal Commission, in spite of the operators' fear that a contract made on that basis will be just as illegal now in the eyes of the federal courts as it was when 225 participants in the last four-state pact were indicted.

Union Spurns District and State Plans

The Chicago conference, following two futile efforts of a subcommittee to agree upon a plan for future negotiations, convened the morning of Jan. 3. It received the failure report of the subcommittee, read the first of the John Hays Hammond telegrams to the conference—a message urging an agreement to prevent a strike lest the commission be faced with "the necessity of fixing the blame for failure to adjust your difference"—and then devoted a short time to oratory on both sides. In that first short joint conference the miners, in a speech by Secretary William Green, made it plain the union would agree to no district or state plan and would accept nothing short of a contract made with a group of operators at least as large as the old Central Competitive Field.

With no progress made, the conference decided it would try a small joint committee of five men from each side plus President Lewis for the miners and Mr. Penna for the operators. The other operator members were Rice Miller, Illinois; Charles O'Neill, central Pennsylvania; James W. Needham, Montana; Hugh Shirkey, Indiana, and Harry Taylor, Kansas; the other miner members were William Green, Indiana; John Ghizzoni, central Pennsylvania; Frank Farrington, Illinois; Lee Hall, Ohio, and Arch Helm, Missouri. This committee failed to agree upon anything.

That night an operators' committee tried to compose operators' differences sufficiently to enable them to make a proposal to the miners. The proposal, which was rejected the next day, was for district negotiations and was practically the same as the last one the operators suggested in the Chicago conference with the miners of the "two-by-two committee" a month before, except that it did not provide arbitration, so hateful to the union, nor any system of flexible wage scales. The committee which worked this futile plan out was: Charles O'Neill, central Pennsylvania; W. L. A. Johnson, Kansas City; T. K. Maher, Ohio; C. H. Jenkins, West Virginia; M. L. Gould, Indiana, and John Donaldson, Pittsburgh. This committee's proposal was:

> That each of the United Mine Workers districts jointly represented in this conference be constituted a wage-scale-making body with full right of autonomy to negotiate wage-scale agreements based upon competitive conditions found existing and affecting each such district, and further, each such district shall be vested with the right to join with any other district or districts, as may be mutually satisfactory to the mine workers and the operators of the district or districts affected, for the purpose of negotiating wage agreements for such section.
>
> For the purpose of negotiating wage-scale agreements to be effective upon the expiration of the present wage agreement, April 1, 1923, the following named districts: No. 2, central Pennsylvania; No. 5, western Pennsylvania; No. 6, Ohio; No. 10, Washington; No. 11, Indiana; No. 12, Illinois; No. 13, Iowa; No. 14, Kansas; No. 17, West Virginia; No. 21, Oklahoma, Arkansas and Texas; No. 22, Wyoming; No. 23, western Kentucky; No. 24, Michigan; No. 25, Missouri, and No. 27, Montana, shall exercise their inherent right under this resolution and by mutual agreement between the mine workers and operators of each of the districts or sections hereinbefore mentioned, shall meet in joint conference at such place as the operators and miners of each district or section may agree; such meetings shall convene in all districts not later than Jan. 22, 1923, for the purpose of negotiating wage scale agreements.
>
> The section of any wage scale making a district or section agreement shall be binding only on that district or section and shall not be binding or have any effect whatsoever upon the making of a wage-scale agreement in any other district or section.

On the second day of the conference there came the second telegram from John Hays Hammond, chairman of the U. S. Coal Commission. This was addressed to Phil Penna, of the operators, and William Green, of the miners, and was the commission's first open proposal that the present contract be continued for another year. The message had an effect upon the conference but led to no agreement, even though a strong effort was made the next day to have the suggestion carried out. The telegram and the replies of Penna and Green are printed in full on another page.

Joint Committee Considers Hammond Telegram

Upon the refusal of the miners to entertain the proposal of the operators for district negotiations, the joint conference appointed another joint committee to reconsider the plan and to consider the Hammond telegram. This joint committee also failed to agree. On it were Phil Penna, Indiana; Herman Perry, Illinois; Michael Gallagher, Ohio; Charles O'Neill, Pennsylvania; James W. Needham, Montana, and J. B. Wilson, Oklahoma, representing the operators, and William Green, Indiana; John Brophy, Pennsylvania; Frank Farrington, Illinois; Lee Hall, Ohio; Arch Helm, Missouri, and President John Lewis, for the miners.

On the morning of the third day the conference resumed at a point no more advanced than that of the first day. A strong effort was being made, however, by such men as T. K. Maher, a leader in signing with the union to break the last strike, and by outlying district leaders such as Harry Taylor and C. H. Jenkins to stave off the studied drive of Illinois, Indiana and northeastern Ohio for four-state negotiation, and instead, to obtain national acceptance of the commission's proposal that the present contract be allowed to run another year.

Chairman Penna twice ruled motions looking toward immediate settlement as out of order. Each time his ruling was appealed and each time sustained, the miners not voting. Each time Mr. Penna yielded the gavel to J. W. Needham and took the floor in defence of his ruling. One of the rejected motions was by Mr. Taylor, favoring district agreements to continue the present wage scale a year. The other was by Mr. Maher, to adjourn the conference forthwith and immediately to reconvene it as a scale-making body to sign an agreement for a year, as the commission had urged.

By the noon adjournment it was obvious that the operators favoring four-state negotiations and an adjournment of the conference were in control and that nothing else could be done. Therefore early in the afternoon session adjournment was taken. No official announcement was made

of the proposed New York conference Jan. 17 but a message was wired to the U. S. Coal Commission prophesying that such a conference would be held. The message explained to the commission that no agreement was possible at Chicago because of the "diversity of opinion and the divergence of interests" among operators.

So the joint conference broke up with the outlying district operators complaining that "Phil Penna packed every committee" and therefore it was impossible to get any plan reported that might produce an agreement and thereby interfere with Midwestern hopes for four-state negotiations.

Herrin Defence Alleges That Massacre Was Committed by "Strangers"

Beginning Jan. 2 the defence of the five prisoners now on trial at Marion, Ill., for playing leading parts in the Herrin massacre of June 22, was raised by the testimony of about 50 witnesses in Judge D. T. Hartwell's court. About 30 more are to be heard, after which the defence lawyers—attorneys for the United Mine Workers—say their whole case will be in. During last week most of the 50 witnesses declared they saw the "death march" of the Herrin mob with its non-union prisoners and that not one of the five men on trial in this first case was to be seen. The state's witnesses, testifying before Christmas, positively identified them all as leaders of the mob.

During the past week there was considerable testimony as to the rough conduct of mine guards who served the Lester strip pit before the mob besieged it. Only one witness could testify that he had been attacked by guards, however, and he was "shoved in the side." Also it was testified by several witnesses that the mine guards fired into a group of union miners who tried to approach the mine to talk peace before the pit siege started June 21.

L. & N. Improvements Start New Projects In Eastern Kentucky Coal Fields

The $52,000,000 improvements which the Louisville & Nashville R.R. has started to make in its Kentucky lines and the betterments which other railroads have promised have already nurtured a crop of new coal-mining projects which are expected to lead the way for much additional development of the eastern Kentucky coal fields.

Several interesting deals have been reported during the past few days. An announcement comes from Whitesburg, Ky., that Sam Collins, state prohibition director, Lexington, Ky., and Louis E. Harvie, of Whitesburg, Ky., have purchased $40,000 of coal land on the L. & N., near Whitesburg, and plan a new town and development of coal properties.

K. U. Meguire, of the Harlan Coal Co., Louisville, one of the active young developers of eastern Kentucky, who has developed some big mining interests, recently went into the Hazard field and obtained control of the Gorman-Purciful Coal Co., which will become the Black Raven Coal Mining Co.; capital $25,000 at the start. This company will have only a small operation, now about six cars capacity, which will be increased to ten or twelve cars a day, by installation of modern equipment. Mr. Meguire has some other development projects in hand.

It is reported that the L. & N. will soon start an extension from Vico, on Carr's Fork, twelve miles into undeveloped coal property in Letcher County. The Fame-Elkhorn Coal Co. has announced plans for immediate development of property recently leased on Sandlick Creek, near Whitesburg, where a lot of lease taking has been going on of late. Development was expected to start after Jan. 1. The Fame-Elkhorn people will construct a new town and a modern plant. It is reported that the Sandlick branch of the L. & N. will be extended to the new leases.

Down in the Harlan field there are several projects pending development of the L. & N. extensions, especially if a plan for looping into the field and back, instead of double tracking, is carried out, as the north-bound loop would open a lot of new territory.

Coal Company to Sue for $1,000,000 Damages in Herrin Massacre

A suit for $1,000,000 against the United Mine Workers of America is being prepared by attorneys for the Southern Illinois Coal Co. as a result of the Herrin riots of last June.

The suit will be filed in the federal courts on the basis of evidence gathered by federal investigators of interference with interstate shipments of coal from the mine. The papers will be ready for filing within a few days, according to O. A. Olson of Bull, Lytton & Olson, attorneys for the company.

Coal Consumption by Public Utilities Increased in November

Electric public-utility plants consumed 3,329,948 net tons of coal during November, according to a recent report of the Geological Survey. This compares with 3,277,357 tons in October.

The average daily production of electricity by public-utility power plants in November, as predicted, broke all records of output, making the fifth time that a record has been established since May. The daily production of electricity in November was 146,600,000 kw.-hr.—nearly 5 per cent greater than the October record. The total output for the period January to November, inclusive, was 43,089,000,000 kw.-hr., an increase of more than 16 per cent over the same period for 1921.

Hammond Does Not Aspire to Succeed Fall

John Hays Hammond chairman of the U. S. Coal Commission, has been mentioned prominently in connection with the appointment of a successor to Albert Fall as Secretary of the Interior. Mr. Hammond told this correspondent, however, that the place has not been offered him and that he is not an aspirant for the office. He stated that he had undertaken the work with the Coal Commission and wants to keep his shoulder to that wheel until the task is completed. It is known that Secretary of Commerce Hoover regretfully declined the portfolio of the Interior.

As this is written, Representative Mondell, of Wyoming, seems most likely to obtain the appointment. It may be said, however, that the President makes his own appointments and it is doubtful if anyone, other than he, knows to whom the job is likely to go.

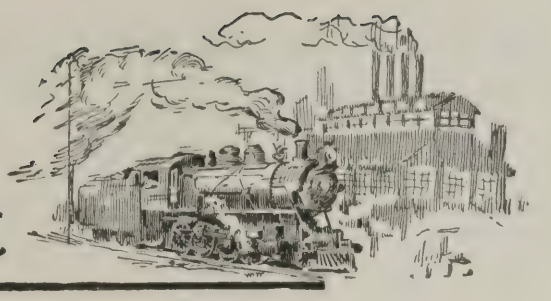
STATE INSPECTOR ADVOCATES SCHOOL OF MINES. — The establishment of a school of mines in West Virginia is advocated by R. M. Lambie, chief of the state department of mines of West Virginia, in a letter addressed to coal operators in various sections of the state. Governor E. F. Morgan also in a recent public address advocated the establishment of such a school. Though West Virginia is the second largest coal producer in the United States it has no school of mines and only one institution offering a course in mining and that only a brief one. "West Virginia," says Mr. Lambie in his letter, "has at present 800 men attending evening mining classes, a larger number than any other coal-mining state."

HARRY W. LITTLE, of Evansville, Ind., has gone to Washington to become secretary to the special committee of bituminous operators that is co-operating with the U. S. Coal Commission. J. C. Brydon is chairman of the committee. Mr. Little has grown up in the coal business. His father was an operator in the Indiana field. He has been secretary of the Southern Indiana Coal Trade Bureau since its formation. He was educated at Wabash college and Johns Hopkins University.

THE CONFERENCE OF CAR-DISTRIBUTION RULES between representatives of the National Coal Association and the American Railway Association will be held in Washington Jan. 11.



Production and the Market



Weekly Review

Heavier production followed the holiday idleness but the accumulation of empties was quickly absorbed when full-time work was renewed, and the car shortage is now as acute as it was before Christmas. Railroads made the most of the lull in loading and cleared away much of the congestion that has been slowing down the freight movement lately. Declining prices resulted from the heavier output but the drop was only temporary, and as the car supply tightened, spot quotations rallied and moved upward again. *Coal Age* Index of spot bituminous coal prices rose 6 points during the week to 375 on Jan. 8, with a corresponding average price at the mines of $4.54. The previous week this figure was $4.47.

Quotations Fluctuate with Car Supply

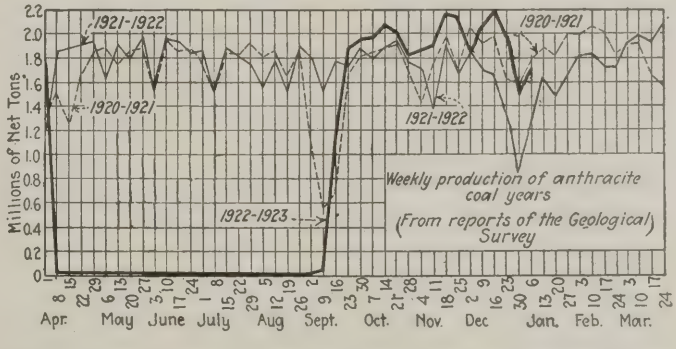
The daily rise and fall of quotations in accordance with the car supply shows how sensitive the spot market has become. Railroads, utilities and large users are drawing heavily on current output and the volume of spot offerings is meager. Smaller industries are buying on a day-to-day basis and the tendency to stock coal grows with the realization that the slender margin between supply and demand is endangered by inclement weather and its effect on transportation.

The steam market is spotty, nevertheless. In the Middle West mild weather and a better car supply conspire to lower prices a trifle and big consumers were quick to take advantage of the slump. The same conditions obtain, but to a lesser degree, in the Cincinnati territory. Inclement weather has held the market firm from Pittsburgh east on all steam coals. New England manufacturers, apparently seeing a better trade outlook, have awakened to the fuel situation and better buying has resulted. Hampton Roads prices are firming up with the stronger Eastern call.

The domestic market shows no signs of abating. Screened grades are moving eastward over an ever-widening territory to offset the anthracite shortage. In the normal markets for domestic soft coal there is a steady distribution by retailers and replenishments are promptly placed on order. Ohio reports a dearth of smokeless and other West Virginia grades and home-mined coal is moving well in that state as a substitute domestic fuel.

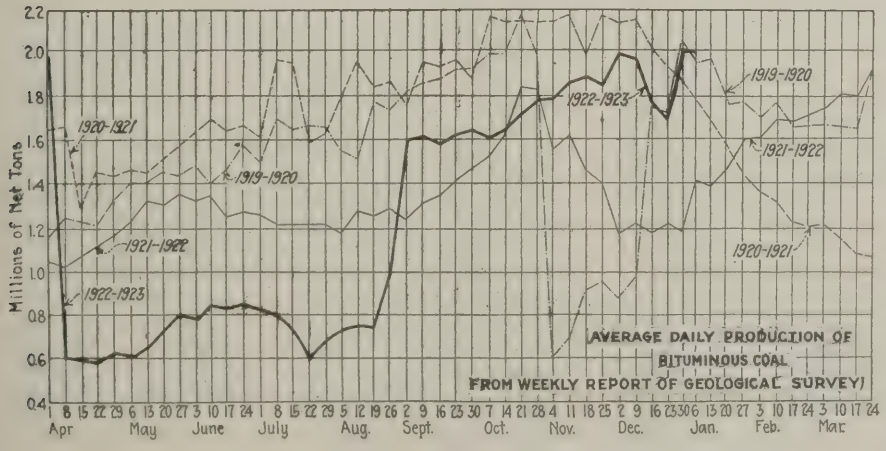
Uncertainty over the labor situation has not reached a point where it is a market factor. Consumers are apprehensive about the outlook on April 1, but are not inclined to stock any additional tonnage at such an early date.

Storms and cold weather have added to the troubles of the anthracite distributors. The drop in production over the holidays is being felt in lowered receipts. Do-



mestic sizes move out as fast as they are received and yard stocks are comprised mainly of buckwheat, bituminous coal and coke.

The Pennsylvania Fuel Commission has issued a fair-price list for all producers whose domestic schedules exceed $9.25, showing a high figure of $12. Canadian



Estimates of Production

(Net Tons)

	1921	1922
BITUMINOUS		
Dec. 16	7,063,000	10,666,000
Dec. 23 (*b*)	7,450,000	10,031,000
Dec. 30 (*a*)	5,960,000	9,974,000
Daily average	1,192,000	1,995,000
Calendar year	415,922,000	407,712,000
Daily av. cal. yr.	1,350,000	1,330,000
ANTHRACITE		
Dec. 16	1,637,000	2,197,000
Dec. 23 (*b*)	1,316,000	2,028,000
Dec. 30 (*c*)	848,000	1,541,000
Calendar year	90,474,000	52,465,000
COKE		
Dec. 23 (*b*)	117,000	281,000
Dec. 30 (*a*)	103,000	260,000
Calendar year	5,538,000	8,030,000

(*a*) Subject to revision. (*b*) Revised from last report.

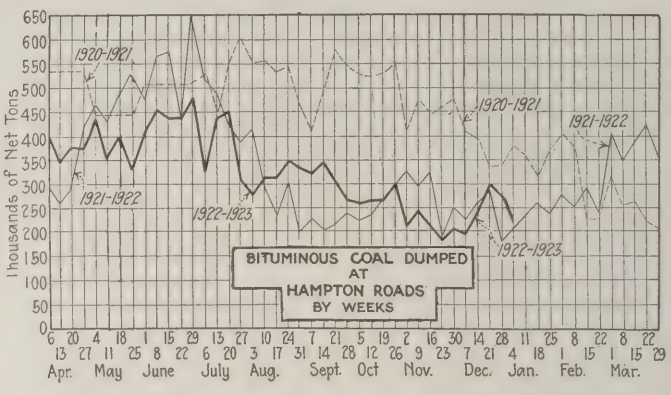
buyers, however, are actively seeking tonnage for which they are willing to pay a premium and in some cases, it is understood, cashiers' checks are offered in payment for the coal before it has been loaded.

Demand for coke as an anthracite substitute has abated somewhat. Heavy orders have been filled and producers and shippers are going slow until they can determine how it is going to be received by householders. This has lowered coke quotations 50c.@$1 from their level of last week.

BITUMINOUS

"Revised estimates for the last week of 1922 (Dec. 25-30) show a total output of 9,974,000 net tons of soft coal," says the report of the Geological Survey. "On Christmas Day production ceased. Recovery thereafter was prompt and a high rate of output was maintained, the average for the five working days of the week being 1,995,000 tons. The improvement shown in comparison with the two preceding weeks was largely due to the opportunity which the holiday afforded the carriers for relieving traffic difficulties.

"Preliminary reports of cars loaded during the first four days of last week (Jan. 1-6) indicate that production on New Year's Day was equal to nearly 30 per cent of the output on recent Mondays. The production on Tuesday was large and the average daily rate of output for the full week



apparently will be about the same as in the week before. Thus the output in the first week of 1923 is expected to be about 10,500,000 net tons.

"Summation of the weekly estimates of soft-coal production in 1922, based on reports of car loadings, shows a total

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

	Market Quoted	Jan. 9, 1922	Dec. 26, 1922	Jan. 2, 1923	Jan. 8, 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.40	$6.30	$7.25	$6.75@$7.75
Smokeless mine run	Columbus	2.15	6.00	6.60	6.50@ 6.75
Smokeless screenings	Columbus	1.50	5.50	5.75	**5.50@ 6.25**
Smokeless lump	Chicago	3.10	7.75	7.75	7.50@ 8.00
Smokeless mine run	Chicago	2.50	6.60	6.60	*6.25@ 6.50*
Smokeless lump	Cincinnati	3.00	6.75	7.00	**7.00@ 8.00**
Smokeless mine run	Cincinnati	1.90	6.25	6.25	6.00@ 6.50
Smokeless screenings	Cincinnati	1.25	6.10	6.25	6.00@ 6.50
*Smokeless mine run	Boston	4.70	8.60	8.60	*8.25@ 8.50*
Clearfield mine run	Boston	2.05	4.25	5.10	4.75@ 5.50
Cambria mine run	Boston	2.50	4.80	5.50	**5.25@ 6.00**
Somerset mine run	Boston	1.80	4.40	5.35	5.00@ 5.75
Pool 1 (Navy Standard)	New York	3.15	6.25	....	6.00@ 6.75
Pool 1 (Navy Standard)	Philadelphia	3.00	5.50	5.80	**5.75@ 6.30**
Pool 1 (Navy Standard)	Baltimore	2.50	6.00	6.75	*6.50@ 6.75*
Pool 9 (Super. Low Vol.)	New York	2.15	5.35	5.75	**5.75@ 6.00**
Pool 9 (Super. Low Vol.)	Philadelphia	2.30	5.30	5.55	**5.50@ 6.00**
Pool 9 (Super. Low Vol.)	Baltimore	2.10	5.10	5.75	**6.00@ 6.25**
Pool 10 (H.Gr.Low Vol.)	New York	1.90	5.10	5.75	*5.00@ 5.75*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.00	4.85	5.10	**5.15@ 5.40**
Pool 10 (H.Gr.Low Vol.)	Baltimore	1.75	4.60	4.50	**5.50@ 5.75**
Pool 11 (Low Vol.)	New York	1.70	4.15	4.50	*4.00@ 4.75*
Pool 11 (Low Vol.)	Philadelphia	1.70	4.45	4.75	*4.25@ 4.50*
Pool 11 (Low Vol.)	Baltimore	1.75	4.10	4.35	**5.00**
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	3.55	....	3.75@ 4.25
Pool 54-64 (Gas and St.)	Philadelphia	1.55	....	4.10	**4.20@ 4.40**
Pool 54-64 (Gas and St.)	Baltimore	1.40	3.85	3.85	**4.25**
Pittsburgh so'd gas	Pittsburgh	2.65	5.25	5.25	4.50@ 6.00
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.10	3.25	**3.50@ 3.75**
Pittsburgh slack (Gas)	Pittsburgh	1.80	3.00	3.25	3.00@ 3.50
Kanawha lump	Columbus	2.80	5.25	5.75	**6.00@ 6.50**
Kanawha mine run	Columbus	1.75	3.10	3.35	**3.50@ 4.00**
Kanawha screenings	Columbus	1.25	2.85	3.10	**3.25@ 3.50**
W. Va. lump	Cincinnati	2.40	6.25	6.50	6.00@ 7.00
W. Va. Gas mine run	Cincinnati	1.30	3.75	3.75	**3.75@ 4.00**
W. Va. Steam mine run	Cincinnati	....	3.35	3.60	3.50@ 3.75
W. Va. screenings	Cincinnati	1.25	3.10	3.35	3.25@ 3.50
Hocking lump	Columbus	2.85	5.25	5.25	5.00@ 5.50
Hocking mine run	Columbus	1.75	2.85	3.10	3.00@ 3.25
Hocking screenings	Columbus	1.45	2.60	2.85	2.75@ 3.00
Pitts. No. 8 lump	Cleveland	2.85	4.75	5.10	4.75@ 5.50
Pitts. No. 8 mine run	Cleveland	2.00	3.25	3.45	**3.40@ 3.65**
Pitts. No. 8 screenings	Cleveland	1.90	3.10	3.30	3.25@ 3.35
Midwest					
Franklin, Ill. lump	Chicago	3.80	5.35	5.35	$5.25@$5.50
Franklin, Ill. mine run	Chicago	2.90	4.10	4.10	4.00@ 4.25
Franklin, Ill. screenings	Chicago	2.00	3.10	3.10	*2.75@ 3.00*
Central, Ill. lump	Chicago	3.10	4.35	4.35	4.25@ 4.50
Central, Ill. mine run	Chicago	2.50	3.10	3.10	**3.25@ 3.75**
Central, Ill. screenings	Chicago	1.80	2.20	2.30	*2.15@ 2.35*
Ind. 4th Vein lump	Chicago	3.35	5.10	5.10	5.00@ 5.25
Ind. 4th Vein mine run	Chicago	2.55	3.85	3.85	3.75@ 4.00
Ind. 4th Vein screenings	Chicago	2.10	2.35	2.60	*2.25@ 2.75*
Ind. 5th Vein lump	Chicago	2.95	4.75	4.75	4.50@ 5.00
Ind. 5th Vein mine run	Chicago	2.25	3.60	3.60	3.50@ 3.75
Ind. 5th Vein screenings	Chicago	1.65	2.35	2.35	*2.00@ 2.25*
Standard lump	St. Louis	2.60	4.25	3.85	**4.00@ 4.25**
Standard mine run	St. Louis	1.85	2.10	2.40	**2.50@ 2.75**
Standard screenings	St. Louis	1.45	1.50	1.50	**1.75@ 2.00**
West Ky. lump	Louisville	2.85	4.35	4.35	**4.25@ 4.75**
West Ky. mine run	Louisville	1.90	3.35	2.75	2.50@ 3.00
West Ky. screenings	Louisville	1.25	2.50	2.10	2.00@ 2.25
West Ky. lump	Chicago	.....	4.25	4.25	4.00@ 4.50
West Ky. mine run	Chicago	.....	2.75	2.75	2.50@ 3.00
South and Southwest					
Big Seam lump	Birmingham	3.35	3.95	3.95	3.45@ 4.45
Big Seam mine run	Birmingham	2.10	2.60	2.60	*2.50*
Big Seam (washed)	Birmingham	2.15	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	6.25	6.25	6.00@ 6.50
S. E. Ky. mine run	Chicago	.....	3.85	3.85	3.75@ 4.00
S. E. Ky. lump	Louisville	3.10	6.75	6.60	6.25@ 7.00
S. E. Ky. mine run	Louisville	1.65	3.50	3.50	**3.50@ 4.00**
S. E. Ky. screenings	Louisville	1.35	3.10	3.20	**3.25@ 3.50**
S. E. Ky. lump	Cincinnati	2.85	6.50	6.50	6.00@ 7.00
S. E. Ky. mine run	Cincinnati	1.40	3.35	3.50	**3.50@ 3.80**
S. E. Ky. screenings	Cincinnati	1.25	3.25	3.25	**3.25@ 3.50**
Kansas lump	Kansas City	5.00	5.50	5.50	5.50
Kansas mine run	Kansas City	4.10	3.75	3.75	3.75
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Latest Pre-Strike Company	Jan. 2, 1923 Independent	Jan. 2, 1923 Company	Jan. 8, 1923† Independent	Jan. 8, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.50@13.00	7.20@ 8.25	*12.00@12.50*	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.50@13.00	7.35@ 8.25	*12.00@12.50*	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.50@13.00	7.35@ 8.35	*12.00@12.50*	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.00@11.00	6.15@ 6.30	**7.50@11.00**	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	**7.00@ 9.50**	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.00@ 5.50	4.00@ 4.10	**4.00@ 6.00**	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00	4.00	5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	3.00@ 3.50	2.75@ 3.00	*2.50@ 3.00*	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.75@ 2.00	1.50@ 2.00	*1.50@ 2.00*	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.

for the year of 407,712,000 net tons. This figure nearly equals the preliminary estimate made on the same basis for the year 1921, and it is expected that final returns from the mines for 1922 will show that the total output for the year will approximate that of the year before.

ESTIMATED UNITED STATES PRODUCTION OF BITUMINOUS COAL
(In Net Tons)

	Production	Average Per Working Day
Annual production:		
1918 (Calendar year)	579,386,000	1,880,000
1919 (Calendar year)	465,860,000	1,515,000
1920 (Calendar year)	568,667,000	1,846,000
1921 (Calendar year)	415,922,000	1,350,000
1922 (Calendar year)	407,712,000	1,330,000

"The following table compares the 1922 production of both anthracite and bituminous coal with the output in the eleven years preceding. The figures are expressed in million net tons.

PRODUCTION OF ALL COAL, 1911-1922

	Anthracite	Bituminous	All Coal
1911	90	406	496
1912	84	450	534
1913	92	478	570
1914	91	423	514
1915	89	443	532
1916	88	503	591
1917	100*a*	552	652
1918	99*a*	579	678
1919	88	466 (strike)	554
1920	90	569	659
1921	90	416	506
1922	52 (strike)	408 (strike)	460

(*a*) Years of large washery production.

"The all-rail movement of coal to eastern New York and New England, although large for the season, was smaller in the week ended Dec. 30 than the two weeks preceding. According to the American Railway Association, 2,696 cars of bituminous coal and 3,166 of anthracite were forwarded through the Hudson gateways and 71 cars of soft coal and 18 of anthracite were shipped through Rouses Point."

The Lake movement of cargo coal for the 1922 season is reported as 18,522,000 net tons. In 1921 the movement was 22,413,000 tons, and 22,408,000 tons went forward in 1920. Heavy shipments from the Head-of-the-Lakes docks have reduced the supply of free coal to about 700,000 tons, but confidence in the all-rail supply has reassured Northwest consumers of soft coal.

Hampton Roads dumpings were 231,386 net tons during the week ended Jan. 4, as compared with 277,312 tons in the preceding week. More coal is flowing to Tidewater, however, as activity in the East enables shippers to offer prices that compete with going quotations in the West.

ANTHRACITE

Anthracite production declined sharply during Christmas week, when 1,541,000 net tons was mined as compared with 2,028,000 tons in the preceding week. Preliminary reports for New Year's week indicate an output of approximately 1,700,000 tons. The total output for 1922 is estimated at 52,465,000 tons. The decrease of 38,009,000 tons, or 42 per cent, as compared with 1921, is, of course, attributed to the 23-week's strike.

COKE

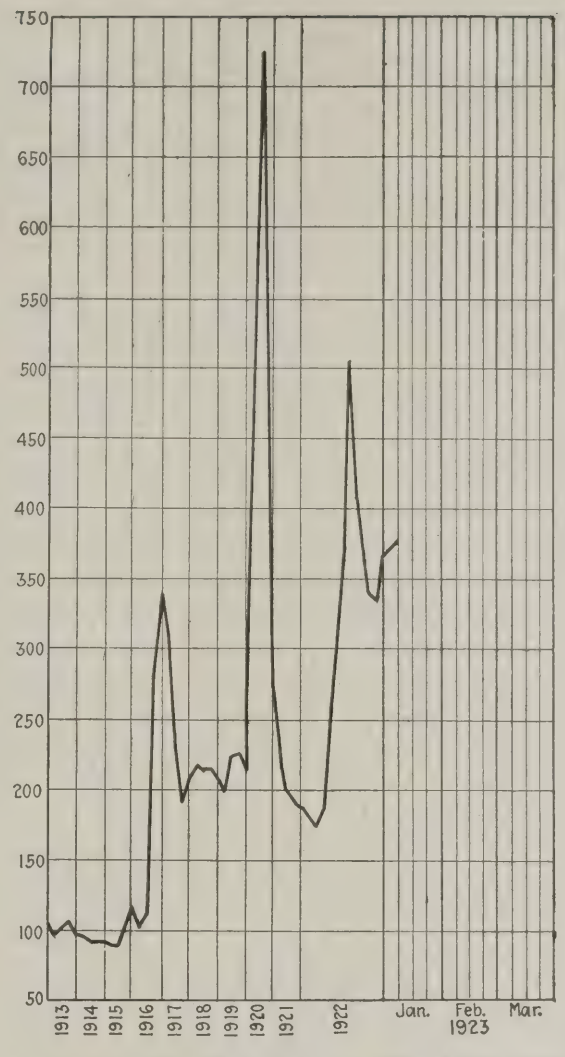
Production of beehive coke also declined during the week ended Dec. 30. The output was 260,000 net tons, as compared with 281,000 tons in the previous week. The year's output is placed at 8,030,000 tons, as compared with 5,538,000 tons in 1921.

The recession of domestic demand has softened the Connellsville market. Blast furnaces are taking light tonnages as it seems they had quietly covered for the first quarter, although the price bulge caused by the December domestic demand interfered with contracting programs and revised first-quarter figures upward 50c.@$1.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended Dec. 23, 1922	834,591	181,325
Previous week	888,082	198,510
Same date in 1921	666,605	136,089

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
Dec. 23, 1922	9,563	2,532	99,908	43,664
Dec. 15, 1922	7,677	2,282	105,018	41,200
Same date in 1921	400,000	190,000	.....	.....



Coal Age Index 375, Week of Jan. 8, 1923. Average spot price for same period, $4.54. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Six Months July to Dec. 1921	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 23, 1922 Inclusive	Week Ended Dec. 23, 1922
U. S. Total	45.6	55.7	....	....
Alabama	63.5	64.6	84.4	(*a*)
Somerset County	55.5	74.9	36.3	31.9
Panhandle, W. Va.	55.3	51.3	56.8	53.8
Westmoreland	54.9	58.8	66.2	41.7
Virginia	54.8	59.9	55.6	45.3
Harlan	53.3	54.8	21.8	23.5
Hazard	51.7	58.4	16.5	15.2
Pocahontas	49.8	60.0	36.2	32.1
Tug River	48.1	63.7	27.9	33.0
Logan	47.6	61.1	25.4	23.6
Cumberland-Piedmont	46.6	50.6	31.7	23.3
Winding Gulf	45.7	64.3	29.9	21.8
Kenova-Thacker	38.2	54.3	42.2	36.3
N. E. Kentucky	32.9	47.7	27.9	29.9
New River	24.3	37.9	31.2	32.7
Oklahoma	63.9	59.6	59.3	30.9
Iowa	57.4	78.4	74.7	89.5
Ohio, Eastern	52.6	46.6	40.7	28.3
Missouri	50.7	66.8	75.4	90.9
Illinois	44.8	54.5	49.8	47.9
Kansas	42.0	54.9	54.8	65.8
Indiana	41.4	53.8	37.7	(*a*)
Pittsburgh†	41.2	39.8	40.8	26.2
Central Pennsylvania	39.1	50.2	53.7	42.3
Fairmont	35.3	44.0	34.4	34.1
Western Kentucky	32.5	37.7	32.4	(*a*)
Pittsburgh*	30.4	31.9	55.7	43.7
Kanawha	26.0	13.0	15.4	16.3
Ohio, southern	22.9	24.3	37.7	34.0

* Rail and river mines combined.
† Rail mines.
(*a*) No Report.

Foreign Market And Export News

British Market Feels Stimulus of Renewed American Demand and Italian Inquiries

British production continues at a high rate. The output during the week ended Dec. 23, was 5,506,000 gross tons, according to a cable to *Coal Age*, as compared with 5,742,000 tons in the preceding week, which was the record for the year.

Stormy weather has greatly delayed coal loading at the ports. More than 100,000 tons was booked for this month for the United States, and the movement for January, February and March may reach the 500,000-ton mark. The renewal of this movement is a result of the continued shortage and fears of a cold weather tie-up of the domestic supply.

In order to pay the minimum wage above the standard, November accounts in South Wales show that owners must sacrifice £191,000 of standard profits making this total for the twelve months £3,057,000.

Welsh pits are booked up in almost every case until the middle of January and in many instances, into February. There is no slackening in the general volume of demand and the market has again been stimulated by new American demands and large contract inquiries from Italy, the latter reputed to be in the vicinity of 500,000 tons, for delivery over the new year. A considerable amount of contract business has been concluded, which in itself must contribute by its volume to a strong market for some time to come. Prices in South Wales show a tendency to rise. Further inquiries on contract account have come in from various directions.

Coal shipments from Durham and Northumberland have developed at an amazing rate. The output has advanced by leaps and bounds, while less men have been employed.

Recent operations on the Newcastle coal market suggest that the first quarter of the year will be very active. Inquiries are heavy for January and February from all sources, including Russia. The demand for gas coal is particularly good, and coking coals come next in popularity. In general the inquiry is strongest for the superior brands of all classes.

In the coal tonnage chartering market there is little activity, as it is almost impossible to secure any guarantee of early loading. The ability to secure a loading turn has been the determining factor in rates for many weeks, and the congestion is restricting business. The partial adoption of a three-shift system by working it at the two most congested loading points is being watched with interest, and it seems fairly certain that an extension of the principle must be carried out if business is to proceed.

During November, 1,617,587 tons of coal were shipped for use of steamers engaged in the foreign trade, as compared with 1,322,287 tons in November, 1921, and 868,594 tons in November, 1920. During the first eleven months of the year 16,805,550 tons were so shipped, as compared with 9,646,136 tons, and 12,638,263 tons, in the corresponding periods of 1921 and 1920 respectively.

Heavy Imports of British Coals Ease French Market; German's Coal Statements Denounced

The situation remains satisfactory for industrial and excellent for domestic coals and patent fuel. The demand, however, owing to an increase of British coal imports (from 886,000 tons in September to 999,000 tons in October and 1,204,000 tons in November) and also to some increase in the French coal output, is not quite so feverish.

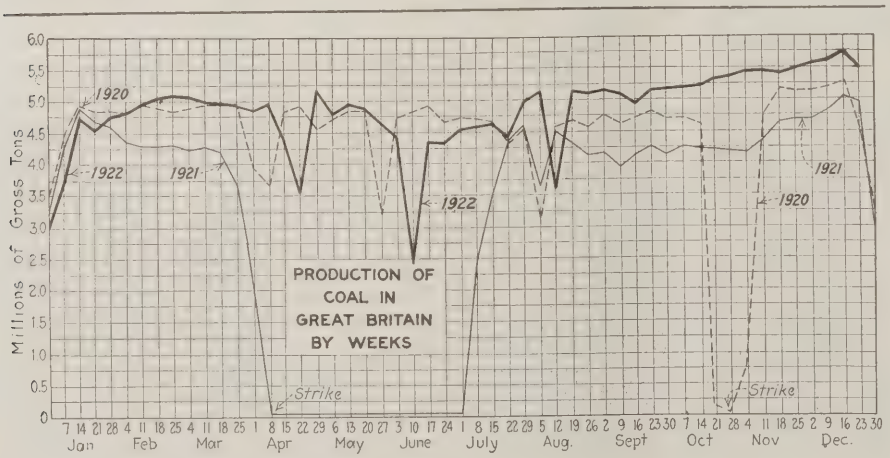
The collieries of the Nord and Pas-de-Calais have just published their new price schedule, to be applied as from Jan. 1. These prices are the same as those of July 1, 1922, except as regards patent fuel. However, these prices are generally exceeded by collieries for their outside sales.

The Société des Cokes de Hauts-Fourneaux, which is the agency distributing metallurgical coke to French blast-furnaces, has raised the adjusted price of coke at the Franco-German frontier to 110 fr., effective Feb. 1.

This is a consequence of the gradual reduction of German coke deliveries (averaging 11,300 tons per day for the first fourteen days of December, as against a daily minimum requirement of 15,000 tons) and also of diminished supplies from Belgium, the price of which has been increased to 120 fr. Owing to the slowness in the recuperation of the French coke production, the Société des Cokes de Hauts-Fourneaux had no other recourse but to apply to Great Britain for supplemental deliveries of coke—100,000 tons—at a price unfortunately which increases considerably the average price to be paid by French blast-furnaces.

So frequent have been recent reports in the German press stating that if Germany was obligated to import considerable tonnages of British coals, to the detriment of her finances, the fault lay in the deliveries of reparation coals imposed upon her by the Versailles Treaty, that it is necessary to dispel with plain facts this fallacious statement. On the basis of statistical data available for the first ten months of 1922, it is reckoned that France's coal consumption, within her new frontiers, will be, in 1922, equivalent to only 77 per cent of what it was (Alsace-Lorraine included) in 1913. But, notwithstanding this reduction in her consumption, France has imported about 12,000,000 tons of British coals (10,826,000 tons during the first eleven months), while she imported only 11,000,000 tons of these coals in 1913.

On the other hand, Germany is now proportonately better self-supplied with coals than the other countries of Western Europe, and most of the British coals she imports are probably used for the making of exported products. Therefore, if Germany has to pay higher prices for imported British coals than for her own coals, she is recovering that difference by selling manufactured goods at world's prices on export markets, and she has, besides, the advantage over other countries—all using British coals or coals equivalent in price—of cheaper labor and of cheaper handling and transportation costs. Moreover, Germany is availing herself of such successive increase in miners' wages by raising coal prices and thus gradually bringing them nearer to the world level. The London *Times* even declared, in one of its last issues, that, in present altered circumstances, imported British coal was more advantageous to consumers of the coasting area of Northern Germany than German coal itself.



GERMAN REPARATION DELIVERIES OF COAL IN NOVEMBER

	To France	To Luxenburg
	Tons	
Coal	332,901	3,068
Coke	367,753	125,223
Lignite briquettes	52,499	5,060

The French coal owners have not yet defined their attitude with regard to the claim for a wage increase recently formulated by French miners. However, as any increase in the wage rates would mean a corresponding increase of the selling prices, fears are freely expressed lest the competitive power of French coal mines should thereby be affected, all the more so as there is not much chance of the miners' work time being legally extended in accord-

ance with the owners' desires, although these desires were endorsed, last October, by the Mines Commission of the Chambre des Députés.

FRENCH COAL PRODUCTION

District	September (Metric Tons)	October (Metric Tons)
Nord and Pas-de-Calais; non-devastated mines	616,006	638,190
Nord and Pas-de-Calais; devasted mines	694,234	728,164
Saint-Etienne (Loire)	310,048	324,311
Lyons (Blanzy, etc.)	234,521	238,213
Clermont-Ferrand (minor Center fields)	109,281	114,955
Southern fields:		
Alais district	155,287	167,858
Toulouse district	151,198	159,674
Marseilles district (lignite)	61,355	66,933
Minor Western fields:		
Nantes district	4,693	4,947
Bordeaux district	5,493	5,599
Nancy district (Ronchamp)	8,274	8,345
Strasbourg (Lorraine district)	369,332	367,299
Total	2,719,722	2,824,488

Hampton Roads Pier Situation

	Week Ended Dec. 28	Week Ended Jan. 4
N. & W. Piers, Lamberts Pt.:		
Cars on hand	958	1,057
Tons on hand	65,709	74,625
Tons dumped	110,420	87,254
Tonnage waiting	8,850	5,850
Virginian Ry. Piers, Sewalls Pt.:		
Cars on hand	921	983
Tons on hand	51,050	55,800
Tons dumped	74,072	59,449
Tonnage waiting	15,000	6,733
C. & O. Piers, Newport, News:		
Cars on hand	1,144	1,610
Tons on hand	67,750	92,200
Tons dumped	63,108	59,892
Tonnage waiting	2,718	4,425

Export Clearances, Week Ended Jan. 4, 1923

FROM HAMPTON ROADS

For Cuba:	Tons
Nor. SS. Frednes, for Santiago	2,040
Dan. SS. Nordstjernen, for Havana	2,962

FROM PHILADELPHIA

For Cuba:	
Nor. SS. Munerway, for Havana	....
Dan. SS. Gai, for Havana	....

Germany Seeks More British Coal

In December Germany had her first experience with deflation with a rather significant effect upon the industrial, especially the coal situation. The mark rate improved, all in all by nearly 30 per cent. Prices, however, especially those comprising cost of living, have continued their upward flight. The only instances of a decrease of prices are those of pig iron, which are keyed to the rate of exchange, and of rolled products. Coal prices on Dec. 1 were adjusted at a ratio to their pre-war level, corresponding with a rate of the mark to parity of 1,900. The recent lowering of this rate put coal prices above pre-war level, in fact to nearly 15 gold marks per ton compared with 12 gold marks in 1913.

The margin between the price of German and British coal, c.i.f. Hamburg, has almost disappeared. The increase of freightage, coming into force on Jan. 1, will even cause a margin in favor of British coal, as long as the present rate of exchange prevails.

In spite of such conditions, the miners have again raised claims for a considerable increase of wages on the ground of the still rising cost of living. Upon their request the overtime shifts in the Ruhr district, which have had such favorable effect upon production, have been stopped from Dec. 18 to Jan. 15 for the alleged reason to grant the miners a relaxation, but manifestly for the purpose to put force into their new claims.

Coal imports have lately shown a decline. The import of British coal in November was still above the pre-war average, but is nearly 100,000 tons less than the preceding month. On the strength of the small margin left between German and British prices, the impending increase of freights already mentioned, and the drop in the rate of production expected from the stoppage of the overtime shifts, large contracts have recently again been placed by importers of British coal.

November production in the Ruhr district was 8,596,214 tons of bituminous coal, 2,176,850 tons of coke and 376,438 tons of briquets. The average daily output in November reached the highest figure recorded since pre-war times. The production of bituminous coal in German Upper Silesia was 776,626 tons or 32,359 tons per day, of which 387,269 tons were shipped to the interior of Germany.

More Stability at Hampton Roads

Business shows signs of improvement, with heavier demand and an increase in supplies at tide. The tone of the market is decidedly healthier than at any time for several weeks.

Coastwise movement took a boom last week, while the bunker trade held up well. There was no foreign business, the higher prices having placed that further from the range of possibility. Some improvement in the car situation was felt.

United States November Coal Exports

	Gross Tons Nov., 1921	Gross Tons Nov., 1922
Bituminous coal:		
By rail to:		
Canada	890,691	1,562,983
Mexico	8,702	4,683
Total	899,393	1,567,666
By vessel to:		
British West Indies	7,659	594
Other West Indies	12,452	2,937
Cuba	28,014	34,973
Panama	9,627	9,622
Total	57,752	48,126
Italy	47,897	.....
Other European	3,720	.....
Total Europe	51,617	.....
Argentina	26,943	.....
Brazil	21,226	.....
Total South America	48,169	.....
Egypt	10,320	.....
French Africa	6,504	.....
Other Countries	5,051	2,245
Total bituminous exports	1,078,806	1,618,037
Total anthracite exports	329,380	440,208
Total coke exports	30,347	38,397

November Exports, by Customs Districts

	Gross Tons Anthracite	Gross Tons Bituminous	Gross Tons Coke
Maine and New Hampshire	158	156	351
Vermont	1,366	947	1,048
St. Lawrence	143,665	162,985	1,064
Rochester	94,714	104,061	.....
Buffalo	174,636	293,113	24,576
New York	7,148	725	204
Philadelphia	6,652	16,563	1,960
Maryland	.....	2,054	.....
Virginia	.....	26,212	.....
South Carolina	.....	4,845	.....
Mobile	.....	224	97
New Orleans	.....	634	50
San Antonio	248	46	.....
El Paso	91	2,401	.....
San Diego	3	9	.....
Arizona	72	2,022	4,957
San Francisco	.....	9	13
Washington	.....	3,276	.....
Dakota	473	1,727	1,030
Duluth & Superior	123	4,653	21
Michigan	.....	16,494	2,105
Ohio	10,819	974,881	814
Florida	.....	.....	107
Massachusetts	10	.....	.....
Connecticut	30	.....	.....
Total	440,208	1,618,021	38,367

British Coal Exports in November

Country	Gross Tons 1920	Gross Tons 1921	Gross Tons 1922
Russia	6,728	26,691	50,708
Sweden	47,357	190,296	342,188
Norway	20,757	85,604	148,739
Denmark	35,041	185,238	259,249
Germany	.....	99,610	735,153
Netherlands	15,554	237,827	774,332
Belgium	7,471	119,099	517,432
France	744,521	1,033,986	1,384,063
Portugal	38,468	51,021	56,109
Azores and Madeira	.....	.....	2,204
Spain	30,795	111,779	151,169
Canary Islands	.....	34,600	46,961
Italy	183,364	497,067	593,615
Austria-Hungary	1,410	.....	.....
Greece	.....	19,984	56,360
Algeria	15,730	54,213	116,295
French W. Africa	7,317	4,402	16,707
Portuguese W. Africa	4,522	13,677	9,908
Chile	9	8,065	4,438
Brazil	6,264	52,285	82,793
Uruguay	.....	37,459	43,724
Argentine Republic	10,629	94,137	191,851
Channel Islands	9,244	14,471	16,680
Gibraltar	70,730	42,756	69,608
Malta	18,306	13,946	27,455
Egypt	42,908	221,936	158,491
Anglo-Egypt'n Sudan	.....	162	.....
Aden and Depend.	.....	4,495	20,923
British India	14	104,086	56,653
Ceylon	.....	23,361	18,426
Other countries	43,590	211,611	618,524
Total, November	1,360,724	3,593,864	6,570,758
Total, October	1,417,498	3,405,972	6,196,411

QUANTITY AND VALUE

	Gross Tons November	Gross Tons 1st 11 Mos.
1920	1,360,724	22,629,777
1921	3,593,864	20,351,390
1922	6,570,758	58,243,742

	Value November	Value 1st 11 Mos.
1920	£5,681,484	£90,282,450
1921	4,878,019	37,585,637
1922	7,433,280	65,836,846

Pier and Bunker Prices, Gross Tons

	Dec. 30	Jan. 6
PIERS		
Pool 9, New York		$9.00@$9.25
Pool 10, New York	$8.75@$9.25	*8.35@ 8.75*
Pool 11, New York	8.15@ 8.50	*8.00@ 8.25*
Pool, 9, Philadelphia	8.35@ 8.50	**8.50@ 9.00**
Pool 10, Philadelphia	7.90@ 8.00	**7.90@ 8.15**
Pool 11, Philadelphia	7.25@ 8.50	*7.80@ 7.65*
Pool 1, Hamp. Roads	7.50@ 8.00	**8.25@ 8.75**
Pools 5-6-7 Hamp. Rds.	7.25@ 8.00	**8.00**
Pool 2, Hamp. Rds.	7.50@ 8.00	**8.25@ 8.75**
BUNKERS		
Pool 9, New York		$9.40@$9.65
Pool 10, New York	$9.00@$9.50	*8.80@ 9.15*
Pool 11, New York	8.40@ 8.75	*8.40@ 8.70*
Pool 9, Philadelphia	8.60@ 8.90	**8.70@ 9.20**
Pool 10, Philadelphia	8.30@ 8.50	**8.35@ 8.60**
Pool 11, Philadelphia	7.50@ 7.75	**7.60@ 7.80**
Pool 1, Hamp. Rds.	7.50@ 8.00	**8.50**
Pool 2, Hamp. Rds.	7.50@ 8.00	**8.50**
Welsh, Gibraltar	38s. f.o.b.	38s. f.o.b.
Welsh, Rio de Janeiro	57s. 6d. f.o.b.	57s. 6d. f.o.b.
Welsh, Lisbon	50s. f.o.b.	50s. f.o.b.
Welsh, La Plata	50s. f.o.b.	50s. f.o.b.
Welsh, Genoa	42s. t.i.b.	42s. t.i.b.
Welsh, Algiers	38s. f.o.b.	38s. f.o.b.
Welsh, Pernambuco	65s. f.o.b.	65s. f.o.b.
Welsh, Bahia	65s. f.o.b.	65s. f.o.b.
Welsh, Madeira	40s. 6d. f.a.s.	40s. 6d. f.a.s.
Welsh, Teneriffe	38s. 6d. f.a.s.	38s. 6d. f.a.s.
Welsh, Malta	41s. f.o.b.	41s. f.o.b.
Welsh, Las Palmas	38s. 6d. f.a.s.	38s. 6d. f.a.s.
Welsh, Naples	39s. 3d. f.o.b.	39s. 3d. f.o.b.
Welsh, Rosario	52s. 6d. f.o.b.	52s. 6d. f.o.b.
Welsh, Singapore	50s. t.i.b.	50s. t.i.b.
Welsh, Constantinople	50s. f.o.b.	50s. f.o.b.
Welsh, St. Michaels	50s. t.i.b.	50s. t.i.b.
Welsh, Port Said	49s. f.o.b.	49s. f.o.b.
Welsh, Oran	38s. f.o.b.	38s. f.o.b.
Welsh, Fayal	50s. t.i.b.	50s. t.i.b.
Welsh, Dakar	42s. 6d. f.o.b.	42s. 6d. f.o.b.
Welsh, St. Vincent	42s. f.a.s.	42s. f.a.s.
Welsh, Montevideo	50s. f.o.b.	50s. f.o.b.
Welsh, Alexandria	42s. f.o.b.	42s. f.o.b.

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations by Cable to *Coal Age*

Cardiff:	Dec. 30	Jan. 6†
Admiralty, large	28s.@ 28s.6d.	28s.@ 28s.6d
Steam, smalls	18s.@ 19s.	*17s.@ 17s.6d*
Newcastle:		
Best steams	25s.	*24s.@25s.*
Best gas	25s.	*24s.6d.*
Best bunkers	22s.@ 23s.	**22s.6d.@ 23s.6d.**

† Advances over previous week shown in heavy type; declines in *italics*.

North Atlantic

Prices Rally as Shortage Of Cars Quickly Reappears

Accumulation of Empties Over Holidays, Accompanied by Price Drop, Is of Short Duration—Loads Move Slowly —Good Grades Scarce.

After a temporary betterment, due to the accumulation over the holidays, the car supply has again fallen off and empties are as scarce as they were before Christmas. Prices dropped with the heavier loadings but rallied quickly with the renewed car shortage. Movement of loads is slow and good grades are hard to obtain. A feeling of hesitancy has slowed the demand somewhat, although the market could easily absorb a much larger tonnage than is offering.

The domestic market is very active. Good screened coals are well sold up and the shortage is responsible for higher prices.

CENTRAL PENNSYLVANIA

Prices along the Pennsylvania range as follows: Pool 10, $4.50@$5.25; Pool 11, $4.50@$4.75; Pool 9, $5.50@$6.25; Pool 71, $6.50@$7.50. On the New York Central, Pool 11 is $4.50; Pool 10, $4.75 @$5.25; Pool 71, $6.50@$7.

There was a fair distribution of cars on the day following New Years, amounting to 30 per cent of the Pennsylvania's Cresson division but later in the week it dropped to 15 per cent. On the New York Central a 100 per cent distribution at the beginning of the week dropped to 50 per cent later.

NEW YORK

Demand was not so strong last week and prices declined slightly. Buyers were about but simply asking questions.

Poor car supply did not appear to cause any increase in buying although many mines did not work more than half time. Reports as of Jan. 5 showed 3,170 cars at the local terminals as against 2,679 cars on Dec. 29. However, most of this was Pool 11. There was nothing better than Pool 10 coal for the spot buyer and very little of that. Most of the coal was on order.

British coal is arriving here in increasing tonnage. Two cargoes reached port early last week, one consigned to a large railroad. Large tonnages have been contracted for delivery during this and next month. Quotations at the end of the last week for Admiralty coal ranged $8.50@$9 c.i.f., but as freight rates were gradually increasing it was predicted that coal quotations would also advance.

An embargo against shipments of all kinds of freight including bituminous coal, from its connections, was placed by the New York, New Haven & Hartford Railroad Co. late in the week.

Coke and screened coal are in heavy demand. The latter is sold up in most quarters. High-volatile coals were quoted $4@$5, according to grade; gas coals, $3.50@$3.75, and coke, $9@$9.50, all f.o.b. mine. Pier quotations on high-volatile coals ranged $7.75@$8.25.

PHILADELPHIA

Spot coal continues difficult to get, and movement is somewhat slow even after being loaded, and all of this is in the face of unimpeded rail conditions. Most shippers now are spending their greatest efforts in getting old orders off the books and the coal to destination. Operators on railroad fuel are mostly able to make full time, which is quite satisfactory, although prices are under the market. Concerns who have contracts, particularly the large users, report fairly good shipments on their account, but of course not up to requirements, and all of them, without exception, are using a fair amount of stock tonnage.

The demand, of course, continues strong, but in some ways considerable of the edge seems to be worn off, consumers probably having gotten over their first flurry of excitement.

Some of the less desirable coals have only been slightly affected as to price recently. It should be borne in mind, however, that while high prices are quoted for market coals, there is actually only a minimum of the production selling at these prices, by far the greater proportion going on contracts and orders entered long ago at price of $3.75@$4.25, and much rail fuel at less than this.

UPPER POTOMAC

There was a decline in production during the final week of 1922, due in large measure to the holiday vacation of miners. Otherwise it is probable that production would have been on a larger scale than usual. The most noticeable improvement is observed in the Georges Creek region. Producers are besieged with inquiries.

BALTIMORE

Immediately after the holiday period the railroads were able to deliver a much better supply of cars to the mines. A price drop of about 50c. came during the past week. At this writing, however, the car supply has gone back almost to the conditions existing just before the holidays and the range of prices has returned to the former high level.

An incident of the last week is quite interesting. Certain interests here secured control of a mine with coal unpledged, and efforts were made to get a number of plants to agree to take a certain tonnage in box cars. The inducement was the offer of the coal at about $1 below the average market price. At last accounts it was reported that not much interest was being shown in the endeavor. Of course, Baltimore consumers have not been educated to the use of box cars for fuel delivered, nevertheless, had there been a serious shortage of fuel there is no doubt that the coal would have been taken up as quickly as offered under such a plan.

Revised and complete figures of the imports and exports of Baltimore during 1922 show a decrease of over 1,300,000 tons in the amount of fuel shipped to foreign countries and Porto Rico as compared with the activities of 1921. In the year 1921, however, a large amount of coal went out of this port to take care of loss through the English strike, while in 1922 the shoe was on the other foot. In 1922 35 vessels loaded cargoes totaling 100,708 tons on export. Eleven of these ships took 8,254 tons to Porto Rico, making actual export figures 92,454 tons. Fourteen of the ships with cargo coal took an additional 6,410 tons for bunkers.

FAIRMONT

Although the loss of a day on Christmas tended to curtail production, yet an accumulation of cars over Sunday and Monday made it possible to load an unusually large tonnage when mines did resume. There was a great deal more activity than usual during the holiday period, from a market standpoint. Under this stimulus, which it was not possible to meet, prices hardened somewhat.

South

BIRMINGHAM

Operations are nearing normal activity following the holidays, though labor has not yet returned in full force. Car supply has been better than prior to Christmas, but the more liberal distribution has been due in some measure to the fact that mines were not operating normally, on account of shortage or layoff of labor, and it remains to be seen whether or not there is to be any net improvement in the number of cars available when production reaches the normal stride.

The market is rather quiet for both commercial and domestic fuel, but inquiry is gradually picking up and improved trade requirements are expected. The outlook for a better year in the coal industry is much more promising than it was with the advent of 1922, economic and industrial conditions being on a much more satisfactory basis and there should be a much greater demand for coal during this year.

ALABAMA MINE QUOTATIONS

	Mine Run	Washed	Lump
Big Seam...	$2.50	$2.50@$2.75	$3.45@$4.45
Carbon Hill	2.50@2.75	2.50@ 3.00	4.45
Black Creek and Cahaba..	3.00@3.25	3.00@ 3.50	5.20
Pratt.....	2.75@3.00	.....	.....
Corona.....	2.75@3.00	3.00@ 3.75	4.55@ 5.00

VIRGINIA

The Christmas holidays made a difference in the volume of coal mined but brought no diminution of demand. Even before the holiday season proper was ushered in mines began to feel the effect of smaller work crews. Owing to the limited car supply many companies increased the tonnage of coal for coking purposes. At the close of the year there was a strong demand at Tidewater as well as in Inland markets, with prices on a somewhat higher level.

Anthracite

Retail Domestic Stocks Low, Screened Soft Coal Booms

Transportation Difficulties Intensified by Stormy Weather—Supply of Substitute Tonnage Also Falls—Independent Prices Up to $12 on Fair List—Canadian Buyers Offer Premiums.

Stormy weather has added to transportation difficulties. The movement from the mines has been slowed down and retail distribution has reduced yard supplies of domestic sizes to almost nothing. Even substitute tonnage has been lowered and producers of screened grades of soft coal are reaping a harvest. Anthracite steam sizes are moving well, with buckwheat the most active, as it is growing in favor as a substitute for the larger coals.

Independent producers who sold in excess of $9.25 have had their coals scheduled in a fair-price list by the Pennsylvania Fuel Commission. These prices ran up to $12, f.o.b. mines, but it is understood that Canadian buyers are offering attractive premiums for prompt shipment and in some cases are paying cash for the coal before it is loaded.

BOSTON

The outlook here is by no means encouraging. Heavy weather and low temperatures have interrupted shipments and sharpened the demand, and as yet there is little relief in sight. Retail dealers are struggling with the situation as best they can with the means at hand, but each week shows increasing amounts of bituminous and coke distributed to replace anthracite. More than likely it is a factor that will arise to plague the hard-coal operators later on.

At wholesale there is little news. The trade is suffering from light holiday production, and while reports last week were favorable, the tonnage actually coming forward is not enough really to affect the situation. There are those who feel that the local situation is the worst we have experienced since 1902.

NEW YORK

Storms and colder weather added to the troubles of the trade last week. Demand increased correspondingly but dealers were in no way able to meet it. Retail yards are practically clear of the domestic sizes and about the only coal available is bituminous and buckwheat No. 1. The use of substitutes is becoming more general and users are not apt to become so panicky when coal becomes short as heretofore.

The one redeeming feature of the situation was the offering of cargo lots of egg and pea in the local harbor. While the quotations were high the offering was taken to indicate that anthracite was more plentiful, and that the reports from the State Fuel Administration that New York's shortage of coal was being overcome were true.

House owners report considerable success with bituminous and many say they propose continuing its use. In some quarters it is predicted that anthracite operators will find it difficult to regain their entire trade.

Company coals are being widely distributed, and most detail dealers are picking up whatever independent product they can, but are not willing to pay the higher prices quoted, some ranging as high as $15.

A stray cargo of egg was reported as being offered during the past week at $17.50, alongside and a cargo of pea was likewise offered at $14.25, alongside. Washery nut was quoted around $10.50 f.o.b. mine.

Buckwheat No. 1 was the most active of the steam coals. It was quoted at $8.50@$8.75, alongside. Rice and barley were not moving rapidly and only the better grades were bringing company circular.

BUFFALO

The best that can be said is that there is rather more coal on hand than there was, but the improvement is not large and it is not likely to be until spring. The supply of natural gas is good and though it costs 60c. per thousand feet, twice as much as it used to, it has to go. It is better than most of the substitutes are.

Some consumers express themselves as puzzled because they are charged $6 or more for some coal than they are for another, not understanding that the independent premium is about that much. It now sells for about $15 at the mines and then Buffalo pays $3.28 in freight and about $2 for local handling and 50c.@75c. for housing it. Fuel is fuel this winter, unless one learns to use buckwheat at $9 delivered to the curb, then it is easy.

PHILADELPHIA

Demand is tempered considerably by the mild weather. The dealers fully realize that it will only take a drop of 10 degrees to create a frantic rush again. As it is now, retail office forces are being badly shaken up due to the strain of the constant efforts of the consumer to get coal. Another element serving to increase their troubles is the influential customer who could have laid in his entire supply early in the spring, but only took enough to carry over the year end, in anticipation of a price reduction. Numbers of these people are now seeking through various unusual channels to get supplied with additional fuel.

Production has been badly hampered by the holidays and this is now showing in the reduced shipments to the dealers. On the other hand there has been a copious rainfall in the region, which has greatly helped a situation that had become so serious as to cause an occasional shutting down.

Retail prices are higher in a few instances, especially in view of an increase by a large independent shipper to $10.75. As a result of this there are more dealers compelled to ask $16. Buckwheat is $9, although the consumer still balks at taking it. Coke of certain grades is moving well at $13@$17 a ton, dealers getting voluntary orders for it, although the supply is quite limited.

Steam coals have held all their recent gains, and even show some additional strength. The companies are not anxious for additional buckwheat orders, while the independents are able to get premiums of 50c.@$1. Rice is in good demand, and barley shows signs of becoming scarce.

BALTIMORE

Hard coal dealers report that the orders on their books are still far in excess of their ability to deliver and efforts are still being devoted to giving one- and two-ton lots to customers who have run out of coal. A somewhat better run of hard coal to Baltimore is noted, however.

The trade is hopeful that January will show an improvement over December of 1922, when in the neighborhood of 1,350 cars were received. The receipts for October, November and December totaled slightly less than 4,100 cars.

Coke

CONNELLSVILLE

Demand from the East for coke for domestic distribution has practically ceased. The buyers are now receiving heavy shipments against their recent purchases, and it remains to be seen how the coke will be bought by the domestic consumers, also whether it makes a favorable impression. No coke has been pressing on the market but with the decrease in buying furnace coke has eased off about 50c. Furnace coke is now $8.50@$9 and foundry $9@$9.50.

All blast furnaces that had contracts expiring Dec. 31 appear to have covered for first quarter, the price generally being $7@$7.25, though it is possible $7.50 may have been paid in one or two instances. The spot market had declined to $6.50 early in December and furnaces had expected to buy for first quarter at that price or less, but the bulge resulting from Eastern buying for domestic use interfered with the program.

The Courier reports production during the week ended Dec. 30 at 117,300 tons by the furnace ovens, and 75,110 tons by the merchant ovens, a total of 192,410 tons, a decrease of 12,120 tons. The decrease is less than usual for Christmas week. Total production in 1922 was 5,675.000 tons, against 3,572,417 tons in 1921 and 21,654,502 tons in 1916, the record year.

BUFFALO

Coke is hard to get, but it is not quite as scarce as it was. Prices are stiff, considerably above standard anthracite. Jobbers quote foundry at the ovens at $11, furnace at $9@$9.50. The local byproduct ovens are running strong, but they have little or none for the house trade.

Chicago and Midwest

Steam Demand Remains Slow with No Stocking

Uncertainty Over Labor Situation Drives Nobody to Stock Much — Domestic Trade Continues Good and Car Supply Fair in Spots — Eastern Shipments Lag.

The Midwestern market is spotted just now on steam coals. In the southeastern part of the territory the Kentucky and southern Indiana fields are finding industrial demand picking up now that the inventory period is about over and holiday let-downs are past, but around Chicago and St. Louis small sizes move sluggishly. There is no stocking to speak of there. In the latter regions car supply has been ragged, one field getting up to 50 per cent running time and another dropping to little better than one day a week. Steam prices have not improved anywhere but instead, are showing a slight tendency to slip.

Domestic, however, is running strong, except that nobody is trying to buy big lots. The uncertainty about the labor situation is puzzling most everybody though of course this has less disturbing effect on dealers than on big industrials.

ST. LOUIS

A little colder weather has stimulated the market some, but it is usually for the cheaper grades and in small quantities for domestic use. A little high-grade coal is moving in, such as Carterville, and the little anthracite that gets here finds a ready market. Coke is scarce and hard to get.

Country domestic is quiet and usually calls for the cheapest grades of Standard. Locally, steam wagonload is good. Carload is slow, and the same condition covers the country steam, although a fairly good tonnage is moving to the North and Northwest. There have been no changes in prices.

LOUISVILLE

According to local jobbers and producers the gas plants represent the best buyers at the present time, there having been some good tonnage placed, moving toward Detroit, Cleveland and north of the Ohio River. Southern movement has been slack, due to mild weather principally. Utility buying is better and it is claimed that there is some stocking demand developing, now that stocks won't go into 1922 inventory, and in view of the fact that some of the big buyers are fairly well satisfied with steam prices, and figure that they had better play safe and stock some coal, as insurance against any strikes in the spring.

Railroad buying is slow, and retail buying is on a hand-to-mouth basis, but fair as a whole. General industrial demand is good and increasing, since business is on the increase, and not suffering the usual big slump over inventory period. Implement, wagon and auto plants are in the list of active consumers. Eastern Kentucky car supply started off badly the first part of the week, but is reported to have shown improvement.

Prospects are said to point to better car supply as a result of open weather, and cleaning up of terminals by railroads during the holidays. Shops are also functioning better, and records of car and locomotive repairs show a good volume of work going through the shops.

Locally jobbers and operators are quoting mine prices in eastern Kentucky at $6.25@$7 on lump; $3.50@$4 on gas and steam mine run; and $3.25 @$3.50 on screenings. Western Kentucky prices are $4.25@$4.75 on lump; $2.50@$3 on mine run; and $2@$2.50 on screenings.

INDIANAPOLIS

Continued mild weather to what was expected has kept down demand, according to both Indiana operators and dealers in Indianapolis. So low has the demand been that retailers have cut off from fifty to seventy-five cents per ton on their prices and operators are making proportionate concessions. Steam coal is plentiful partly because many plants curtailed operations during the holidays. The car situation has improved to about 50 per cent. There is as yet no nervousness on the part of either industries or domestic consumers about trouble in the spring. There are practically no reserves in the state and industries haven't time now to build up big surpluses before April 1, operators say.

WESTERN KENTUCKY

Prices in the western Kentucky field are fluctuating considerably this week with car supply, which was very poor at the start of the week, but which has shown material improvement. Industrial demand is generally better. Utility buying is also good, but volume from railroads is only fair. There is every indication of a better stocking movement. The present market looks fairly good in view of the hand-to-mouth demand and car supply.

Reports show that during December car supply was below 30 per cent for the month, records showing the Illinois Central to have supplied 29.8 per cent; while on the Louisville & Nashville, only 22.4 per cent was supplied on the Henderson division, and 23 per cent on the O. & N. division, which resulted in a stronger market just before the holidays. Indications are for a better supply in January.

Prices at the mines show a considerable range, lump being $4.25@$4.75, with the bulk of movement at around $4.50. Mine run is $2.50@$3.25, mostly $2.50@$2.75. Screenings are quoted all the way from $2 for pea and slack to $2.50 for nut and slack, with bulk of sales at $2@$2.25.

CHICAGO

A slight softening of the market for steam sizes was noticeable during the past week. Improvement of the car situation with continued open weather during most of the week put enough coal on the market to give big steam buyers just the opportunity they constantly watch for. Domestic coal of every size remained in good demand and the result was screenings grew a trifle numerous. This naturally edged the screenings market down but the drop was small in most cases. Fifth Vein Indiana, for instance went off a quarter to $2@$2.25 and not much Fourth Vein sold over $2.50 though brokers contended the market ran up to $2.75 as it did the week before. Southern Illinois screenings held up to $2.75@$3.

Eastern coals continue to have a hard time getting through Cincinnati and Toledo on their way west. This keeps down the volume of West Virginia high-volatile as well as smokeless that reaches here. Eastern Kentucky undergoes some of the same handicaps but car supply is so short there that the effect is not so deeply felt around here. Elkhorn gas coal in 2-in. lump size brings $6.50 and 2 x 4-in. egg, $6. What little mine run is traded here moves at $4@$4.25. Harlan field quotations are about the same. From West Virginia it is noticeable around here that box cars are coming into use wherever coal can be disposed of in that kind of equipment at a price 50c.@$1 under the quotation for open-ton shipment.

SOUTHERN ILLINOIS

Car shortage started this week once again to make things interesting in the Carterville, Du Quoin and Jackson country fields and practically all roads are affected. Movement is slowing up and with cold weather prevailing there is an increased demand for everything. There seems to be nothing unbilled on track. Mines are getting from two to three days a week with the usual exceptions. Steam sizes show improvement. Prices on Du Quoin and Jackson county are $5@$5.50 for lump, egg and nut, with screenings at about $3 and steam nut ranging $4@$4.50.

Improvement is noted in the Mt. Olive field in the movement of steam and domestic, chiefly to the North and Northwest. The railroad tonnage in this field has been good. Steam is better than in the other districts. Prices range from $4 on domestic at St. Louis to $4.50 for country districts, with screenings at $2.25 and nut from $2.50 up. Car supply is fair, averaging three days a week.

The Standard district is tied up again on account of no cars. Conditions are extremely bad on the Illinois Central, the B. & O., Pennsylvania, and the L. & N. The Mobile & Ohio is getting on a par with the others too. Some of the mines average but one day a week. Prices are not good. Six-inch lump and 3 x 6 egg range $4@$4.25. Two-inch lump ranges $3@$3.25, with steam sizes, $2.50@$2.75 and screenings at $1.75@$2.

Railroad tonnage fair, but conditions generally are not good with the poor working time and low prices.

Eastern Inland

Empties Scarce Following Spurt of Heavier Loading

Holiday Idleness Brought Temporary Accumulation of Cars—Spot Buying Necessary to Eke Out Current Needs—Domestic Demand Unabated —Steam Prices Stiffen.

Holiday idleness provided an accumulation of cars which enabled mines to make inroads on their orders. Following this brief period of heavier loading, however, has come a return of the car shortage and empties are now as scarce as before Christmas.

Contract deliveries are good, under existing circumstances, but consumers must eke out their current needs with spot purchases. Railroads and other large users are taking stock coal and the offerings on the spot market are very meager. Domestic demand continues unabated and prices for steam grades as well have stiffened further during the week.

CLEVELAND

Prices of Ohio coal, which are being substituted to a large extent for West Virginia smokeless, semi-smokeless and anthracite, have been advanced 10c.@ 20c. This has been due largely to severe weather, which has affected transportation conditions. The railroads are taking large tonnages in this territory.

Public utilities and other large consumers are planning to build up storage piles this month and will continue to buy through February and March. The Cleveland Electric Illuminating Co., which supplies heat to a large number of business blocks and apartment houses and furnishes power for light manufacturing and street cars, has 75,000 tons in its yards, enough to last twenty-eight days. The present stock is a little larger than it has been recently. Homes, apartments and industrial concerns in certain parts of the city have been deprived of lights and electric power when a partial shutdown of the municipal light plant has been forced several times through inferior grades of coal finding its way into the plant's boilers.

Pocahontas coal is camparatively scarce in this market. Shoveled lump is delivered for around $13 a ton, and some mine run also is available. The price asked for this grade is $11.50 @$12.

EASTERN OHIO

During the last week of 1922, operations were accelerated somewhat by an improved car supply. Output was 290,000 tons, representing 56 per cent of potential capacity for the five-day week. Increase over the preceding week was 25,000 tons. Cumulative statistics covering production for 1922 show an aggregate output of 11,192,000 tons, or 36 per cent of potential capacity, based on railroad ratings.

At the current rate of operations and the comparatively small quantities of free coal available, there is a ready market for all that is offered and prices are stiffer. The railroads have only moderate amounts of reserve fuel on hand, and public utilities and other large consumers are doing some storing. However, the rank and file of industry continues to buy in a hand-to-mouth fashion and stock piles are at a minimum. Weather conditions have resulted in a constant demand from domestic consumers upon retailers and operators and jobbers report activity in that quarter.

The City of Cleveland recently opened bids on 40,000 tons of nut and slack for the waterworks. Lowest bid came from the Valley Camp Coal Co., Cleveland, for No. 8, at $2.90, contract running for six months, freight rate $1.70 per ton. Next lowest bid was from a middle district operator, offering No. 6 at $3.22, freight rate $1.45 per ton.

Receipts of bituminous coal at Cleveland were the largest on record during the last week of 1922, and local terminals report slow deliveries because of bunched arrivals and inability of several large receivers to handle. Total receipts were 3,332 cars, or about 177,000 tons. Of the total, 2,659 cars were consigned to industries and 673 cars to retail yards.

BUFFALO

Trading is not really brisk, although the snow storm, added to the car shortage, stiffened prices materially, but they are already dropping off again. Some of the shippers are trying to maintain the advance until there is a stir in anticipation of trouble in April, but as a rule this is looked on as too far away.

The disposition of operators to urge more and more coal on the market is a discouraging feature of the market. Jobbers make no secret of their disapproval of the tendency.

All quotations are subject to individual variations, as follows: $5@$5.50 for Youghiogheny gas lump; $4.75@$5 for Pittsburgh and No. 8 steam lump; $3.75@$4.25 for all mine run, and $3.25 @$3.75 for slack, adding $2.09 to Allegheny Valley and $2.24 to other coals for freight.

PITTSBURGH

The market is definitely quotable at a slightly higher average level. It has now been strengthening for three weeks.

Cars continue in short supply and there is much irregularity, both in the supply on a given division from day to day and in the supply comparing one division with another. Consumers are receiving moderately regular shipments from their usual sources of supply, but many are in the market from day to day for extra tonnages, making a fairly large volume of spot trading. To what extent consumers are stocking cannot be determined as buyers are indisposed to discuss such matters. The common assumption is that there is a good bit of stocking.

The latest gossip indicates the probability of a disagreement on April 1 with the U.M.W.

The Pittsburgh district market is quotable as follows: Steam mine run, $3.50@$3.75; slack, $3@$3.25; gas mine run, $3.85@$4; gas slack, $3@$3.50; domestic 1¼-in. lump, $4.50@$5. Some nut is being produced for the Eastern trade, and brings high prices, up to about $6.

NORTHERN PANHANDLE

Embargoes and congestion are still interfering to a great extent with the movement. There is a heavy demand for prepared grades and for steam coal, with the prepared sizes hovering around the $4.50-mark. Mine run prices, too, had stiffened somewhat.

DETROIT

Slow demand continues a prominent characteristic of the market. Offerings create little interest among buyers. While some sales are being made the business is mainly of an irregular nature involving only small amounts.

The closing of navigation of the Lakes has not brought the increase in shipments to Detroit that some of the buyers had expected. In fact, some of the jobbers say less coal is coming to Detroit than a month ago. One of the details apparently overlooked by the buyers, is the longer haul now involved, which requires the use of a large number of cars. Car supply also is reduced by the demands from other lines of industry.

Very little free coal is to be found on track. The larger proportion of the receipts comes from Ohio. Hocking lump is $5.25@$5.50; egg, $4.75@$5; run of mine, $3; nut, pea and slack, $2.75@ $2.90. Three-quarter lump, Pittsburgh No. 8, is $4.50; run of mine, $3.25; slack, $3. Lump from West Virginia or Kentucky is $5.50, mine run, $3.25; slack $3. Smokeless continues scarce with lump and egg about $8 and mine run and slack, $5.75@$6.

COLUMBUS

A stronger demand has developed since the holiday season. This includes all steam sizes as well as domestic grades. Prices have strengthened materially and indications point to a rather stiff market for the remainder of the month.

Hocking, Pomeroy and Cambridge lump are good sellers and there is also a good tonnage coming from West Virginia and Kentucky. Pocahontas is still scarce. Retail prices are strong but consumers are buying more liberally.

Steam business is showing considerable firmness. Large consumers are buying better as there is a growing likelihood of a suspension about April 1. Railroads and utilities are taking larger orders while the small manufacturers are showing a tendency to come into the market.

Production is somewhat heavier, due to better car supply, caused by the accumulation of empties after the two holidays. The Hocking Valley is producing about 40 per cent while the same is reported from Pomeroy and Cambridge. Eastern Ohio has been near the 50 per cent mark.

Northwest

Upper States So Used to Worrying They Are Callous

End of Fuel Administration Control Over Supply Is a Relief, Even Though Hard Coal Will Exhaust By Feb. 1 And Free Bituminous Totals Only 700,000 Tons.

The Northwest is breathing a sigh of relief now that the fuel administration has ceased to have charge of supplying that region with coal. The fact that there is only enough anthracite to last in dealers' yards to Feb. 1 is such common knowledge now that the people are getting used to it and are not worrying much, especially since the weather for a week has been mild.

The confidence felt in rail shippers to supply the region from the South all through the winter has removed much uneasiness over soft coal, of which it is estimated there is now only about 700,000 tons free at the docks. Shipments inland from the docks have been so tremendously heavy ever since the strike that the country has a little more bituminous on hand than is usual.

DULUTH

Shipments from docks during December ran pretty nearly to the high-water mark. In all 23,985 cars went out as against 13,444 in the same month in 1921. In November 20,638 cars were shipped.

The total number for the year shows how much more freely the Northwest is taking coal this season than last. During 1921 the total car shipment was 161,322 and in 1922 in all 245,683 cars were shipped. Until June in 1921 the average car shipment from the docks was around 5,000 to 8,000 monthly while this year the poorest month, April, showed 9,000 cars and the peak was reached in September with 26,000 cars. The demand has been steady, chiefly because many feared a shortage.

At the end of last week, a spell of mild weather caused a drop in selling orders, but coal still continues to go out in a steady stream on past orders. Anthracite is in demand everywhere. Calls come for coal from all Inland points, and there seems to be real suffering. The policy of reserving hard coal for those who have magazine stoves for heating still continues. Pocahontas is a feature of the market. It has climbed from $11.50 to $13 and supply is short. Coke is $12 and briquets, $10.50.

It is estimated that there are 700,000 tons of bituminous left free. If this estimate is anyway near correct, it would seem to indicate that the slightest slip-up in the all-rail delivery plans for the southern part of the state would cause a shortage. In fact, there will be no coal left on the dock for a surety when navigation opens, but there may be no want by that time.

MINNEAPOLIS

The coal trade is compelled to get along as best it can without the aid or hindrance of the fuel administration, which has wound up its work.

The hard coal situation is practically one of exhaustion. Less than half the reasonable needs of the Northwest were received up to the close of the extended period of navigation on the Great Lakes. Despite all economies through the open fall and early winter, and the use of other grades, the 550,000 tons received will not last through the season. In fact, the wholesale stocks are exhausted now and are all in retail hands. Retailers are distributing them steadily, and many will be entirely out of sizes very soon. Feb. 1 will probably see many retail concerns practically without hard coal.

The soft coal situation is steady, though without a great deal of support. The mild weather took the edge off buying, after the two weeks of cold weather braced the market sharply. As long as mild weather prevails, there will be no real support to the market. On the other hand, it is unlikely to go soft, with strong markets reported in other centers, and shipments several weeks behind. That will prevent any excess coal being sent into this market. It is this practice that has generally upset things here. With that removed, there will be a much steadier soft coal market.

MILWAUKEE

There is a good demand and dealers are kept busy filling urgent orders, as few consumers entered the winter with anything like reasonable supplies. Anthracite is being distributed in small lots. There have been some complaints of discrimination, but the State Fuel Commission is satisfied that dealers are acting fairly both to the city and country trade, notwithstanding there is an advantage to them of 75c. per ton in favor of dumping into city trucks as against loading cars.

Just when the shortage of anthracite will become acute is problematical, but it is admitted that severe cold weather will mean hardship in the country. To avoid such a condition, the state authorities are considering the commandeering of all anthracite on the docks at Milwaukee.

The car situation is wretched, and country shipments are two or three weeks behind. Industrial plants are showing an inclination to re-establish storage piles, now that it is certain that coal will not be any cheaper this winter. Illinois and Indiana screenings are still scarce and firm. There seems to be no inclination on the part of dealers to disturb prevailing prices. Soft coal and coke are being extensively substituted for hard coal both here and in the country.

New England

More Inquiry for Spot Coal; Heavier Use of Steam Seen

Buyers Awaken to Situation—Short Car Supply and Holiday Delay Are Factors—All-Rail and Water Movement Checked, Putting Contracts Behind.

In all directions spot coal is in better request. Buyers are awakening to the current situation, and in most lines of manufactured goods there is enough better business to mean increased use of steam. Short car-supply is another governing factor and the holiday period of extremely light shipments has brought home to many consumers the delays that follow rough weather. Both all-rail and by water the movement of coal has been checked, and doubtless it will take the balance of January in most instances to catch up on contract quotas.

In Central Pennsylvania practically all grades have further advanced in price the past week. At Hampton Roads the market is also notably firmer.

Favored grades from the Cambria districts have sold up to $6 per net ton and quotations still higher are looked for in the near future. Even moderate to poor grade coals have sold recently at enhanced prices, and while a seasonable thaw and a better run of anthracite would tend to hold things down it is quite possible spot prices will reach $7 on average grades within a reasonably short time.

It is rumored here that $9.25 at the Roads has been paid for tail-ends, but an average figure on what little volume has been available for spot sale would probably be $8@$8.50 per gross ton f.o.b. vessel. Shipments latterly have been rather in favor of prepared sizes to the West, but with more inquiry at the Virginia terminals it is quite likely that the volume will increase in that direction. Practically all the factors are making only small deliveries on contracts, urging as a reason the meager output during the whole of December.

The textile manufacturers are showing more interest in the current situation. This is due partly to decreased water power, but the improvement in the market for goods is really accountable. The prolonged strike very much reduced the available supply of goods, and now with any prospect at all the cotton mills are expecting to run full during the remainder of the season.

Cincinnati Gateway

Byproduct Buyers Again Prominent in the Market

Feeling-Out Process by the Wholesalers Is Strongly Defined — More Rapid Movement of Coal Demands Caution.

After a lull of several weeks byproduct buyers are again the prominent feature of the market. They have not been bunching their purchases to the degree that was noticeable in November but their requirements have been sufficiently strongly shown to bring that type of coal back to the spread that it was enjoying over the price of steam and splints.

The transportation situation has surprised some of the astute observers. Both the C. & O. and the L. & N., through quickened movement of loads off of branch lines, have shown that accumulations have been pretty well worked out. The N. & W. is not in such good trim, which is indicated by the small shipments to Inland and Western markets. Prices west, however, were given an upward boost of proportions to start the new year off right.

CINCINNATI

The market can be said to be divided into two camps. Direct mine representatives are pretty well sold up with their coal while the jobbers and wholesalers are laying back and using a "feeling-out process" in the hope of discovering which way the prices will move. Most of the latter are taking coal on a quick turnover basis, while the former have sold on the upturn for the coming month and hoping that their judgment is correct.

Because of the better movement of steam coal prices on high-volatile run of mine have shown but little change. On the other hand, the rush of buying orders for gas and byproduct coals has sent these upward.

Producing companies changed the price on smokeless lump to contract takers to $7 the first of the year, some asking $7.50. Brokers on the other hand are asking $8@$8.50, which indicates that they still have difficulty in getting car numbers. Low-volatile run of mine, nut and screenings are stronger due to the Tidewater situation.

Retailers have made no change in the price line up but declare that any further advance in the cost of smokeless will force them to readjust.

HIGH VOLATILE FIELDS

Kanawha

As was to have been expected, production was curtailed by the holiday idleness. When the men did return to work there was a larger supply of empties, but by the end of the week the supply was exhausted. What little tonnage there was mined was consigned to Western markets, much of it for regular customers, so that production was far from keeping pace with demand.

Logan and Thacker

There was no improvement worth mentioning in the Logan district during the final days of 1922, but the lack of cars made somewhat less difference as there was a complete suspension of operations for a day or so during the holiday week. Not only were inquiries growing in volume, but producers were being pressed for early delivery, which was difficult owing to the slow movement of loads to Western points.

Northeastern Kentucky

Idleness at the mines over a period of several days gave the C. & O. a chance to accumulate cars but the supply was soon used up. With production curtailed, and with buying on a heavier scale, prices have climbed a peg or two.

LOW-VOLATILE FIELDS

New River and the Gulf

The Christmas suspension tended to restrict the output of the New River territory to some extent though it was possible to offset in part the losses so sustained by heavier loading when the miners returned to work because cars had accumulated during the several days of mine idleness. The increased supply available, however, was only temporary. Transportation and market conditions are instrumental in diverting the bulk of the output to Easten points. The movement to Tidewater is as heavy as is possible in view of curtailed production. Westward movement is retarded by rail congestion.

Had there been a full week of work in the period ended Dec. 30, it would probably have been possible for Gulf mines to increase the output a little since the Virginian is gradually getting back to a normal basis with its motive power. Most of the coal so produced is being handled to Tidewater where there is an active demand. Prices are gradually creeping upward.

Pocahontas and Tug River

The Pocahontas field had a larger production to its credit when the year closed than at any time since 1916 but the increase of 25 per cent for the year as a whole was not made possible by conditions such as obtained at the end of December. There is a heavy pressure from many sections for Pocahontas fuel, a demand greater than it is possible to supply.

Tug River production was affected by the holiday suspension though idleness did not last throughout the week and it was of course possible to load on a little larger scale once the miners were back, since cars had accumulated. There are not as many empties coming from the West, however, as are needed to take care of the demand so that an unusually large proportion of the output is going to Tidewater.

West

SALT LAKE CITY

Stocks are getting low in many local bins as a result of people not putting in a full winter's supply of coal last summer and fall. The retail price of lump five or six months ago was $9. Now it is $10. It is felt that more staple prices would be better for all concerned—operators, dealers and the public—as business would then be steady and people would not wait to see what changes in prices would be made before ordering coal. The last change, however, in this locality was unavoidable, being the result of the strike. Car supply is adequate and there is plenty of high grade labor available.

KANSAS CITY

The new year opened with little change in market conditions here. The weather has continued mild. Partially as a result of the weak domestic demand, and partially because railroad service always improves with the weather, the car situation is better. The Oklahoma and Arkansas fields, the products of which must travel farther to market than those of the Kansas field, are the greater sufferers. Kansas coal is quoted at $5.50 for lump; $5 for nut; $3.75 for mine run, and $2.50 for screenings. Arkansas semi-anthracite lump is quoted $6@$8; mine run, $3.50@$4.50; screenings $2.

DENVER

Rail service is steadily improving so that nowadays, with 60 per cent car supply in Colorado and supply running up to 75 and 76 per cent in Wyoming the Rocky Mountain fields are enabled to get out a good deal of coal. Demand remains steady for all domestic sizes and steam is picking up slightly with industrial improvement.

Many companies in this state are planning considerable property improvements for 1923, including the Producers Coal Co., which is opening a new mine in Moffat County. The Moffat, C. F. & I., Colorado-Utah, National, and Victor-American companies all have plans for extensive improvements at their various mines, so that the state may be in better position to produce a heavy output during the coming year.

Toronto

TORONTO

There is little change in Toronto market conditions, the most noticeable feature being the increasing use of substitutes for hard coal, very little of which is now coming in. Householders are largely using bituminous coal, coke and briquets, many finding it impossible to obtain anthracite. Receipts have been much below the 60 per cent of normal supply understood to be allotted to Canada and it is claimed that Ontario is credited with carloads which are merely passing through en route to the West. Cases of actual distress which occur are being looked after as much as possible. The industrial demand for bituminous shows little if any improvement.

News Items From Field and Trade

ALABAMA

The Empire Coal Co., owing extensive coal properties in Walker County and at present operating several mines in the Warrior field, will soon begin construction of a byproduct plant to cost approximately $1,500,000, according to announcement of Walter Moore, president. A battery of forty or more byproduct ovens of the latest design will be built. The new ovens which will take the place of the bee-hive battery now operating at Empire mines, will be placed in close proximity to the coal supply and be so situated as to be served by the Warrior River transportation system and the newly projected branch of the L. & N. The ovens are to be ready for operation by July 1.

Edmund Ewing has resigned as superintendent of the Bessie Mine of the Sloss-Sheffield Steel & Iron Co. to become assistant to Vice-President James E. Strong, of the Alabama Co., and will be in charge of operations of coal mines, effective Jan. 1.

CALIFORNIA

For the first time in the history of the Pacific Coast the **toggle bucket is being used successfully at Los Angeles harbor** to remove coke from the holds of vessels. The new scheme is expected to revolutionize coke activities on the Pacific Coast. Heretofore coke has always been removed with shovels. With the advent of the toggle bucket and the hoist the work can be accomplished in half the usual time. The coke is not broken when unloaded with the bucket, a great improvement over the shovel method.

The Columbia Steel Corporation has sent out inquiries for equipment needed in extending its plant in Pittsburg.

COLORADO

The Champion Coal Mining Co. has incorporated at Durango with a capital of $50,000. L. D. McCormick is general manager and work will be started on a mine near here.

A wreck on the Moffat road Dec. 30 near Corona blocked the shipment of 2,500 tons of coal a day from the Victor American Fuel Co.'s mines in Routt County. These mines have up until recently worked only from two to three days a month on account of the continuous interruption of transportation service and inadequate car supply.

The **Colorado Fuel & Iron Co.,** has opened its rail mill at Pueblo with a 75 per cent normal force re-employed. This means employment for 1,000 men in the mills and an additional 700 miners in the mines. The mills will require from 5,000 to 6,000 tons of coal a day.

The Moffat tunnel injunction suit by Jefferson County to prevent the state from issuing state bonds were denied by the Colorado Supreme Court and has been appealed to the U. S. Supreme Court. This tunnel would mean the adding of 300,000 tons production a month to the state, raising the states total to more that a million more tons a month.

CONNECTICUT

The American Coal Co., Hartford, recently increased its capital stock from $50,000 to $100,000, to be used in increasing the business facilities of the concern.

ILLINOIS

F. R. Johnson, of the **St. Louis Coke & Chemical Co.,** with plants near Granite City, recently spent some time on business for his company in Chicago. He is in charge of the raw materials department of the firm and is located in the main offices of the company in St. Louis.

The following **itinerary of the Illinois Miners' Examining Board,** has been announced by Robert M. Medill, of Springfield, Director of the Department of Mines and Minerals of Illinois: Edwardsville, Jan. 8; Harrisburg, Jan. 9; Herrin, Jan. 10; West Frankfort, Jan. 11; Duquoin, Jan. 12; Sandoval, Jan, 13; Litchfield, Jan. 15; Springfield, Jan. 16; Decatur, Jan. 17; Danville, Jan. 18; Canton, Jan. 19 and Peoria, Jan. 20.

George W. Gosnell, of Herrin, formerly county mine inspector, has been appointed by Governor Small to the position of **state mine inspector** for the 12th district, comprising Williamson and Johnson counties. He succeeds **W. L. Morgan,** of Greenville, who was recently appointed as state mining investigator. Mr. Gosnell has served several terms in the capacity of county inspector.

John J. Watt, secretary-treasurer of the Springfield subdistrict of the United Mine Workers, has announced that proceedings to **contest the re-election of Frank Farrington** as state president of the union will be instituted at once. Alleged fraud in the counting of the ballots will be the basis for the suit.

A resolution condemning President Farrington, of District No. 12, Mine Workers of America, for ordering strikers back to work on a mine at Green Ridge, on the ground that the mine was idle in violation of contract, and demanding that he state his position as to the legality or illegality of the strike, has been passed by members of Local Union No. 2897, Subdistrict No. 6.

The Willis Coal & Mining Co. of St. Louis, Mo., has filed suit in the federal court against the Mobile & Ohio R.R. to collect $140,620.18, alleged to be due for coal furnished for the two years prior to July 1, 1922. For many years this shipper and carrier were regarded almost as partners. The Willis company held for many years the contract for Mobile & Ohio fuel coal from its many mines on the Mobile & Ohio in Illinois. Competition waned and mining, it is asserted, became unprofitable at other mines on the Mobile & Ohio. The Moffatt Coal Co. of St. Louis now furnishes most of the Mobile & Ohio coal from one big mine in Illinois and other mines near Blocton, Ala.

Mine No. 18 of the C. W. & F. Coal Co., Herrin, broke a hoisting record Dec. 18, when 4,357 tons of coal were raised in eight hours, making a total of 1,381 dumps. The previous record for eight hours was 4,175 tons. An interesting feature about the record is that the employees did not set out that day to make a record but owing to the fact that all of them did exceptionally good work, they were able to make this remarkable lift of coal. George Parson is the engineer at this mine; Fred Hauck, superintendent and T. F. Bailey, mine manager.

INDIANA

A "right-to-work" bill aimed at unionism in Indiana will be filed with the next state Legislature, the first bill of its kind the state has ever seen. The measure would make it unlawful for any person or persons acting singly or jointly with another or others, by means of any kind of force, threats, coercion, intimidation or violence, to cause or induce or attempt to cause or induce any person engaged in a lawful occupation to quit such employment, or to refuse or decline to accept or begin a lawful employment." Punishment for a violation of the act would be fixed at imprisonment of not less than sixty days nor more than two years and in addition a fine of not less than $50 nor more than $1,000 might be imposed.

Plans are being drawn for the **J. K. Dering Coal Co.,** of Chicago, for the construction and equipment of a **coal washery** at Clinton. The building will be one story, 50 x 125 ft. and, together with its equipment, will cost approximately $50,000.

An ordinance for regulation of retail coal sales in Anderson, will be introduced in the City Council there. The measure, if passed, will require that dealers supply each purchaser of coal with a duplicate check as to the gross, net and tare weight and the name of the quality or grade of coal sold, and by whom sold or weighed. It further is provided that a license fee be required and that the fees be applied to the salary of the inspector of weights and measures.

The Bicknell Coal Sales Co., of Indianapolis, has filled a final certificate of dissolution with the Secretary of State.

The Knox Region Coal Mining Co. has been organized at Indianapolis with a capital stock of $450,000 for the purpose of mining and distributing coal. The organizers are W. P. Worth, H. A. Huskey, Carl J. Fletcher, H. H. Taylor, E. A. Ogle, Burrell Wright and C. H. Hassmann. All the organizers are well known in the Indiana field.

IOWA

Coal in a 2-ft. vein has been discovered at Spickard at a depth of 145 ft. A mine will be opened on the Austin farm, one and a half miles northeast of Spickard. The site of the mine is a gully with hills on either side. A much thicker vein is expected to be uncovered when the entries are run from the shaft. It is reported that a thicker vein is located 50 ft. further down.

Federal Judge George C. Scott has issued an order **restraining the receiver of the Cedar Rapids Ice & Coal Co.** from selling the company's property. This action prevented the sale of the property Dec. 20. The order issued by Judge Scott is temporary. A hearing was held Dec. 20 at Waterloo. The Cedar Rapids Ice & Coal Co. became an involuntary bankrupt last autumn and Oct. 16 a receiver was appointed. The proposed sale Dec. 20 had been planned because the state court of Iowa, the body which appointed the receiver, had sanctioned the proposed plan.

KANSAS

The Spencer-Newlands Coal Co. is experimenting in opening a 20-in. seam west of Mulberry with special stripping equipment. In the past working these seams in this country has not been equipment. If the new method is profitable it will be followed by other firms and thousands of acres in Crawford County will furnish years of additional mining operations.

KENTUCKY

The Big Four Coal Co., of Candill, whose post office address is Hammond, has been purchased by W. J. Raybold and others of Whitesburg, who will increase the capacity of the plant and lease and develop additional properties.

The Big Seam Coal Co. has been incorporated at Creeck, with a capital stock of $45,000, and with C. H. Lewis, J. D. Yarbrough and McKinley York as the incorporators.

The Gorman-Meguire Coal Co., of Jeff, has announced that it will make some extensive improvements on its property, including the erection of a new tipple.

A. C. Craft, Jr., and **Tilden Wright** have leased coal lands at Millstone, Ky., and will develop the same.

New Kentucky corporations include: **Big Six Coal Co.,** Livingston, $10,000; R. F. Quinn, John Cockrell and A. Richardson. **Clear Fork Coal Co.,** Middlesboro, $150,000; S. M. Reams, B. T. Milan and T. G. Anderson. **Dixie Land & Improvement Co.,** Stearns; $5,100; A. F. Wheeldon, R. W. Henderson and Mark Gibbs.

The Laib Co., Inc., Louisville, manufacturers of plumbing, heating, mine and mill supplies, has filed a petition providing for an increase in capitalization from $150,000 to $900,000.

Recent charters filed by new coal companies are: **Black Raven Coal Co.,** Louisville; capital $100,000; W. J. Borris, Arthur N. Sager, E. L. Williams, and K. U. Meguire; to enlarge production of the Gorman mines in the Hazard field. **Paint Cliff Mines Co.,** Louisville, operating in eastern Kentucky, amended articles increasing capital from $50,000 to $75,000; signers, K. U. Meguire, Sol S. Smith and A. C. Van Winkle. **Wallins Creek Coal Co.,** $100,000, from $50,000, Louisville; mines at Wallins Creek, eastern Kentucky; T. L. Young, L. H. Stone and J. S. Laurent. **Phoenix Fuel Co.,** Louisville, jobbers; amended articles increasing capital from $10,000 to $25,000; Frank J. and R. A. Ambach, S. D. McLaren and W. B. Talbot. **Providence Coal Mining Co.,** Webster (western Kentucky); increasing capital from $250,000 to $500,000.

Gus Noffsinger, general manager of the Southland Coal Co., was found dead at his garage door at Henderson, Dec. 31. A coal miner's hammer lying about 60 ft. away was the most important clue uncovered in the investigation of his death. Noffsinger was believed to have been killed instantly by a blow on the back of the head. An analysis of stains on the hammer to determine whether they were caused by blood was ordered.

That Noffsinger was struck down by a disgruntled former workman was the most plausible theory, according to investigators. Noffsinger last was seen alive when he started home after a conference at a local hotel with Edward Potter of Nashville, Tenn., president of the Southland company. He was a native of Central City and is survived by his widow and one child.

MASSACHUSETTS

Foreign coal landed in Boston Harbor in 1922 totaled 1,527,172 tons, the first shipment having been received June 27, when 3,707 tons of Hastings unscreened coal was brought in from Wales. There were 234 boats used in bringing this coal, the average cargo for the entire period being 6,526 tons. Shipments reached their peak in September, when 476,249 tons were received. During December the receipts were 139,728 tons. The heavy receipts have involved heavy demurrage charges, which in some instances undoubtedly caused a loss rather than a profit on a number of the cargoes.

MINNESOTA

The Stott Briquetts Co. of Superior, Wis., recently had as its guests the officers and sales force of the Northwestern Fuel Co. at a dinner held at the Minnesota Club, St. Paul, Minn. The Northwestern is the sales agency for the Stott concern.

The new 12,000-ton steamer of the Kinsman Transportation Co., now building at the yards of the Toledo Shipbuilding Co., will be named the "Wonell Clarkson," after the president of the Clarkson Coal & Dock Co., of Duluth and Ashland, Wis. The steamer will be put in commission April 15, 1923.

MISSOURI

The Polar Wave Ice & Fuel Co., at St. Louis has by a stock dividend increased its capital from $1,800,000 to $5,400,000. This represents the surplus for a few years past, which has been transferred to capital account. This is a retail coal and ice firm. **The Romann & Bush Pig Iron & Coke Co.** increased its capital from $20,000 to $70,000.

NEW YORK

William H. Woodin, who resigned as State Fuel Administrator, effective Jan. 1, continued to perform the duties of the office last week in the absence of word from Governor Smith as to the appointment of his successor. Commenting on a report that General George W. Goethals was being considered for the post, Mr. Woodin said he thought General Goethals would be "an ideal man for the post." General Goethals said he knew nothing about the report except what he had seen in the newspapers, and would not comment upon it.

Acting on reports received from the Police and Health departments William H. Woodin, State Fuel Administrator, on Jan. 6 **ordered the immediate distribution of 6,000 tons of coal to residents of Brooklyn and Queens** who are without fuel, although able to pay for it. He sent a communication to E. W. Parker, National Director of Fuel Distribution in Philadelphia, urging preference for coal shipments to this district because of the emergency that has arisen.

E. J. Berwind, president of the Berwind-White Coal Mining Co. has declined to make any comment or statement concerning the charges contained in the report of Mayor Hylan's committee that investigated labor conditions at the Berwind-White mines in Pennsylvania.

OHIO

William T. Latta, for years engaged in the coal business in Indianapolis, died recently in Seattle, where he had gone three years ago. The body was taken to Indianapolis for burial. Interment was in Eagle Creek cemetery near Zionsville, Ind.

John Marchesi, a New Philadelphia operator, has purchased three mines and a considerable coal acreage from the Scott Coal Co., at Midvale. The seller reserved a retail coal yard in Akron which will be operated by John Scott, principal stockholder in the Scott Coal Co. The capacity of the mines is about 800 tons daily.

The Monarch Coal Co., chartered some time ago at Columbus, with a capital of $30,000, by E. E. Learned, L. M. Buchannan, E. Gilbert, Ray Cheek and R. H. Learned, is negotiating for the sale of a mine in the West Virginia field which may soon change hands.

PENNSYLVANIA

The Pittsburgh Coal Co. has resumed dividend payments on the common stock at the rate of $4 a share annually, by the declaration of a quarterly dividend of $1 a share. Only three months ago, much to the surprise of stockholders, the directors passed the quarterly dividend, which then amounted to $1.25 a share. The dividend now declared is payable Jan. 25 to stock of record Jan. 5.

The Pennsylvania system of mine inspection has been the model for many states and foreign countries, Governor Sproul told the Legislature when it convened Jan. 2. He made his final message to the Legislature, part of which he read in person. Statistics and details of the departments he presented in printed form to the members. Speaking of the mine-cave situation and the decision of the U. S. Supreme Court, holding the mine-cave legislation unconstitutional, the Governor said that a way to meet the question should be devised. The right of the public to appropriate by eminent domain with compensation to the miner's hammer lying about 60 ft. away he pointed out.

The modified plan of the **Lehigh Valley R.R. for the segregation of its coal properties** has been submitted to Attorney General Daugherty and it is expected that a decision on the matter will be forthcoming in about a month. The Lehigh Valley's plan for the segregation of its coal properties, announced Oct. 7, 1921, was in accordance with the United States Supreme Court's decision of Dec. 6, 1920. The plan was filed in the United States District Court of the Southern District of New York, and at the same time the government filed three objections. Representatives of both parties have been at work since in an effort to come to an agreement on a modified plan, which it is understood has been accomplished in a series of conferences between representatives of the railroad and the Attorney General's office.

One hundred and twenty of the executive, sales and operating personnel of the **Bertha Coal Co.,** Pittsburgh, met in the company offices, Dec. 30, to outline plans for 1923. Following a meeting of the sales department with C. F. Ingold, vice-president and sales manager, and a meeting of the operating department with John H. Jones, president of the company, the entire personnel of the company took luncheon with the Board of Directors at the Chamber of Commerce. Among the various resident managers of the company present were: George N. Reed, New York; Horton J. Davis, Corry, Pa.; T. P. Jones, Cleveland; H. A. Thompson, Covington, Ky.; Vaughn J. Jolliff, Detroit; H. L. North, Akron, and C. S. Gilmore, Grand Rapids, Mich.

TEXAS

The property of the **Anderson County Coal Co.** six miles west of Palestine has been sold to the **Ligol Chemical Co.,** of Houston. The property will continue operations but new machinery is being installed for the manufacture of byproducts, especially carbon. This lignite coal is of a peculiar quality for byproduct purposes. The Ligol Co. has another mine in Grimes County and a byproduct refining plant at Houston. J. J. Barry is in charge of the property here.

UTAH

The Columbia Steel Corporation has sent out inquiries for byproduct coke ovens and auxiliary equipment for a proposed installation.

Wm. D. MacLean, general sales agent of the Standard Coal Co., Salt Lake City, for several years, has been elected vice president of the company. He is one of the best known coal men in the mountain country.

VIRGINIA

Argument has been completed in the Norfolk Circuit Court in the case of the **Norfolk & Western against the Pan-Handle Coal Co.,** growing out of the controversy which arose early last year over the manner in which demurrage charges had been assessed at the Lamberts Point Coal Exchange. The railroad claims the coal company in this case owes $3,200 and the company claims it has overpaid by $1,000. The original case was filed by the members of the exchange who constituted the Hampton Roads Demurrage Committee, of which W. W. Houston, manager of the Pan-Handle Coal Co. at Norfolk, was chairman. The committee asked the Interstate Commerce Commission to investigate the manner in which demurrage was assessed and asked the Circuit Court to restrain the railroad from collecting demurrage charges under the system of assessment it had employed. The court decided against the coal companies, as did the Virginia Supreme Court of Appeals. The case has not been decided in the Interstate Commerce Commission. Judge Hanckel in the Circuit Court has given the attorneys for the Norfolk & Western twenty days in which to file a brief, and has given the coal company's attorneys ten days additional to file their reply.

WEST VIRGINIA

W. P. Beveridge, of Wichita, Kan., purchased a coal mine at Lillian, and is arranging **to operate it on a co-operate basis.** He has chartered the concern as the Beveridge Co-operative Coal Co., of which he retains 50 per cent of the stock, while the coal miners are to own the other half. The men are to work for $6 a day and every three months the profits are to be divided on a 50-50 basis. The plant will be operated on a non-union basis and none but stockholders will be employed. It has a capacity of 200 tons daily.

A. J. Dalton, of Omar, Logan County, and associates have obtained a certificate of incorporation for the Main Island Coal Corporation, representing holdings of more than 28,000 acres of valuable coal lands in Logan County and with an authorized capitalization of $25,000,000. It was formed by the consolidation of the Main Island Creek Coal Co., Omar Coal Co. and Middleport Coal Co. all operating in Logan County.

J. W. Smith, secretary-treasurer of the Raleigh and Wyoming County Mining Institute, has taken a position with the **Algonquin Coal Co.,** Algonquin. He was previously employed by the Coal River Collieries Co.

On Jan. 16 the Main Island Creek Coal Co. will open its Y. M. C. A. at Stirrat, which the company has erected for the benefit of its employees at a cost of approximately $200,000. Employees and their friends are invited to attend the opening, beginning at 2 P. M. There will be a free picture show, dancing and refreshments.

The Weyanoke Coal & Coke Co. and the S. J. Patterson Pocahontas Co. have been consolidated as of Jan. 1, 1923, as **The Weyanoke Coal & Coke Co.,** capitalization of which has been increased to $1,000,000. Both of these companies are in close proximity, mining the third-vein Pocahontas seam at Springton, and were owned by practically the same interests. R. D. Patterson, of Dayton, Ohio, being president of both companies, and the S. J. Patterson Co. of Dayton, Ohio, exclusive sales agents for the entire production of these mines. The S. J. Patterson Co. of Dayton, Ohio, maintaining a Chicago office in the Old Colony Building and represented by the J. W. Lowe Co. in New York, will continue to market the product of these mines.

S. W. Riddle, of Chattanooga, accompanied by Clyde Palmer, manager of the Cincinnati office, were on a two weeks visit to the Blue Star mines of the Riddle corporation. R. O. Farrell of the Chattanooga office has been transferred to Cincinnati and H. R. Bonnell, formerly with Jewett, Bigelo and Brooks, has also joined the Riddle forces.

Recent visitors to Cincinnati were **Lawrence Snapp,** president of the United Fuel & Iron Co., of Pittsburgh, who was on his way to his mining properties at Darby and St. Charles, Va.; **J. R. Charlton,** of the West Virginia-Elkhorn Coal Co., of Boncar, W. Va., and **W. G. Chelf,** an operator of East Bernstadt, Ky.

WYOMING

Heavy snows has stopped work on surface plant of the **M. H. Shields Coal Co.,** six miles from Gillette, Wyo. The vein is 96 ft. thick and the top of the seam is under 20 ft. of cover. Drift mining must be employed, as the vein runs under a hilly rise. M. H. Shields is president and Thomas Hotchkiss is general manager.

CANADA

The Cape Breton collieries will be so active during the winter that some of them will be placed on double shift.

J. B. McLachlan, secretary of District 26, of the United Mine Workers, **demands that the workers take over operation of the bituminous-coal mines** of eastern Canada. Further, he has announced publicly that he is strongly in favor of a communist government for Canada and will fight tooth and nail for such a government.

The U. M. W. called an **open meeting at Glace Bay to discuss the soft-coal mining situation.** The principal speaker was Trover McGuire, of Toronto, who was recently arrested for alleged treasonable utterances and sedition but was liberated because of his meritorious war record, he having won the distinguished conduct medal while in action with the Canadian Expeditionary Force in France and Flanders. McGuire urged the members of the U. M. W. in District 26 to rebel and take over the mines by force.

The Rev. J. J. Nolan, Roman Catholic priest, and **the Rev. A. Bull,** Church of England minister, of Leading Tickle, Newfoundland, **discovered a seam of coal** recently and staked it on behalf of their respective churches, which are co-operating in sinking a shaft and installing other equipment.

During the British Columbia legislative session, which has just closed, **an effort was made to amend the Coal Mines Regulation Act** in order that coal miners might appoint representatives on gas committees other than from their own number. They wanted the privilege of nominating outside men. The majority of members of the House, however, held that such latitude might lead to abuses that would seriously affect the industry and the amendment was defeated. In the debate attention was drawn to the serious results of the large importations of fuel oil into the province from the United States. It was said that 90,000 tons of British Columbia coal per month was being driven from the local markets. Local coal was unable to meet the competition. One large mine already had been closed down on Vancouver Island and the time had arrived for the Dominion to impose a heavier duty on fuel oil coming from outside in order that the provincial coal industry might be saved.

R. M. Macdonald, of Blairmore, has been elected international board member of District 18, United Mine Workers of America, comprising southeastern British Columbia and Alberta. He succeeds Robert Livett. **William A. Sherman** has been re-elected president by acclamation and **William Ryan,** vice-president, and **Robert Peacock,** secretary-treasurer, were returned to office.

The British Empire Steel Corporation is devoting much attention to meeting the demand for coal of a good quality. The method of undercutting the coal has been changed in several of the collieries to insure large and clean coal. The transportation, cleaning, absorbing and screening processes also are being improved.

Charles Murphy, general manager of the western lines of the Canadian Pacific Ry., states that at present 75 per cent of the coal used in Winnipeg comes from Alberta. All the Western mines are now working except some in the Edmonton district, where there is a strike of small proportions. As most of the coal supply comes from Drumheller and Lethbridge, the strike is an inconsiderable factor of the situation. In order to further encourage the use of Alberta coal in Manitoba and at other Eastern points the Calgary Board of Trade and the Western Canada Coal Operators' Association have decided to continue the campaign begun with this object. Letters will be sent to Manitoba merchants, clubs and societies asking for support of the effort being made to develop the coal trade within the Dominion.

International Fuel Co., Ltd., of Toronto, has been incorporated with $40,000 capital stock. The provisional directors are Gerald M. Malone, Albert Mearns and Gertrude Wallis.

Twenty candidates sat for examinations conducted recently at Nanaimo, Fernie, Merritt and Cumberland, B. C., by the Board of Examiners appointed under the Coal Mines Regulation Act. They wrote for first-, second- and third-class certificates, although the majority took papers of the two latter classes. Of the twenty who offered, ten were successful, and the board in its report observes that most of the candidates for second-class and a few of those for third-class certificates possessed a knowledge of mining matters and gave proof of a general education considerably above those usually manifested by aspirants for these certificates.

WASHINGTON, D. C.

The Secretary of the Interior has requested a deficiency appropriation of **$10,000 to cover the expense of administering the Leasing Act as it applies to coal.** Coal development on the public lands is proceeding faster than had been anticipated. On June 1 there were 240,000 acres of potential coal lands under lease. On Oct. 1 the total had grown to 340,000 acres. The 500,000 acre mark was reached on Nov. 8. To meet this situation, the Bureau of Mines, which is charged with the administration of the Leasing Act, has been forced to take men from its other work and to borrow personnel from the Land Office.

Obituary

A. I. Dexter, age 76, one of the pioneer industrial men of the district and a director in the Bessemer Coal, Iron & Land Company, died at Birmingham, Ala. Jan. 1. Mr. Dexter moved to this district in 1896 from Whitewater, Wis., and was actively interested in the development of coal and iron properties for a number of years following. He was born in West Topsham, Vt., but interment took place at Whitewater, Wis.

Traffic News

In the Dec. 14 issue of "Coal Age" a news item stated that "An effort to increase the first zone coal freight rate was resisted by northern West Virginia coal shippers when that question came up for a hearing before representatives of the Interstate Commerce Commission on Dec. 4 in connection with the case of the Pittsburgh Coal Co. against the P. C. C. & St. L." This was an error, as the Pittsburgh Coal Co. was not a party to the case. The plaintiff was the **Pittsburgh Coal Producers' Association.**

The I. C. C. has assigned for hearing in Washington Feb. 15 and 16 the **Western coal-rate case.**

The Missouri Pacific R.R. has issued Circular Letter No. 299-A, urging shippers to make the best possible use of equipment, so that the greatest number of people may be served, and as many lines of business as possible be kept in operation. The following suggestions are offered: (1) Load cars to their full carrying capacity; (2) unload cars promptly; (3) reconsignment requests should be placed promptly.

The attention of the Interstate Commerce Commission has been called to the **poor showing being made by the Chesapeake & Ohio** in the movement of coal in other than private cars. It is alleged that coal in privately owned cars is being dispatched promptly at the expense of coal in cars of railroad ownership. It is declared that 80 per cent of C. & O. system coal cars are on its line, but that coal mines are not being supplied with the maximum possible number of cars, due to the fact that they are held for unnecessary periods under load.

Oral argument on the complaint brought by the **Southern Ohio Coal Exchange against railroads serving the southern Ohio field,** as to differentials on freight rates betwen Ohio and the so-called inner and outer crescents of West Virginia, will be heard by the I. C. C. Jan 23. In the report of the special examiner named to take evidence the contestations of the defendant roads were upheld. This report is only tentative and must be approved by the I. C. C. before it is effective.

An investigation of the shortage of coal cars in Kansas was started by the Kansas State Public Utilities Commission Jan. 3, with a hearing at Pittsburg. The investigation is inspired by complaints of dealers and consumers of delayed deliveries. The most recent was by the firm that supplies state institutions with coal, which attributed slow deliveries to lack of cars.

G. C. Randall has been appointed district manager of the Car Service Division American Railway Association, with headquarters at Dallas, Texas, effective Jan. 1, 1923. Mr. Randall will have the authority of the Car Service Division in the states of Texas, New Mexico, Oklahoma, Colorado, Louisiana and Arkansas and other outlying points as may be directed.

The Illinois Central is ready to buy and build a new line 125 miles long between Edgewood and Paducah, Ky., cutting down the distance between Chicago and Memphis by 22 miles. It will cost approximately $1,500,000. The Illinois Central is buying the Kentucky Midland R.R., whose line supplies about 100 miles of the route.

Trade Literature

General Electric Catalog No. 6001. General Electric Co., Schenectady, N. Y. Pp. 1338; 8 x 10 in.; illustrated. General catalog of all products of this company for year 1921. This book contains a wealth of information.

Association Activities

New River Operators' Association

S. A. Scott, in charge of the operations of the New River Company in the Fayette and Raleigh fields, was chosen to succeed himself as president of the New River Operators Association at the annual meeting of the association held at White Sulphur Springs. T. L. Lewis was once again chosen as secretary of the association. Mr. Lewis was at one time president of the international organization of the United Mine Workers of America, succeeding the late John Mitchell in that capacity. His headquarters are at Charleston. After members of the association had completed a review of the year's activities and the usual annual reports had been submitted, they enjoyed a banquet at which C. W. Dillon, of Fayetteville, was the toastmaster.

Northern West Virginia Coal Operators' Association

Representatives of the association held a conference late in December on car supply and other transportation questions with Daniel Willard, president of the B. & O., and other executives of the road. Secretary George S. Bracket, speaking for the association, pointed out that the business of the coal producer on the line of the B. & O. has suffered, that the tonnage of northern West Virginia is not claiming its share of the national production and that the road is not maintaining its share of the traffic within northern West Virginia territory. Mr. Bracket also pointed out that shippers on the Baltimore & Ohio never had had reasonably constant service and had never been able to go into the market and sell their coal and offer to their customers this essential factor in the industry. The association asked for adequate car service. In replying to the complaint of the operators, Mr. Willard said that the road was having a number of cars repaired and that with those purchased there would be available by April 1 about 12,000 empties. He thought an excellent plan would be to have a special committee of the association appointed to confer with officials of the road in northern West Virginia.

Chicago Wholesale Coal Shipper's Association

The annual meeting of the association was held at the Great Northern Hotel Jan. 3. After luncheon the officers and the chairmen of special committees reported the activities of the association during the last year. The following officers and directors were elected to serve during the ensuing year: President, Wm. C. Hill; vice-president, Chas. M. Moderwell; secretary, Geo. H. Merryweather; treasurer, Geo. S. Wood; directors, Chas. L. Dering, Lewis Overholt, Thos. C. Irwin, Fred A. Brahm, Chas. E. Hostler, Leon Romanski and Roscoe B. Starek.

Clarksburg Coal Club

At the last meeting of the Clarksburg Coal Club at the Waldo Hotel, at Clarksburg, W. Va., car shortage, the labor situation and general conditions in the industry were the topics of discussion. The club also discussed the proposed visit of Vice President C. W. Galloway and other officials of the Baltimore & Ohio to the region. It was the consensus of opinion among those at the meeting that the car shortage is worse now than at any time in recent months, as some mines have only 15 per cent or 20 per cent car supply, although the assigned car supply is good.

Coming Meetings

American Engineering Council will hold its annual meeting Jan. 11 and 12 at the headquarters of the Federated American Engineering Societies, 24 Jackson Place, Washington, D. C.

Northeast Kentucky Coal Association will hold its annual meeting Jan. 23, 1923, at the Ventura Hotel, Ashland, Ky. Secretary, C. J. Neekamp, Ashland, Ky.

Northern West Virginia Coal Operators' Association will meet Feb. 13 at Fairmont, W. Va. Secretary, G. S. Brackett, Fairmont, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

Engineers' Society of Western Pennsylvania will hold its annual banquet Monday evening, Jan. 22, 1923, at Pittsburgh, Pa. Secretary, K. F. Treschow, Pittsburgh, Pa.

Hazard Coal Operators' Exchange will meet on Jan. 12, 1923, at the Phoenix Hotel, Lexington, Ky. Secretary, R. A. Hord, Lexington, Ky.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Looking Ahead in the Light of What Happened in 1922

Bituminous Coal Production Approximately That of Preceding Year, Though Output of Manufactures Is 50 Per Cent Greater—Substitution and Conservation Foreshadow Smaller Base for Soft-Coal Industry

WHAT happened in 1922 in the coal industry is of chief interest now in helping us to look ahead into 1923. The first fact to be faced is that production of bituminous coal was approximately as great in 1922 (407,000,000 tons) as in 1921 (415,000,000 tons) and making allowance for net changes in consumers' stocks and for exports, it appears from the preliminary figures that 400,000,000 net tons of bituminous coal was consumed in 1922, as compared with 392,000,000 tons in 1921. The difference is small.

On the other hand, the production of manufactured commodities in 1922 was about 50 per cent over 1921, according to the Department of Commerce. Textiles, iron and steel, non-ferrous metals, petroleum, paper, rubber, automobiles, building construction, lumber, brick, cement, leather, sugar, meats and agricultural receipts each recorded gains in the past year of from 5 to 70 per cent over 1921. The railroads originated approximately as many carloads of freight in 1922 as in 1921, despite the loss of some 40,000,000 net tons of anthracite production and several million tons of soft coal.

The answer to how the country could do more business requiring fuel and power and use little or no more coal is found in several directions, none of which can be evaluated with precision at this time. Householders' requirements, as measured by deliveries to retail coal dealers, were substantially lower in 1922 than in 1921. Mild weather is only partly responsible for this: probably as important is the fact that retail dealers took in much less than normal tonnages of bituminous coal during the summer months, when the strike was on. This and the partial lack of hard coal accounts for the avid demand from domestic users and retail dealers that characterizes the market at the close of 1922.

In other directions, among the heavy coal-consuming industries the greater production with less coal consumed is attributed to substitution and conservation, both the direct result of high prices and, since April 1, the difficulty of obtaining supplies. There is in progress a continually greater utilization of water power that makes for greater industrial output with corresponding replacement of coal. This has continued through 1922. There was a 9-per cent increase in crude-oil consumption in 1922 over 1921, accompanied by a 20-per cent decline in price. Fuel-oil consumption doubtless gained even more, as is indicated by a 13-per cent increase in imports of Mexican crude, chiefly valuable as fuel. More fuel oil means less coal. New England, the Atlantic seaboard, the Gulf region and the Southwest are the areas of greatest use of fuel oil. Greater use of these substitutes will account for not less than 10 per cent of the coal that was not used.

Better utilization helps account for more results on less coal, for more production of manufactured products with less production of coal. The railroads, for instance, made their coal do approximately 8 per cent more work in ton-miles of freight handled in 1922 than in 1920 and about 3 per cent more than in 1921. The revolution in coal utilization that has been going on for a number of years is concerned with the development of central-station plants. These producers of power attain the maximum of horsepower from coal in their large modern plants. Year by year they have been taking over the power load for industry. Thousands of isolated plants maintained by industrials before the war have been laid idle and power purchased from central stations. The result is a gain in horsepower hours with the same tonnage of coal. The total consumption of coal by central stations is gradually increasing—they also have the largest developed water power plants—but the output of the former is gaining at even a more rapid rate. Furthermore, every ton of coal sold over power wires replaced more than a ton of coal in some smaller, less modern steam plants. The net result of more power from less coal cannot be measured in exact figures but it is an important factor.

If instead of tons of coal produced there were records of utilizable heat units shipped, the records of output would be different from what they are. Beyond question the tons of coal produced in such boom years as 1917, 1918 and 1920 contained more slate and ash in other forms than that produced in 1919 and 1921. When the buyer is free to choose, the best coals only, generally speaking, are produced. Pool 18 disappeared from the market in 1921; pools 9 and 10 gained. It so happens that the coal fields that are non-union and that worked during the strike in 1922 furnish among the highest grade coals in the country. Despite the threatening shortage throughout 1922 there were few periods when the lower grade coals were brought into the market. While not as clean as in 1921, the coal produced in 1922 was better than that produced in 1920. The tonnage shipped in 1920 that was not coal may have been anything up to 20,000,000 tons. Quality of coal produced is then a factor in making up the tons of total consumption.

Looking ahead into 1923—a year which observers generally, in their best New Year's vein, agree is to

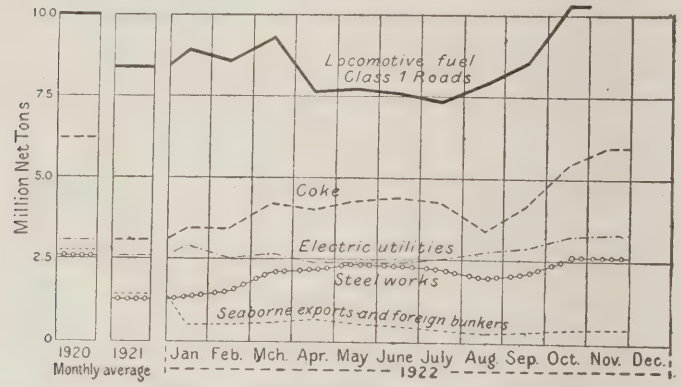
Coal Produced in the United States, by Groups of States, 1916-1922

(In Thousands of Net Tons)

	1916	1917	1918	1919	1920	1921	1922	Ratio 1922 to 1921	Increase or Decrease 1922 Compared With 1921 Tons	PerCent
Pennsylvania, Maryland, West Virginia, Virginia, Eastern Kentucky, Ohio and Michigan	324,493	334,283	351,511	298,930	347,196	252,275	251,959	99.9	—316	—0.1
Tennessee, Alabama	24,223	26,381	26,083	20,803	23,000	17,063	22,016	129.0	+4,953	+29.0
Illinois, Indiana, Western Kentucky	94,110	122,110	130,623	91,897	129,961	100,441	87,248	86.9	—13,193	—13.1
North Dakota, South Dakota, Iowa, Missouri, Kansas, Oklahoma, Arkansas and Texas	27,119	31,595	31,547	22,690	28,639	17,985	17,123	95.2	—862	—4.8
Colorado, Montana, Wyoming, Utah and New Mexico	29,388	33,411	35,539	28,550	36,114	25,729	26,814	104.2	+1,085	+4.2
Washington	3,039	4,010	4,082	2,990	3,757	2,429	2,540	104.6	+111	+4.6
Total bituminous	502,282	551,790	579,385	465,860	568,667	415,922	407,700	98.0	—8,222	—2.0
Anthracite	87,578	99,612	98,826	88,092	89,598	90,473	52,465	58.0	—38,008	—42.0

be one of continually expanding prosperity—the soft-coal industry must reckon on a new and smaller base.

Two years ago it was considered that 550,000,000 tons of bituminous coal represented a normal requirement for the country. That figure plainly is 100,000,000 tons too high for the present. It has been argued that the consumption of coal is inelastic; that it is fixed by conditions entirely outside the coal industry itself. In the humdrum days before the war, when price varied



THE TREND OF COAL CONSUMPTION

from season to season a few cents a ton at most, and a jump of 50c. over night was unheard of, perhaps consumption was inelastic. But it is not so now. Consumption has contracted, relative to the power-producing and heat-requiring needs of the country. High prices and uncertainty of supply have driven consumers to substitution of oil, water power, tar, and coke breeze, and the purchase of more economically produced central-station power.

Just as one result of the strike of 1922 will be the permanent loss of some of the old-time trade of the hard-coal producers—lost because consumers have been driven to substitutes that they find satisfactory in view of the price differential—so has the bituminous-coal industry in the past four years lost trade.

How some of the more important consumers used coal in 1922 is illustrated in the accompanying diagram giving the monthly consumption of bituminous coal in tons last year as compared with averages for 1920 and 1921. The drop in consumption of locomotive fuel from April to August was notable. Decreased tonnage of coal during the strike is largely responsible for the falling off in this item. Coke held up very well until August and made remarkable improvement in the last quarter. Consumption of coal by electric utilities was above 1921 but below 1920, until toward the end of the year. Steel works made gains in consumption throughout the first half, but slumped in July, August and September. Seaborne exports and foreign ship bunkers were low throughout the year. This diagram, compiled by W. F. McKenney, of the U. S. Geological Survey, does not cover the consumption of coal by industrial plants or distribution by retail dealers, two important items. All the available evidence indicates that the gradual business recovery of 1922 has gained speed since the strike ended. Consumption by the consumers represented in the diagram has increased sharply since that time, and the most recent reports show that of the five known items only exports and foreign bunker coal have failed to reach the monthly average in 1920.

How production varied through the year in each state is shown in the following table.

Production of Bituminous Coal by Months, 1922*

	January	February	March	April	May	June	July	August	September	October	November	Year to Nov. 30
Alabama	1,060,000	1,150,000	1,440,000	1,110,000	1,400,000	1,526,000	1,450,000	1,740,000	1,500,000	1,500,000	1,450,000	15,326,000
Arkansas	148,000	168,000	210,000	3,000	20,000	35,000	10,000	65,000	149,000	175,000	147,000	1,130,000
Colorado	804,000	782,000	980,000	400,000	595,000	770,000	750,000	950,000	845,000	920,000	1,000,000	8,796,000
Illinois	7,383,000	7,770,000	9,510,000	10,000	17,000	55,000	32,000	1,880,000	7,130,000	8,540,000	8,300,000	50,627,000
Indiana	2,180,000	2,420,000	3,040,000	7,000	15,000	12,000	18,000	410,000	1,840,000	2,400,000	2,230,000	14,572,000
Iowa	600,000	630,000	850,000	0	0	0	0	53,000	476,000	656,000	605,000	3,870,000
Kansas	410,000	470,000	650,000	45,000	75,000	145,000	174,000	250,000	545,000	593,000	483,000	3,840,000
Kentucky	2,650,000	2,880,000	3,350,000	3,000,000	5,050,000	5,150,000	3,100,000	3,400,000	2,336,000	2,678,000	2,767,000	36,361,000
Maryland	170,000	160,000	210,000	3,000	12,000	13,000	14,000	26,000	37,000	183,000	195,000	1,023,000
Michigan	120,000	110,000	140,000	0	0	0	0	33,000	123,000	154,000	120,000	800,000
Missouri	360,000	370,000	530,000	1,000	10,000	25,000	83,000	80,000	332,000	474,000	420,000	2,685,000
Montana	345,000	390,000	490,000	10,000	10,000	20,000	22,000	83,000	342,000	427,000	410,000	2,549,000
New Mexico	190,000	180,000	260,000	145,000	150,000	255,000	250,000	290,000	239,000	295,000	277,000	2,531,000
North Dakota	75,000	80,000	80,000	26,000	20,000	20,000	36,000	123,000	162,000	78,000	80,000	780,000
Ohio	2,685,000	2,900,000	3,570,000	200,000	370,000	430,000	470,000	1,600,000	3,400,000	4,000,000	4,280,000	23,905,000
Oklahoma	190,000	210,000	290,000	50,000	75,000	95,000	89,000	156,000	379,000	304,000	235,000	2,073,000
Pennsylvania (Bit.)	9,370,000	10,640,000	13,295,000	4,115,000	3,590,000	4,200,000	3,828,000	7,270,000	10,787,000	12,248,000	12,550,000	91,893,000
Tennessee	400,000	455,000	540,000	240,000	330,000	370,000	208,000	293,000	272,000	512,000	523,000	4,143,000
Texas	66,000	60,000	74,000	68,000	75,000	75,000	75,000	95,000	102,000	120,000	108,000	918,000
Utah	425,000	402,000	430,000	255,000	250,000	340,000	375,000	498,000	490,000	421,000	490,000	4,376,000
Virginia	705,000	750,000	920,000	850,000	1,150,000	1,200,000	1,300,000	986,000	851,000	856,000	810,000	10,378,000
Washington	290,000	290,000	330,000	80,000	80,000	80,000	106,000	155,000	246,000	292,000	275,000	2,225,000
West Virginia	6,210,000	6,876,000	8,000,000	5,155,000	6,990,000	7,485,000	4,600,000	6,750,000	6,200,000	6,400,000	6,570,000	71,236,000
Wyoming	760,000	830,000	970,000	1,000	1,000	1,000	1,000	160,000	709,000	900,000	960,000	5,292,000
Other States†	8,000	7,000	8,000	5,000	5,000	7,000	12,000	12,000	18,000	15,000	18,000	115,000
Total bituminous	37,604,000	40,980,000	50,167,000	15,779,000	20,290,000	22,309,000	17,003,000	27,358,000	39,510,000	45,141,000	45,303,000	361,444,000
Anthracite	6,258,000	6,762,000	8,757,000	26,000	35,000	84,000	116,000	164,000	4,976,000	7,810,000	9,673,000‡	44,661,000
Grand total	43,862,000	47,742,000	58,924,000	15,805,000	20,325,000	22,393,000	17,119,000	27,522,000	44,486,000	52,951,000	54,976,000	406,105,000

* Estimates of the U. S. Geological Survey.
† Includes California, Georgia, Idaho, South Dakota, North Carolina, Alaska and Oregon.
‡ December production of anthracite, 7,804,000 net tons, calendar year, 52,465,000 net tons

Course of Coal Prices in 1922 Markedly Irregular

Market Vagaries Accentuated by Strike, Relatively Limited Demand and Restraining Influence of Operators and Government—Anthracite Shortage Causes Sharp Upturn in Quotations—Forecasts Vary Widely

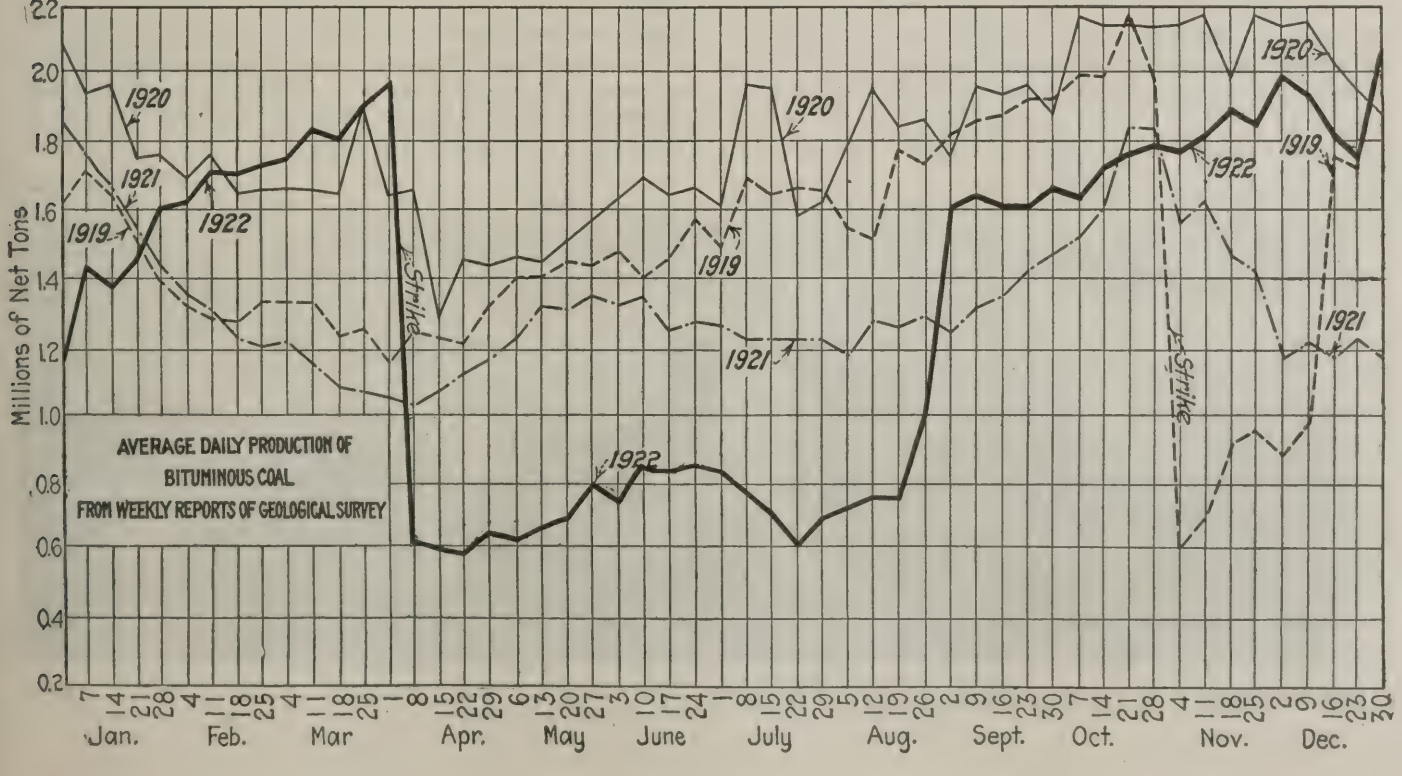
SPOT prices ran an irregular course in 1922. The vagaries of the market were accentuated by the strike, the relative smallness of the total demand and the voluntary repression on prices exercised by the operators and the government during several months of the strike period. The steady decline in the market that characterized 1921, when from January to December the spot market dropped $1 and the *Coal Age* Index from 270 to 187, continued through the first quarter of 1922. Demand was strong in the pre-strike months but the offerings overtopped the market. Little car shortage was reported and buyers had no difficulty in building up huge reserves.

Immediately after April 1 the market became firm and gradually stiffened. It was not until late in May, however, that prices threatened to get out of hand. Strikes in the non-union fields of Pennsylvania left the iron and steel industry with an unsatisfied demand. They had not made the preparations for a shutdown of the mines as had other consumers, and when their mines were largely closed they went into the market for large tonnages. They bought carefully but the effect was to bolster the market, in fact it seems likely that had the iron and steel industry not been forced into the market when they were the Southern fields would have had some difficulty until later in the summer in finding a market for their huge tonnages.

In the last half of May the government, through the Secretary of Commerce, effected a working agreement with the operators in the South by which prices on a majority of the tonnage were held down to levels considered reasonable as compared with the prices fixed during the war. These informal agreements with Mr. Hoover did not have the effect of reducing prices, for the action was taken while the market was actively climbing and before the levels set had been reached. The result was a temporary staying of the ascent. Two fields, western Kentucky and eastern Kentucky, did not immediately enter into an understanding with the government. These are the only fields in which the average spot price in July was higher than in August; in all others that produced even in part during the summer the maximum prices were not reached until August. In August, following the strike, the voluntary price agreements were abandoned.

After the settlement was reached in Clevelend, in the middle of August, and the union mines returned to work the market was nearly two weeks finding a level. In several fields there was a small gain in prices in the last half of that month, in others the peak was recorded at once. Production was quickly attained and by the first of September spot prices were at the post-strike peak. Every precedent pointed to a continuation at this level and even further gains in the market. Stocks were depleted, the winter was approaching, the condition of the railroads indicated that production could not be raised to such high levels as in 1918 or in 1920, when 12,000,000 tons a week was common and 13,000,000 tons passed several times.

Here again Mr. Hoover stepped in, this time acting with the buyers and consumers. Through the United States Chamber of Commerce and the many affiliated organizations representing coal purchasers of magnitude, he appealed for sanity in handling the situation. Buying only to meet current requirements was urged. Purchasing agents for industrials, steel mills and railroads took up the idea. Prices began to decline. Production held up, even gained and, after reaching 11,000,-





RELATIVE SPOT PRICES OF ANTHRACITE

This shows the weighted average price of anthracite by months, including all sizes of both company and independent production. It is compiled from *Coal Age* quotations and the base of 100 is the average for the year ended June, 1914.

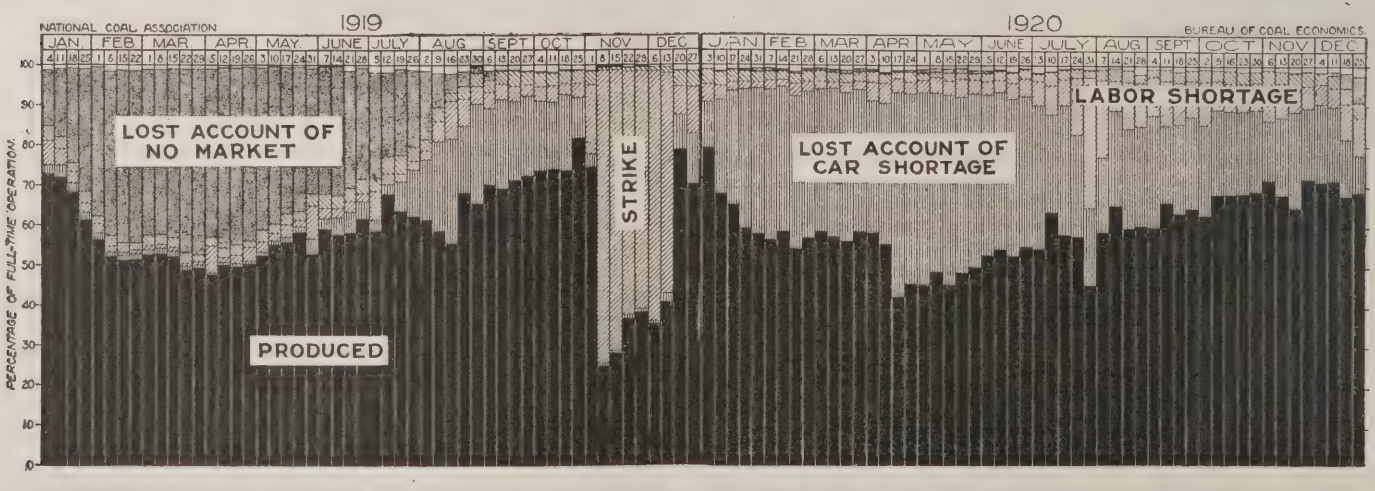
000 tons per week, was maintained on that level until the holiday season at the end of the year.

During this period prices declined steadily, until real winter weather in the middle of December brought forth another factor theretofore dormant—the shortage of anthracite. Approximately 40,000,000 net tons represents the difference between the 1921 and 1922 production figures for hard coal. When the hard-coal miners went back to work Sept. 1 the general public that depends on hard coal to keep warm in the winter settled down with a huge sigh of satisfaction. They expected that now they would have their coal. Nothing that was said by public officials seemed to stir them to action in stocking substitutes and retail dealers were lacking in incentive to fill their yards in anticipation of the demand that followed. When zero weather did hit the East the demand for all kinds of household fuel became sharp and there was and still is a scramble for suitable substitutes for the domestic sizes of anthracite. Mainly as a result of this large increment to the demand and in part because production declined in the last half of December, while consumption was increasing, prices took a sharp upward turn, regaining in part the ground lost during September, October and November. The largest gains were in the East, where there is the greatest demand for substitutes for hard coal.

Opinion on the course of the market in 1923 ranges widely, from forecasts to the effect that not only will this year see continued high prices but that the same situation will prevail for several years to come to the more conservative belief that once the question of a strike in the soft-coal fields this year has been settled, either pro or con, and the sharp edge of winter is off, the market will settle down to a long down pull.

It seems reasonably clear that negotiations between the miners and operators looking toward a new contract are going to be long drawn out. The demand for coal will be good throughout the first quarter of this year. Stocks will be accumulated by consumers though not so large as last year. Then, whether there be a strike or not, demand after April 1 will fall off and the market drop. The extent of the expected decline in demand and prices after April 1 in the event of a strike will depend on the severity of the strike. If the Connellsville and other non-union fields in Pennsylvania are not affected the result will be quite different than if they again are hard hit. Should the old Central Competitive Field, even in part, reach an agreement and continue at work, and some of the outliers, as central Pennsylvania, come to grips over their local situation—and their disinclination to join in a national conference appears to be predicated on the desire to straighten out their particular affairs with the union—the market would be stronger by that much than if they continue.

Looking ahead to the fall and winter of 1923, all that can be said is that contingent always on the attainment of some form of settlement of economic affairs in Europe that does not deprive this country of a market abroad, the demand for coal will be strong inversely as the production this summer is low. That is to say, barring a setback in the industrial recovery now definitely under way, which setback can be most effectively accomplished if Europe does not come to terms within itself, the consumption of coal in this country in 1923 will necessarily be greater than in 1921 or in 1922. If a fair normal share of that coal is not bought, produced and delivered during the summer, whether the lack be because of strikes or apathy of buyers, the market will be strong next autumn and winter.



PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES OF ALL BITUMINOUS COAL MINES IN UNITED STATES, 1919 AND 1920

Factors Limiting Production of Bituminous Coal

Lost Time in Earlier Months, Preceding Strike, Principally Due to "No Market"—Post-Strike Losses Almost Wholly Attributable to "Car Shortage"—Curtailment from Both Causes Nearly Equal

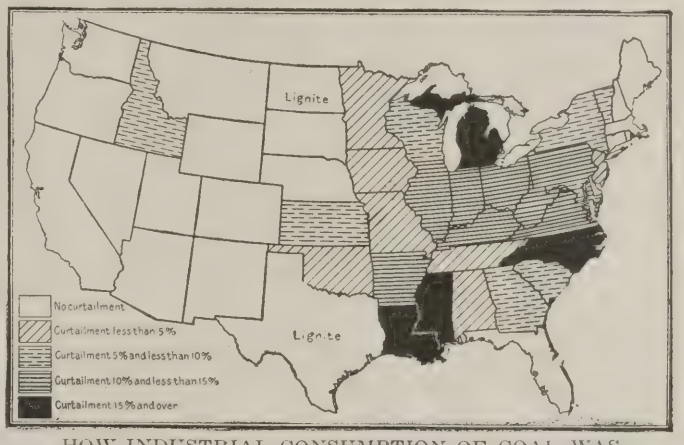
A COMPARISON of the *Coal Age* Index of spot prices and the diagrams of time worked and lost at the soft-coal mines, as shown in this issue, illustrates the difference between "no market" and "car shortage" as factors limiting the production of bituminous coal. Production in February and March was approximately equal to that in October and November, progressing upward in each of these two-month periods, one prior to the strike, the other afterward. In February and March the average daily production ranged from 1,600,000 tons to nearly 2,000,000 tons. The price was dropping throughout the period, the decline being slight, however, the index dropping from 182 to 170. The operators reporting to the Geological Survey attributed practically all of their lost time to lack of market.

Then, following the strike, after production had been resumed, the price index, standing at 404 the first week of October, declined to 330 the last week of November, while the average daily rate of production rose from about 1,600,000 tons to 1,900,000 tons. Here we had two periods with almost identical rates of production—in the first, the market limiting the rate of production; in the second, "car shortage" being charged with the lack of output.

In the earlier months there was less anxiety on the part of buyers and less bidding for coal—fewer mines were producing and calling on the railroads for cars. The mines that were in operation were satisfied that had they called for more cars they could have obtained them, for they charged up their main losses in working time to lack of market. It was a buyers' market in February and March. By the time the long strike was settled, stocks were low, winter was in prospect and buyers more avid for supplies. It had become a sellers' market and with orders in excess of current ability to produce and ship, the producer charged up his main loss of time to "car shortage."

The individual district records in this respect are interesting. They are shown graphically in the Market Review Section of this issue, as compiled by the Bureau of Coal Economics of the National Coal Association, in part from unofficial records and in part from the weekly reports of the U. S. Geological Survey. The more important fields in which there was a total suspension of operation during the strike—Illinois, Indiana, Ohio and Pittsburgh—and those, as central Pennsylvania, Fairmont, Kansas and Kanawha, nearly but not entirely closed down, best illustrate the sharp change from market to transportation as factors limiting production.

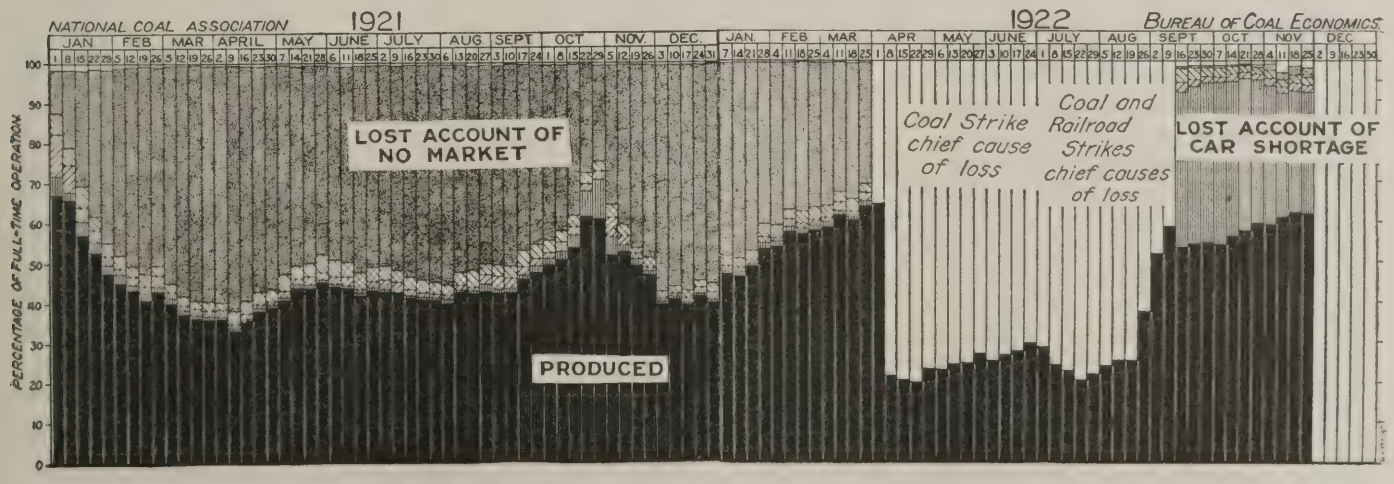
The records for Cumberland-Piedmont, New River,



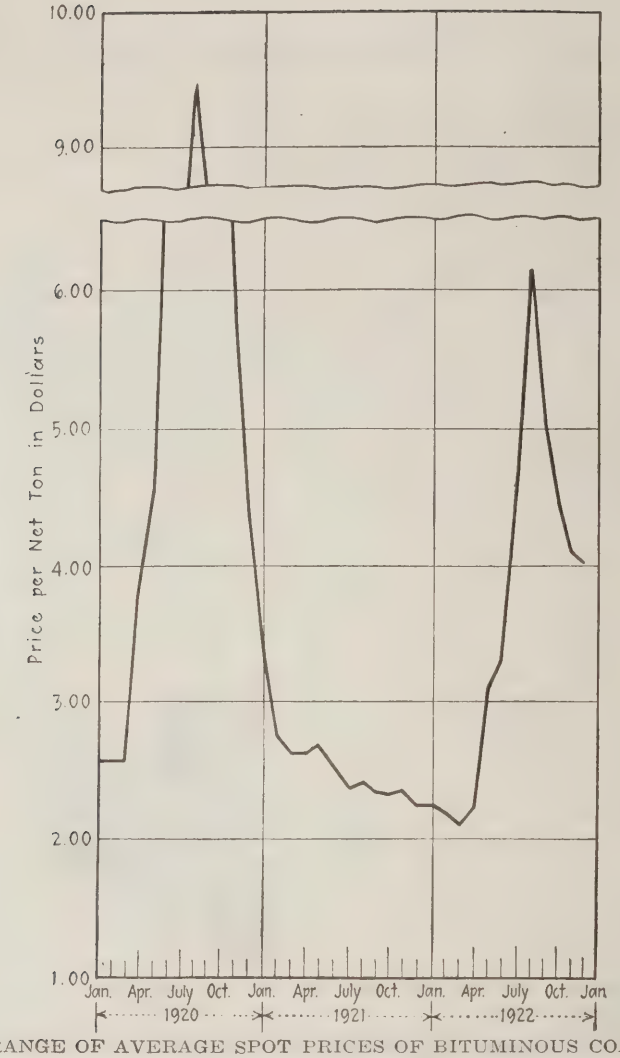
HOW INDUSTRIAL CONSUMPTION OF COAL WAS CURTAILED BY THE STRIKE

This diagram, based on data collected by the United States Geological Survey shows when and to what extent industrial consumers curtailed operations and the consumption of coal during the later months of the strike of 1922.

Somerset County and the West Virginia Panhandle show the usual period of "no market" in the first quarter, followed by partial cessation of operations in April 1, and the transition of "strike" to "car shortage" as factors limiting production in the period beginning with April and ended with December. These districts



PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES OF ALL BITUMINOUS COAL MINES IN UNITED STATES, 1921 AND 1922



RANGE OF AVERAGE SPOT PRICES OF BITUMINOUS COAL

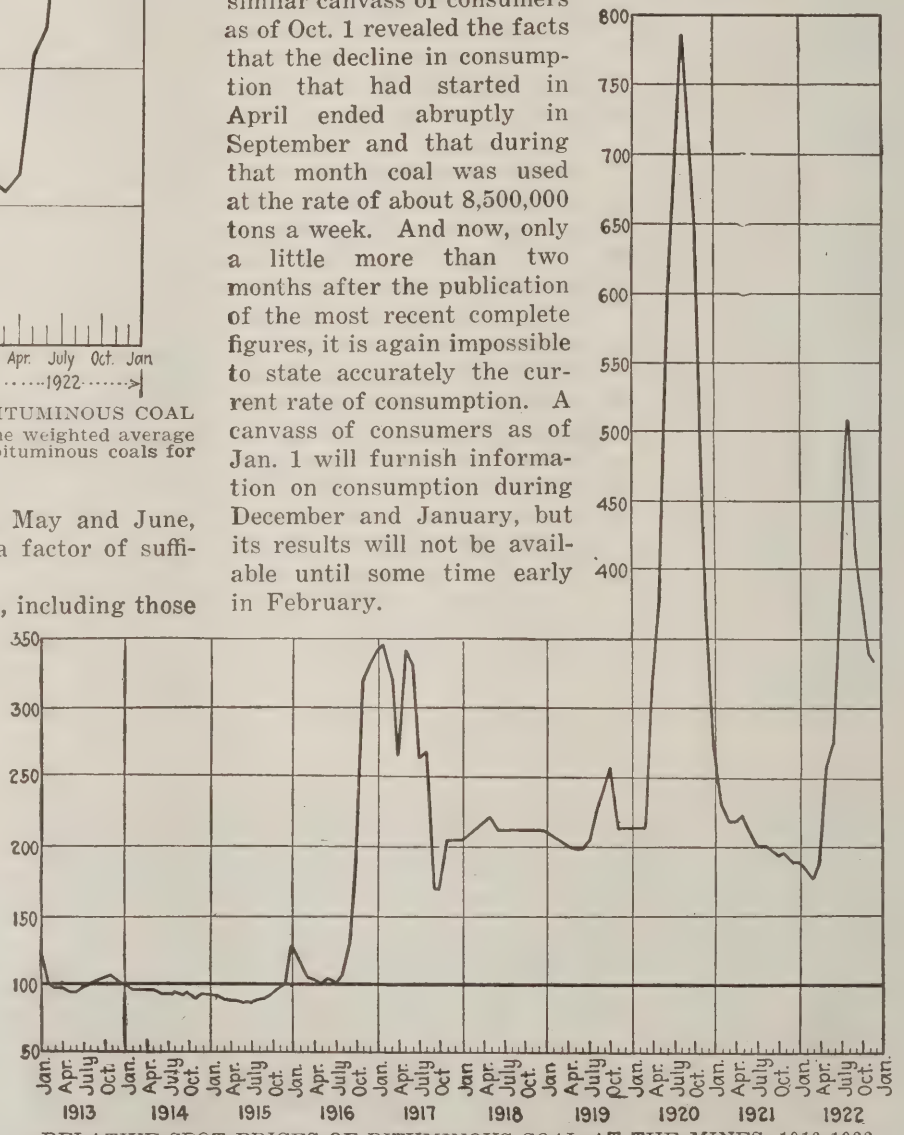
This diagram shows the monthly range of the weighted average spot price (f.o.b. mines) of 14 representative bituminous coals for the three years 1920-1922.

also record the short period in April, May and June, during which lack of market was yet a factor of sufficient importance to record.

There is another large group of fields, including those in southern West Virginia, Logan, Kenova-Thacker, Pocahontas, Tug River and Winding Gulf, those in eastern Kentucky, including Hazard, Harlan and northeastern Kentucky, all non-union, and western Kentucky, a union field, that recorded remarkable spurts in production in April, May and June. New high records in output were established in this quarter. These fields had ample car supply and with continuing impetus to the market as the strike in the union areas continued on into the summer, full advantage was taken of the opportunity to run. The shopmen's strike, directed primarily at roads originating coal in these fields, began on July 1, and by the second week had crippled the roads. Car shortage soon became a limiting factor, production dropped and by the time the strike was settled and the union mines began to order cars, production had slumped. The last quarter of the year was a period of short-time operation for these fields.

Virginia recorded a year of this character, with the car supply depleted in the last half, but better than in the other non-union fields to the immediate north and west. Alabama and Westmoreland did much better than the average non-union fields. There were some strike losses in Westmoreland in the second and third quarters and, compared with most other fields, a mild car shortage in the last quarter. Alabama found lack of market the largest single factor limiting production until the second half of August. From then on car shortage was the more important.

A canvass of coal consumers on March 1 indicated that during January and February, 1922, coal was consumed at the rate of about 8,100,000 tons a week. After the results of that canvass had been published, on the day the strike was called, there was no further complete information until a month after mining had been resumed. During that period of six months any estimate of the rate of consumption that may have been published necessarily included much guesswork. A similar canvass of consumers as of Oct. 1 revealed the facts that the decline in consumption that had started in April ended abruptly in September and that during that month coal was used at the rate of about 8,500,000 tons a week. And now, only a little more than two months after the publication of the most recent complete figures, it is again impossible to state accurately the current rate of consumption. A canvass of consumers as of Jan. 1 will furnish information on consumption during December and January, but its results will not be available until some time early in February.



RELATIVE SPOT PRICES OF BITUMINOUS COAL AT THE MINES, 1913-1922

This diagram shows the relative prices, not the actual prices, shown in succeeding diagrams in this issue of *Coal Age* for particular coals. Prices for fourteen coals, representative of nearly 90 per cent of the total output of the United States, were weighted in accordance, first, with respect to the proportions of each of slack, prepared and run-of-mine normally shipped and, second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the Report on *Prices of Coal and Coke, 1913-1918*, published by the Geological Survey and the War Industries Board. The result is a series of index numbers.

Year 1922 Tackles Hopefully Many of the Big Problems Of Coal Production and Preparation

Loading Machines Halting Before Room-and-Pillar System—Rotary Dumps Makes Big Car Feasible and Big Car in Turn Solves Some of Our Loading Problems—Coal Crops Being Stripped—Germans Reinvent Cement Gun

By R. Dawson Hall*
New York City

IMPORTANT as are haulage, hoisting, pumping, and preparation at the mines, the leading problems are in the operations at the coal face—undercutting, drilling and loading. These three are more adversely affected than any other by the room-and-pillar method. The area to be undercut, drilled and loaded at the end of any room may be only 5x12 ft. and at most is 10x40 ft. If it could be staked out on the surface into a small farm and if all the other similar areas were likewise staked and if lanes were run up to the various farms from a common roadway at right angles thereto, one would have an idea how lacking in concentration such operation is, for work on the surface is never done in this manner. The farmer, being asked to plough, drill, and cultivate such trifling areas, would remark that if he could not have his farm in one or two places he would just as soon have none at all.

The difficulty of operation with such distances between operating points has made clamorous the present demand for longwall, sidewall or some other method of operation which would give some, at least, of the desired concentration. It is true the undercutter in a degree has managed to fit himself into the room-and-pillar system, and that there are not lacking some who are disposed to demand that the drill and loader shall be made to conform also to its requirements.

Must All Machines Come to It?

It is said that the cutting machine has settled itself down to room-and-pillar work and that other machines must do the same. But cutting is reasonably efficient under that system. The full face can be cut at one time, be it 12 or 40 ft. wide, but the loading machine must load the cars one by one. So in a room-and-pillar face the machine is continually waiting. That is true even when every care is taken by the management to supply cars frequently. It is an inherent fault of the shuttle method of supplying cars.

The problem undoubtedly will be solved before long, but before that time something like a revolution is needed not only in operating methods, but in the compensation of the mine worker. The new machines should afford him a larger wage than he would receive when working by less efficient methods, but he is so doubtful whether such profit will result that it is likely that the operator will have to pay his miners entirely by the day or forego the advantages of loading machinery unless indeed he is operating in non-union territory.

When, however, it is solved it will be found that what is now regarded as a large tonnage for a single mine can be produced from nine or ten longwall faces. In the year just past a loader of the American Coal Loading Corporation in 3½ hours of broken time actually loaded 267 tons, the average loading rate per hour being 76.3 tons. This is considerably over one ton per minute of actual working time.

Unfortunately it is a heavy machine, requiring so much space that it seems to be suited only to those mines having a good roof and a hard floor. It is probable at least that mines thus favored will be the first to use loading machines exclusively and as a standard practice, but as confidence is established their use may be extended to mines less favorably circumstanced. The value of concentration, however, is quite important as far as haulage problems are concerned. Nothing is more wasteful than the gathering and coupling of cars. With a proper system there will be only one class of locomotives in the mine—namely, the main-line type designed for the hauling of full trips of cars.

Several attempts are being made to develop short or extensive longwall faces suited to loading machines or face conveyors, the aim being to obtain a long face without the cost and labor of packwalling, brushing and bottom lifting that is incident to longwall systems such as are usually employed in the mines of Europe and in those of Illinois, Iowa, and the anthracite region of Pennsylvania. Progress has not been rapid. The public only slowly grows to appreciate a new system and really there are so many rival and tentative plans that the public is still, and with reason, a little befuddled. After all it is quite likely that where the roof and floor are good the plans adopted will be entirely different from what they are when top and bottom are bad, and different yet again when the coal is thin from what they are when the coal is thick.

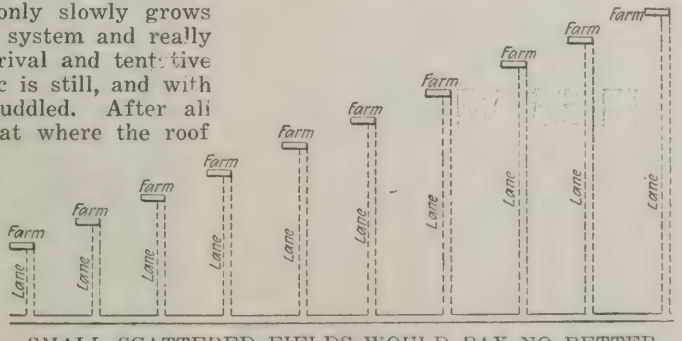
Interesting also is the way in which the scraper loader is being developed. New efficiency is being sought by making the haulage engine, the drag plane and its chute portable, by taking the ropes and the sheaves off the heading and by illuminating the scraper with a searchlight mounted on the hoist.

In gathering storage-battery locomotive service, units have been developed that will pass under an ordinary four legged table. The storage-battery locomotive is an economy wherever it is kept busy. It is profitable in thick and thin coal measures, but its value is most evident in thin coal. The lower the room into which it can travel the surer it is to keep the mule out. With such vertical clearances for locomotives as have now been developed it would be extremely expensive to dispense with the locomotive and rip top or lift bottom to provide room for a mule.

Rotary Dump Modifies Cars

The rotary dump is having an interesting effect on the mine car. The front end of the wagon being strengthened by the absence of the gate it has been possible to make the flare of the car flatter and yet build the car wider than ever before. The wheels now run in housings in the car bottom. This has been possible for two reasons. One is that the car is now so stiff that it is protected against any deformation that would make it drag on the wheels and the other is that the bottom of a car to be discharged on a rotary dump does not have to be flat for the coal to slide out of it.

Now that the coal is slid out at the top the shape of the bottom of the car is a minor matter, in fact gusset plates



SMALL SCATTERED FIELDS WOULD PAY NO BETTER THAN MANY SHORT, UNCONNECTED MINE FACES

By making an analogy between a farm and a mine the reader can see perhaps how distressingly uneconomical are the operations in our coal workings. These ten small fields up ten long lanes approached by a lengthy highroad would breed desperation in a farmer.

*Engineering Editor, *Coal Age*.



AUTOMOTIVE SCRAPER HOIST, DRAG PLANE AND CHUTE

Long ropes constrained to follow certain lines by pulleys have cumbered the roadways under the scraper system. This is all saved by the new method which puts the hoist at the mouth of the room and enables it to move under its own power from neck to neck or, in longwall, from loading point to loading point.

are being used to stiffen the sides so that their full length will be supported and protected. Just how far this will go is doubtful, but with a rotary dump any plates needed to give the required strength can be introduced, though coal thrown on their edges is almost sure to be broken and vacuities are likely to be formed in the contents, thus lowering the working capacity of the car.

The room-and-pillar method so hampers loading that the large car is in ever greater demand. Such a car when placed at the face will give a loading machine several times as long a service as a small car. To carry the matter to an absurd extreme, suppose railroad cars could be used. Then the loading machine would need only to have cars placed ten times a day and three men loading by hand would find one car more than a day's supply. This would almost eliminate waits altogether. Rooms could be made longer without the increased length of the waiting time consequent thereon having an appreciable affect on the tonnage. Such a car would be unthinkable in any but in such mines as those at Hanna, Castle Gate or Hiawatha, and men could scarcely load them at all, as the casting would be too high and over too long a distance. Nevertheless the illustration though forced—perhaps just because it is forced—shows clearly one big advantage that the large car enjoys.

Big Car, Low Gathering Cost

Furthermore, by the use of a large car gathering is relieved of its greatest problem—length of travel. With a big car a mine locomotive in one trip moves seven or eight tons instead of one and cuts the gathering cost to about one-seventh. Roller bearings and better tracks have made the large car more easy running. Braking on the locomotive instead of by sprags in car wheels has made the tractive resistance of mine cars lower than ever. Rotary dumps have made the handling of mine cars easier. For these reasons big cars are likely to become more general in the thicker beds of this country, and in fact experiments are being made to design a car that will hold eight tons for use in the thick beds of the southern Illinois fields, specifically at the mines of the Chicago, Wilmington & Franklin Coal Co.

This change solves in part the problem of the room-and-pillar system in some mines—those having thick coal—but what is best suited to the room-and-pillar system will serve well also in longwall or sidewall should the car be used in such places. In fact the large car comes in time to meet the needs of mechanical loading, in whatever manner that loading may be performed.

Reverting, however, to the solid-end car it is interesting to note that just at the time that the rotary dump was introduced into America, and the solid-end car accordingly became feasible, the bottom-dump car (that hitherto dumped so readily that it could not overcome the habit but discharged anywhere between the face and the tipple) was so much improved that it began re-establishing itself in public confidence. It has a great advantage in that it will dump a whole trip on a cheaply constructed dump without any delay for uncoupling. It has, however, an unhealthy past to live down.

In connection with rotary dumps it may be added that, according to H. A. Turner, the H. C. Frick Coke Co. is expecting to install two Ramsay dumps each of which will handle thirty-five cars at one time. The dump will be nearly 400 ft. long and will be underground. The dumping operation will occupy only about ten seconds.

The Coverdale mine, and that of the Monroe Coal Co., at Revloc, Pa., have introduced a new idea in hoisting, two cars being raised side by side in the same cage, not in tandem nor one above the other but flank to flank. With the cars in tandem they must be removed from the cage for unloading. With cars on different decks the difficulties are many, so many, in fact, that not much attempt has been made to meet them. With cars side by side, self-dumping cages can be used. Ingenious indeed is the way in which cars in single file are caged side by side and after raising, dumping and lowering are again discharged side by side to be maneuvered into single file again.

Give Dirt Time to Settle

In the past year coal preparation has made some advances. In the anthracite region, for example, the James jig has been successfully treating fine coals, the secret of its success lying in the absence of suction. Owing to this quality the coal being washed has an opportunity to segregate. It is all very well to stir up the mine product in water, but some opportunity to settle is needed if the light and heavy are to be parted satisfactorily. The James jigs also have been developed so that they will prepare coal up to, and including, broken. In fact they expect soon to be handling lump coal also. A vibratory screen is being tried out by the Hardinge Co.

The Chance separator is making progress in the anthracite region, and in the soft-coal field something on a large and practical scale should be heard about the air or dry concentrator, a large installation being built by the American Coal Co. of Allegany County at the Crane Creek Mine.

Abroad the Draper and Rheolaveur



RELOADING COAL FROM STOCKPILE BY UNDERGROUND LOADER

The photograph from which this illustration was made was taken a few years back at Montour No. 10. For some doubtless good reason only one track was laid so that the machine is in the same disadvantageous position in which it would be if loading at the end of a room.

washers, both original applications of time-honored washing principles, are arousing much interest. Flotation is still being actively pushed as a means of treating coal and in some mines the coal thus floated is briquetted economically by a new process. In this county the Trent process is making headway, and Lindon W. Bates, who had been in England installing a plant to manufacture colloidal fuel, has now returned to this country.

In the stripping field activity in outcrop work has been reported around Osceola Mills, where miles of coal crops are to be found. It has been found by some coal men that if coal from the crop is crushed new black faces are exposed which not only fit the coal for steam uses but give the purchaser a more favorable impression of the product. The rust of outcrop coal is along developed fractures and does not extend into the heart of the lump. Crop coal has the advantage of being less disposed to coke on the grate.

In the extreme south of Alabama, in Escambia County, at the Alco mine, near the Florida line, hydraulicking is to be used to remove the overburden from above a coal bed. That method has not been practiced, I believe, since it was used in the Danville region of southern Illinois. It proved successful there but opportunities for its operation, of course, are somewhat limited. It has been used also for stripping iron ore in the Cayuna range of Minnesota.

Now Motors Are Absence-Proof

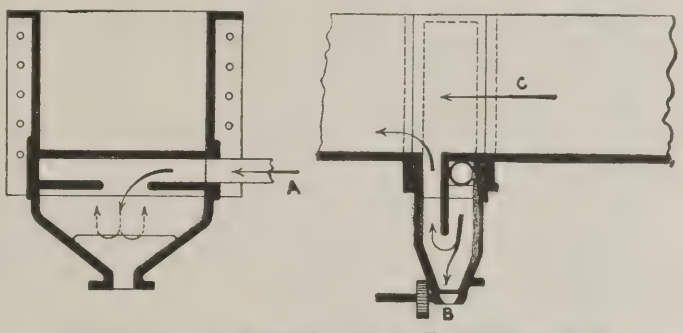
Notable among the achievements of the year has been the advance in the use of automatic electrical equipment. Nothing adapts itself better to remote control and automaticity than electricity, yet only recently has that fact been realized and taken advantage of in mining. At first the attempt was made, not with the approval of the manufacturer of course, to leave some machinery without manual control and with only a circuit breaker or even only fuses to protect it, but now the most elaborate of mechanical and electrical precautions are being taken to protect machinery, and where they have been installed the authorities at the mines regard automatic as safer and more expert than manual control.

At the Red Star Mine in West Virgina arrangements are provided so that if much power is desired, two motor-generator sets are put in operation, but if only one is needed the automatic electric apparatus shuts down one of them. The busiest time around the mine is the early morning and that is when much of the electric machinery has to be put in operation. Today, in consequence of the introduction of automatic devices, machinery can be safely started by remote control, and hence much of the most valuable part of the day is saved to the man who has the operation of the electric machinery in his charge.

One wonders whether the time will not come when the man who runs a locomotive or even a medium-sized hoist will be afforded opportunity merely to start the sequence of actions by which full power is developed or shut off, instead of being able to throw the controller handle with utter disregard of all the rules of proper operation. This provision is already embodied in electric railroad operation. Why should the motorman have it in his power to "goose" a motor?

If we had electricians to handle electrical machinery the present equipment might be properly used, but with machines started by motormen, machine men, ditch diggers, pumpers and hoistmen little latitude of choice should be allowed. It is to be hoped that within the space available on the locomotive, mining machine and loader some means will ultimately be found to put devices which will prevent the motorman, cutter and loader, respectively from abusing their motors. The pump and the hoist also should be protected by automatic devices, even where not operated from a distance.

Coal storage is increasing at the coal mines. It is beginning to be realized that while putting coal into and out of storage is expensive the coal thus put in and taken out may be a product which if not so disposed of would be otherwise holding mules, day and monthly men idle awaiting delivery of railroad cars or the repair of equipment. After the tipple has been idle an hour the coal coming to it for the next hour should be charged with double or nearly double the haulage and other operating costs.



HOW COAL IS WASHED BY THE RHEOLAVEUR

The coal is washed into the Rheolaveur through the pipe *A* and has to make a downward passage before rising through an opening into the main pipe *C*. The clean coal readily performs this aquatic feat urged on by the rush of water, but the slate on leaden feet falls down into a pocket and is drawn off by the gate *B*.

Had the coal been disposed of during that hour it surely could be handled so cheaply into and out of storage as to cost no more and probably far less than the tonnage received within the hour immediately following the shutdown, and the men would be kept in the mine and be better contended. It may be argued that the cost of delay should not be all loaded onto the coal dumped within a time equal to the period of delay but should be spread on all the coal loaded in that day. That argument looks fair enough, and indeed is fair, provided the cost of storing and reclaiming is spread also over all the day's product regardless of quantity.

If, however, it is figured on the basis of its own tonnage, then the cost of being idle should fall on an equal tonnage and not be spread any further. This fact has been overlooked and the result has been a false conclusion. Storage is a cost that is more than paid by the lowering of the average cost of the coal that is loaded that same day. The daily tonnage expense will be considerably lower than it would have been had the one-hour delay been allowed to occur. Furthermore there will be the advantage that with storage, every night "every last car" can be loaded. No cars partly loaded will be lost to next day's allotment, nor will a failure in the equipment, except such, of course, as affects the reclaiming of coal, prevent the full number of cars received from being loaded.

Many are the devices for such stocking and reclaiming; excessive mine-car supply, storage bins, derricks, shovels, locomotive cranes, conveyors, scraper loaders, dump cars and combinations of such equipment. A few serious fires have dampened the ardor of the companies in regard to coal storage but this usually can be avoided by dumping the coal into smaller piles and stocking sized coal, all fine or all coarse, the former being preferable from the point of view of economy, for the degradation of fine coal in storage does no harm. Frost is another source of difficulty.

Cement-gun work is being increasingly used not only in the United States but in Great Britain also. In Germany, according to the Department of Commerce, the cement gun has been invented all over again. The roof and ribs are covered with the cement-and-sand mixture $\frac{5}{32}$ in to $\frac{3}{4}$ in. thick. When the surface is weak and crumbly the layer is from $\frac{9}{16}$ in. to 1 in. thick.

The Germans contend that the use of the cement-sand coating gives the mine greater security against fire, enlarges haulageways by doing away with timber, improves the air by the removal of decaying wood and saves the costs of timber and maintenance, which, it is asserted, is reduced to one-fourth that of a timbered haulageway. In Upper Silesia a haulage road coated with concrete has stood for many years without timbering. A firm in New York City, the name of which is withheld, has been given the American rights to this power concrete gun. It may be a surprise to them to learn that the cement gun has been used in mining work more than a decade and was used in construction some years before.

At some mines an attempt is being made to avoid expensive surges of current by using locomotives of a speed of four miles instead of six miles per hour. It is believed that speed in gathering, while valuable, is being obtained at the cost of excessive charges for current. This belief, however, is being subjected to a practical test.

No Strike Expected April 1, Says Preliminary Report Of United States Coal Commission

The preliminary report to the President and the Congress of the United States Coal Commission was released on Monday, Jan. 15. As was expected, the report is primarily a report of progress. No final conclusions are announced, but further statements are promised at any early date. The report in full follows:

"The United States Coal Commission, as directed in the act creating it, approved Sept. 22, 1922, transmits herewith its first report.

'The commission held its first meeting on Oct. 18, 1922, within a few days after the appointment of its members by the President of the United States and less than three months prior to the making of this report. So numerous are the problems presented for our consideration by the Congress that we deemed it essential, before engaging in public hearings, to acquaint ourselves with the phases of the industry to be investigated, and for that purpose we have devoted much of our time to conferences with representative mine operators, officials of the United Mine Workers of America, wholesalers, retailers, experts on transportation and storage of coal, and committees representing the railroads and the public utilities, believing that after these conferences the public hearings could be materially shortened by being directed to the important points in controversy and avoiding collateral issues.

"An investigation of this character requires of necessity expert assistance, and the commission immediately began and has continued, as rapidly as proper persons could be found, to secure the services of a staff of experienced investigators and assistants to study and collate the undisputed underlying facts to be gleaned from reports of previous investigations and from the activities of such Federal agencies as the Geological Survey, the Bureau of Mines, Bureau of the Census, and the Federal Trade Commission, in order that it might use in its official reports all well-established and undisputed facts bearing upon the questions presented to it for consideration by the Congress of the United States. This staff is also charged with the duty of preparing questionnaires and conducting field investigations which should fully reveal, when completed, the salient facts bearing upon the various phases of the mining industry. The principal investigators are named in the appendix to this report and the character of their work is there indicated.

"When it is remembered that there are some 8,000 mines to make reports to this commission, it will be at once apparent that the queries could not be prepared, submitted and answered, and the returns analyzed or the field work completed within this short period of time. The commission is unwilling to guess about the facts, to jump at conclusions, or to make recommendations on the isolated facts which it has been enabled to accumulate since its organization. But it does report that it has found the conditions set forth in this report to exist, and that the questions arising therefrom have either been submitted as queries or will be taken up through field investigations and in public examination of witnesses.

"There is, however, so much controversy over many of the questions—especially those touching on strikes and lockouts, miners' wages, earnings of companies and upon what theory these earnings are computed, the living conditions of the miners, the competition between the different fields, whether there should be cars sufficient to supply the needs of the whole country at a peak demand, whether the miner is idle because he has no work or because he does not want to work—that the commission deems it to the best interest of the Congress of the United States not to express *prima facie* views upon these subjects, but only to give the facts and express opinions after complete investigations and deliberate thought.

The commission is unwilling to guess about the facts, to jump at conclusions, or to make recommendations on the isolated facts which it has been enabled to accumulate since its organization.

No solution of the coal problem can be found that does not recognize this community of interest between coal and transportation. But this community of interest, though simply stated, is not simple upon examination.

"The Public and Coal.—The coal problem begins with a contradiction. Rich beyond all other nations in its wealth of coal resources, the United States experiences coal shortages and high prices. The coal deposits of the country are abundant and well distributed. Coal of every variety from anthracite to lignite underlies the hills and plains and mountains in beds whose content is measured by thousands of billions of tons, so that coal of a quality and in quantity that would be regarded as important by most other nations is found in all but thirteen states of the Union, and commercial mines are being operated in twenty-nine states. Yet, with resources of coal in the ground adequate for the needs of perhaps a hundred generations of Americans, the nation's coal bin is too often depleted and too often the prices paid for coal are much higher than seem warranted by the wealth of coal available.

"There have been during the last six years three periods when shortage in the supply of coal has given rise to acute national concern. These recurring periods of scarcity have increased the cost of this basic commodity—increases especially serious to domestic consumers, railroads and public utilities. These experiences of unsatisfied demand and unsatisfactory prices have created in the popular mind a conviction that the natural benefits to be expected from a condition of plenty have been denied through artificial interference. The coal industry, therefore, has been subjected to outspoken criticism, and public dissatisfaction has expressed itself in a series of investigations and in regulatory laws. The act creating the United States Coal Commission is an expression of this feeling of public concern and dissatisfaction.

"The Coal Industry.—Every industry and every citizen throughout the country is directly or indirectly dependent upon coal. While it is true that a large majority of the states have coal mines within their limits, it is significant that all the anthracite comes from a narrow area of 480 square miles in eastern Pennsylvania and 93 per cent of the bituminous coal comes from three major areas: The Appalachian region, extending from Pennsylvania to Alabama, the greatest storehouse of high-rank coal in the world; the Eastern Interior region, comprising Illinois, Indiana and western Kentucky; and the Western Interior region, extending from Iowa to Arkansas and Oklahoma. Any map showing the distribution of the larger industrial plants of the country would in itself demonstrate the part played by these coal fields in locating the great manufacturing centers and planning the network of railroads that connect the larger commercial cities with the rich agricultural lands of the West and South. Inasmuch as more than two-thirds of the country's supply of high-grade coal lies within these three great coal areas, they may well be regarded as its chief known sources of industrial power for future centuries.

"The coal problem of the country, so far as it relates to present production, then, is largely localized in three coal regions and about a dozen States, although it is recognized that each mining district, large or small, has its problems to be investigated. In reality the coal industry includes three interrelated industries—mining, transportation and marketing.

"The coal-mining industry, in point of numbers employed, outranks any single manufacturing industry and stands next to transportation and agriculture. Approximately three quarters of a million men are employed in this industry, of whom 90 per cent work underground.

"The capital invested, according to the rough figures of the census, is $2,330,000,000, of which $430,000,000 is invested in the anthracite region and the remainder in the bituminous fields.

There are only 174 producers of anthracite and 8 of these control over 70 per cent of the annual output, while there are at least 6,000 commercial producers of soft coal, to say nothing of thousands of wagon mines and country coal banks. These producers operate 9,000 commercial mines.

"While the anthracite and bituminous branches of the coal industry are to some degree competitive in their markets, the differences in their mining, labor and economic problems are so marked that the discussion in this report will be limited to bituminous coal except where anthracite is specifically mentioned; the law requires a 'separate report on the anthracite industry on or before July 1, 1923.'

"Each coal district, if not each mine, has its own local customs and problems, determined by the quality of coal, thickness of seam, attitude of the bed, conditions of mining, the markets which it can reach, its freight rates, its labor policy and other factors. In the matter of wage scales, even in the union districts where wage scales are determined by joint agreement, we find variations from district to district and from mine to mine. Still more difficult to summarize are the wage rates in non-union mines. Not only are these wage rates complicated but the opportunity to labor varies so greatly from field to field or mine to mine, depending on character of coal, nearness to the market and commercial connections, that it is hazardous to make any generalization concerning miners' earnings.

"No less difficult under such conditions is the determination of average cost or profit. These subjects require specific and very detailed, painstaking investigation, which is complicated by the varying prices charged and received for the coal, quantity and quality both entering into the subject. The bituminous output is consumed approximately in the following percentages: Railroads, 28; industrials, 25; coking, 15; domestic, 10; iron and steel, 7; public utilities, 7; export, 4; mines, 2; bunkers, 2.

"The coal industry does not end at the mine. Some 180 railroads take the coal at the mine mouth and transport it to thousands of destinations. Because the railroads are the largest customers of the bituminous industry, and because coal—anthracite and bituminous—constitutes one-third of the railroad's freight, the problems of the two are closely interwoven and their interests interdependent. Not only does irregularity in coal output mean serious fluctuations in revenue but excessive irregularity imposes impossible traffic demands on the railroads. On the other hand, interference with rail transportation means a corresponding stoppage of output for the mines and shortage of fuel for the consumer. No solution of the coal problem can be found that does not recognize this community of interest between coal and transportation. But this community of interest, though simply stated is not simple upon examination. The movement of coal by rail and water is complicated by variations in freight rates, arbitrary differentials and competition between different coals and between carriers.

"Nor does the coal industry end with transportation. To connect the thousands of producers, big and little, with more than 90,000 buyers of carload-lot coal scattered over 48 states requires a widespread system of wholesale marketing. Sometimes this marketing is reduced to the simplest terms, as when a steel plant or railroad buys a mine and consumes its entire output. Sometimes it is conducted by the selling department of a large operating company. Sometimes the task of bringing together producer and consumer is performed by an independent wholesaler or selling agent. There are some hundreds of large wholesalers and a much greater number, perhaps 3,500 in all, of smaller middlemen. Like the business of running mines, the business of selling has its problems and, like mining, it has also its abuses.

"The final link in the chain of coal supply is the retailer, who receives coal in carload lots from car or yard storage and delivers it in smaller quantities to the consumer. There are some 38,000 retail coal dealers, most of them conducting a small business. They handle about 130,000,000 tons of coal, or 14 per cent of the bituminous and two-thirds of the anthracite produced.

This commission has reason to believe that an agreement will be reached in the near future that will avert any widespread cessation of mine operation in the union fields on April 1, thus assuring the needed coal supply for at least another year.

"Combined charges of the railroad, the wholesaler, and the retailer in most localities exceed the price of the coal at the mines. Therefore it is readily seen that the problem whether the transportation and marketing charges are just and fair is of the utmost concern to the consumers of coal.

"*Deficiencies in Service.*— The widespread public dissatisfaction with the service rendered by the coal industry is not confined to matters of shortage and price, for a train of unfortunate consequences has followed those recurring periods of scarcity: Deterioration in the quality of fuel delivered; congestion of railway traffic, necessitating the neglect of other freight to give preference to coal, to the serious harm of other business; and breakdown of mutual confidence of producers and consumers of coal as expressed in the customary contractual relations.

"How many there are we do not yet know, but there are certain mines which contract a part of their potential output, reserving the balance for spot coal. These operators guard themselves against car shortage by clauses which compel them to fill their contracts only in proportion to the relative car supply. So in recent years, when speculators with contracts could get only a partial supply of cars, say 60 per cent, they would use only that percentage of available cars for deliveries upon their contracts, while the other cars would be used for spot coal; that is, they prorate their contracts with the sole purpose of having free coal for a higher spot market.

"The record of production and distribution of coal in recent years may be summed up in the word 'instability,' and this instability in the supply of one of the most fundamental of all raw materials has been an important cause in unsettling business and in delaying the return of normal times.

"(1) *Large Profits.*—It has been suggested to us that one of the causes of high prices of coal is profiteering. There has been profiteering in the sense that grossly exorbitant profits have been taken at times by many operators, brokers, and retailers; profits that have been disproportionate to the cost of the coal or the service rendered or the risk incurred. But this commission has not yet obtained the figures for the past ten-year period specifically required by the act in order to settle this question. A thorough examination of the profits of production and distribution, including the revenue derived from associated enterprises, is already under way.

"(2) *Labor Difficulties.*—Others attribute the instability in the coal industry primarily to labor troubles. There can be no doubt that two of the three periods of high prices since 1916 have been caused largely by labor troubles. In the first period of scarcity—August, 1916, to March, 1918—there were no strikes of consequence and therefore some other explanation of the high prices and distress must be found.

"The second period of runaway prices, November, 1919, to late in 1920, was originally caused by a nationwide strike of miners beginning November 1, 1919. In this case the shortage created by the strike was aggravated by difficulties in transportation resulting in part from severe weather and in part from a strike of railway switchmen, and was further intensified by an unprecedented demand for export and by boom times at home.

"In the third period of shortage and high prices from which we have not yet emerged, the primary cause was a nationwide suspension of mining, involving practically all union men, which closed the anthracite region completely and shut down two-thirds of the capacity in the bituminous fields of the United States and Canada. As the merits of that suspension, whether it more resembled a 'strike' or a 'lockout', the commission expresses no opinion in this report. The point of immediate interest is that, as before, the effects were prolonged and intensified by transportation troubles until prices rose alarmingly and industrial plants began to close.

"We may refer to the unfortunate and unusual coincidence of the general cessation of work in the union mines in the summer of 1922 with that of the railroad shopmen and other crafts within the same period. The former very largely curtailed the output of the

mines and the latter so affected transportation in the fall and early winter as to interfere seriously with the distribution of coal. The effect was seriously to deplete the usual supply of coal with which the country enters the winter.

"When work was resumed and the mines were once more turning out their product, it was found that the increased output could not be distributed apace with production, for the effect of one cessation of labor was not so quickly remedied as the other, and not even yet has the transportation equipment been restored to its former condition. With the shortage of coal and lack of railway facilities the fall season opened with general bidding for the supply on hand. Prices were forced up with the obvious effect on the public.

"Whatever the cause or the merits of the labor controversy, it is clear that an indefinite repetition of these crises in the production and distribution of coal would be intolerable. Industry and the home alike must be freed from the menace of constant interruption of their coal supply.

"The responsibility of settling its disputes rests primarily upon the industry. The commission appreciates not only the importance of this principle but realizes also that it is vested by the law creating it with no functions of mediation or arbitration and only when it had reliable information that the efforts of the parties in controversy to reach a basis of agreement were on the verge of failure did the commission feel constrained to offer its suggestions. With knowledge of the fact that a suspension was threatened on April 1, 1923, in the unionized bituminous coal fields, it could not sit idly by and not use its good offices to promote peace. It therefore warned miners and operators alike that the country looks to them to settle their own disputes and to reach an amicable agreement when the present contract expires. In this spirit the commission addressed the following telegrams to the joint meeting of operators and union miners at Chicago, on the third of this month:

The United States Coal Commission respectfully calls your attention to the fact that among the subjects assigned to it by the Congress of the United States for investigation is that of the causes which from time to time induce strikes in the industry. There is sharp conflict in opinions expressed to the commission as to whether the cessation of work on April 1, 1922, in the unionized bituminous coal fields of America was a strike by the miners or a lockout by the operators.

As the duly appointed representatives of operators and miners in the fifteen organized union districts, you have met for the purposes of finding a way to maintain peace in your fields. Failure to agree would create an intolerable situation. Such failure would inevitably result in most serious injury to the general business and common welfare of this country. All branches of the industry have promised this commission their co-operation in the discharge of its duties. The commission, therefore, in the public interest urges upon you the obvious necessity of promptly devising some plan whereby the mines affected by your conference will be kept in operation to the end that the revival of all industry be unchecked, the uninterrupted flow of commerce among the states be maintained, and the menace of an insufficient coal supply be averted.

Business halts while in doubt as to your action and awaits with anxiety the speedy and successful outcome of your labors!

You can contribute to the peace of American economic life by reaching a speedy agreement and avoiding further conflict in the fields under your control. Your agreement will spare the commission the necessity of fixing the blame for failure to adjust your differences.

[Signed] JOHN HAYS HAMMOND,
Chairman, U. S. Coal Commission.
Washington, Jan. 2, 1923.

The Congress of the United States, charged with the duty of legislation for the general welfare of the American people, has created the United States Coal Commission to investigate the coal industry and to report the facts which it may find and to make recommendations to assist the legislative branch of our government in its efforts to guarantee justice to all concerned, to stabilize the industry, and to keep the mines in uninterrupted operation.

This commission has not yet had time to ascertain the facts nor to reach any conclusions as to the merits of your controversies, but it is satisfied that delay in reaching an agreement is bad for the whole country and that every interested party would suffer a greater economic loss by the closing of your mines even for a comparatively short period than would be sustained by a continuance of your present agreement until April 1, 1924.

If therefore all efforts to reach an agreement fail the commission urges you in the interest of the common welfare to continue your present arrangement until April 1, 1924, by which time this commission expects to have found and reported fully all the facts over which your disagreements have arisen with recommendations to the Congress and by which time the Congress will have had opportunity to consider and take such action in the premises as it may deem wise.

[Signed] JOHN HAYS HAMMOND,
Chairman, U. S. Coal Commission.
Washington, Jan. 4, 1923.

We are seeking to promote industrial peace by ascertaining and publishing certain facts. The first group of these includes reliable data on wage rates and earnings, on the volume of employment, on the costs and profits of the industry, on the competition of other fuels and of coal produced by non-union mines.

A second group of facts required includes the effect upon the industry of provisions for the check-off of union dues, participation in management or limitation upon freedom of management, and other working conditions.

"In response to the above a telegram was received on Jan. 5 from Phil. H. Penna, chairman of the conference, as follows:

Your telegrams dated Jan. 2 and Jan. 4, addressed to the joint Reorganization Committee of Bituminous Coal Operators and Coal Miners, were given serious consideration by the operators in their meeting here today, after they had failed in their efforts to reach an agreement with the miners upon a method for future wage scale making.

The joint conference made earnest, serious and sincere effort to reach an agreement. The cumbersomeness of a nation-wide conference of bituminous-coal operators and coal miners, representing fifteen producing districts, made success impossible. The diversity of opinion and the divergence of interests in such a gathering is obvious to any competent observer.

The operators' proposal to the conference was the only one upon which agreement could be reached among themselves. We believe further it offered a practical and practicable solution of the difficulties. We regret that the miners could not agree with us on this proposal. No other solution could come from this conference.

As to renewal of the present arrangement with the miners, as requested in your telegram dated Jan. 4, a reading of the Cleveland agreement with the miners, dated Aug. 15, 1922, will disclose that the present conference has no power, jurisdiction or authority to take such action. The conference or conferences to consider this matter comes subsequent to the adjournment of this meeting. The arrangement of such conferences is being given consideration at this time.

"On Jan. 6 the following telegram was received from William Green, secretary of the conference:

Your telegrams directed to me as secretary of the Reorganization Committee, were read to the conferences of coal operators and miners. Each side decided to make reply. Both groups decided to make separate reply thereto.

The United Mine Workers' representatives were profoundly impressed with the advice and suggestions transmitted through your messages. Unfortunately, because of the diversity of interests represented in the conference it was impossible to reach an agreement upon the form and character of a wage scale conference.

You can be assured, however, that the situation is not hopeless but, on the contrary, it is reasonably certain that a wage scale conference will convene before the end of this month.

The United Mine Workers will diligently endeavor to reach a settlement of the wage scale at the earliest possible date.

"On Jan. 11 the following telegram was received from John L. Lewis, president of the United Mine Workers of America:

The United States Coal Commission has already been advised that the representatives of the miners and operators of the Central Competitive Field will meet in joint conference at the Pennsylvania Hotel, New York, on Thursday, Jan. 18, for the purpose of negotiating an agreement for wages and working conditions in the bituminous industry of that area. It is the sincere and earnest hope of the United Mine Workers of America that this joint conference may successfully and quickly accomplish that task. We are anxious to bring about a stabilization of the coal industry that will assure the American public and business and industry in general a steady supply of fuel for the future, and this can best be done by an agreement between miners and operators that will cover a period of two years or more. A contract for such a period would enable industry and business to make their plans for the future knowing that they would be safe from such interruptions to the coal supply as have occurred in recent years.

"The representatives of the United Mine Workers will enter the joint conference in good faith and with a sincere purpose to do their part toward affording such assurance. In the meantime the commission would be relieved of all anxiety as to whether there would be peace in the coal industry, and the Commission could carry on its investigations and reach its conclusions before the expiration of such agreement.

"While the Chicago conference to which the commission's telegrams were sent took no official action, it is seen from the above replies that definite steps were taken at Chicago and this commission has reason to believe that an agreement will be reached in the near future that will avert any widespread cessation of mine operation in the union fields on April 1, thus assuring the needed coal supply for at least another year.

"We are seeking to promote industrial peace by ascertaining and publishing certain facts. The first group of these includes reliable data on wage rates and earnings, on the volume of employment, on the costs and profits of the industry, on the competition of other fuels and of coal produced by non-union mines. All of these subjects the commission's staff is now studying, and the results of its investigations will be made public in supplementary reports to Congress as fast as they become available. Up to this time returns on costs are already received and are being analyzed from about 2,000 operators, representing about 40 per cent of the total bituminous output.

"A second group of facts required includes the effect upon the industry of provisions for the check-off of union dues, participation in management or limitation upon freedom of management, and other working conditions. This also involves investigation of what causes petty strikes resulting in costly stoppage of operations.

"Collective bargaining should rest upon reason rather than upon force. American law and American public opinion recognize the right to organize into unions and the right to work without let or hindrance. It is alleged by the mine workers that in Logan County, West Virginia; Somerset County, Pennsylvania, and elsewhere, free speech and peaceful persuasion have been denied, in violation of the law. It is charged by operators, on the other hand, that the agents of the union have resorted to violence in their efforts to organize the non-union fields and thereby to lessen competition of non-union coal produced at lower costs. We will investigate and report upon the methods used by union miners to organize these fields and the methods used by the operators to prevent such organization.

"(3) *Car Shortage.*—An opinion commonly expressed before the commission is that the primary cause of scarcity and high prices of coal is transportation deficiency. There have been recurring periods of 'car shortage,' and such periods have generally been accompanied by high prices of coal. There are many other causes for the inadequacy of transportation beside the absence of cars, such as lack of motive power, congestion of yards, terminal facilities, or gateways, single tracks where double tracks are needed, inability to co-ordinate movement of boats and cars at ports, strikes of railway labor, and severe winter storms temporarily blockading traffic. Any one of these elements may be responsible for what to the operator at a mine seems a simple 'shortage of cars.'

"Car shortage occurred at intervals before the war, but since 1916 it has appeared more frequently and for longer periods, and is effects upon prices and coal supply have been more serious. This increase in transportation disability as a factor interfering with the movement of coal is in part due to the depreciation of equipment under the strain of war and labor complications. This important subject—inadequacy of railroad equipment—is under careful study by the Interstate Commerce Commission as well as by this commission, and it is hoped that definite findings and recommendations can be made later.

"The so-called 'car shortage' is not always due to insufficient coal-carrying equipment alone. In part it has been due to an overload upon the transportation system beyond what that system could reasonably or properly be expected to bear. The period of coal shortage and high prices from the middle of 1916 to March, 1918, was marked by almost continuous complaint of lack of cars at the mines. But the volume of traffic thrown upon the roads as a result of the war exceeded anything in their previous history, and when by the summer of 1918 adequate preparation had been made to handle the traffic all current requirements for coal were met and an unprecedented surplus accumulated in storage.

"In the next period of shortage—November, 1919, to late 1920—the roads were called upon to make up for six weeks' stoppage in coal production caused by a nationwide miners' strike. On Nov. 1, 1919, the union bituminous miners stopped work, and when they resumed, on Dec. 13, the movement of coal was 26,000,000 tons behind the previous year. The railroads were then asked to make up the deficit and to do it on top of the regular current movement of coal and other freight. The extra load came at a time when the export business in coal was unprecedented and when general business was booming. Even so, the railroads could probably have met the demand had it not been for the severe storms of that winter and the switchmen's strike of the following spring. As it was, they established a new record for total volume of traffic handled, and by the end of 1920 the deficit in coal supply had been overcome and the price was again normal.

Short working time is the result of overdevelopment in the industry. There are more mines and more miners than the needs of the country require.

"Since the resumption of work, in August, 1922, after five months cessation, more bituminous coal has been offered for shipment than the railroads have been able to carry, but only by investing money in a transportation system vastly in excess of reasonable requirements may the people of the country expect the railroads to make up within a few weeks the consequences of the five month's suspension of a large part of the coal mining.

"At the beginning of 1923 the bituminous coal industry presents to the country its usual contradictions. The one complaint common to most of the coal mining territory is that of 'car shortage'; yet the outstanding fact is that in spite of a miner's election day and the Christmas holidays, these coal mines produced in December, 1922, over 46,000,000 tons of soft coal. An actual shortage of anthracite has kept domestic consumers on the verge of a buyer's panic, restrained only by the co-operation of the larger coal operators with the federal and state fuel distributors, yet the 46,000,000 tons of soft coal was probably sufficient for the country's needs for current consumtion, even in December, if evenly distributed. The fact that low coal reserves in the hands of the consumers are not being rapidly replenished doubtless adds to the fear of scarcity, yet a full-car-supply for the country's soft coal mines, as rated by the railroads, would have furnished transportation in December for more than 75,000,000 tons or 20,000,000 tons more than the country ever took from the mines in a single month. Plainly, '100 per cent car supply,' as based on such inflated ratings, would create a car surplus or a coal surplus far beyond the ability of the market to absorb.

"(4) *Overdevelopment.* — Already in our study we have come to see that underlying these immediate causes of scarcity and high prices—labor difficulties and transportation deficiency—are other causes; namely, the irregularity of demand and the overdevelopment of the mining industry. These basic factors apply directly only to bituminous coal but indirectly they affect anthracite as well, for anthracite is in competition with bituminous coal and the wage scale in the one industry is influenced by changes in the other.

"We find that in the bituminous industry since 1890 the mines have averaged, over the country as a whole, only 213 days out of a possible working year of 308 days. These averages, of course, show nothing as to the relative annual earnings of individual miners or their individual opportunity to work. In 1920, a year of active demand, the average time worked was only 220 days, and in 1921, the year of depression, it dropped to 149 days, with many districts showing a figure much below this average. Over a long period comparatively little of the time lost has been on account of strikes and that in the years when there are no strikes the aggregate time lost from all causes is about as great as in those when strikes occur. In the twenty-three years over which the statistical record of strikes extends, the time lost because of strikes has averaged 9 days a year, or less than 10 per cent of the time lost for all causes combined.

"The other attributed cause, lack of transportation facilities during the annual peak of railroad business, commonly known as 'car shortage,' enhances the cost to the consumer, but it does not explain the short working year for the miners. When the needed coal is supplied the miner gets it out at one time or another and his work takes so much time and no more. Short working time is the result of overdevelopment in the industry. There are more mines and more miners than the needs of the country require.

"A cause of part-time operations of the bituminous mines is the variation in demand for the product, in part annual and in part seasonal. In so far as the irregularity in demand is seasonal, greater in cold weather than in summer, the lost time in summer is unavoidable unless some means can be devised to encourage the storage of coal during the dull months. The seasonal fluctuation in demand varies greatly from one district to another; in some fields of the East it is unimportant; further West it is dominant.

"Moreover, our preliminary studies show that even in times of maximum demand the mines as a whole do not work full time. In other words, the mine capacity is in excess even of maximum requirements. Although the country has never been able to absorb

in a year more than 579,000,000 tons of bituminous coal, the present capacity of the mines is well above 800,000,000 tons.

"The steady increase in the army of bituminous coal miners during the last four years, notwithstanding a lessened demand for their product is also a fact that stands out in the statistical records furnished the commission by the U. S. Geological Survey. In 1918, the year of maximum coal output, when 579,000,000 tons were mined, 615,000 men were employed in the bituminous coal mines, nearly 622,000 the next year, over 639,000 in 1920, and in 1921 663,000 mine workers were employed in producing about 416,000,000 tons. To get a year comparable in soft coal output with 1921 we have to go back to 1910, when 417,000,000 tons were mined, and it is significant that in that year less than 556,000 mine workers were employed—or about a million more tons of coal with 100,000 fewer miners.

"The difference between 1910 and 1921 may be viewed by the consumer of bituminous coal somewhat as follows: The manufacturer who bought 10,000 tons of steam coal in 1910 paid for the year's labor of 13⅓ mine workers, whereas if he bought the same amount of coal in 1921 he paid the wages of nearly 16 mine workers. This plainly is not progress, but the mistake must not be made of blaming the miner for a decreased output, for the average miner's daily output in 1921 was 4⅘ tons, taking the 8,000 commercial mines, large and small, in the United States, and in 1910 his daily output was about 3½ tons, although this difference is attributable in part to the increased use of machines. But in 1910 the average bituminous coal mine was operating 217 days as against 149 days in 1921.

"This condition of overdevelopment in mines and of surplus number of miners is an underlying cause of the instability of the industry. It means unemployment and intermittent employment to the coal miner and a direct loss to him of earning power. It explains his need and demand for a day wage rate higher than the average for most other industries. It has also adversely affected the profits of the operator and imposed a burden on the consumer.

"The seasonal character of coal movement is a serious handicap to the railroads in those districts where it is the rule. If the peak demands of the mines are to be met the carrier must provide equipment for which there is no use in the off-season.

"The unequal distribution of work between mines, attributed by many persons to the assigned- and private-car system, is also being considered by the Interstate Commerce Commission at this time. By this system men in one mine may get perhaps only one day's work a week, and others, even in an adjoining mine, may get six days' work, causing discontent and strengthening the demands for higher rates of pay applicable to all.

"As for the public, the cost of maintaining an overdeveloped industry is reflected in the high price of coal. We do not know accurately the extent of burden, but it may well be measured by the cost of keeping in the industry an excess of perhaps 20,000 miners and their families and the excess investment in mines.

"The commission is convinced that there can be no permanent peace in the industry until this underlying cause of instability is removed. Diverse causes have apparently promoted overdevelopment and inquiries are in progress as to the relative importance, among others, of the following: The policy of railroads toward encouraging the opening of new mines and new mine fields as sources of revenue; car distribution rules that permit, if they do not encourage, larger capacity than the market obviously requires; the opening of new mines by large consumers; the establishment of freight rates that encourage the development of new fields; shifts in centers of consumption that abandon old fields and encourage new fields; the difference between union and non-union wage costs; large scale suspensions in the unionized fields; and irregularity of demand.

Collective bargaining should rest upon reason rather than upon force. American law and American public opinion recognize the right to organize into unions and the right to work without let or hindrance. It is alleged by the mine workers that in Logan County, West Virginia; Somerset County, Pennsylvania, and elsewhere, free speech and peaceful persuasion have been denied, in violation of the law. It is charged by operators, on the other hand, that the agents of the union have resorted to violence in their efforts to organize the non-union fields and thereby to lesson competition of non-union coal produced at lower costs. We will investigate and report upon the methods used by union miners to organize these fields and the methods used by the operators to prevent such organization.

"(5) *Coal Storage.* — A preliminary survey indicates that much can be done to overcome irregular demand by encouraging the storage of coal, and the commission cannot stress too strongly the great advantage of coal storage during the spring and summer for fall and winter use. This recommendation should apply to all consumers of coal—the railroads, the public utilities, the industries, and the home—and on the measure in which it may be adopted will largely depend the evenness of distribution and the cost of coal to the public during the season of heavy consumption. In addition, it will contribute to more continuous operation of the mines during the summer, distributing employment more evenly throughout the year, thus tending to stabilize the industry. Coal storage, generally adopted by the consumer, large and small, would benefit the carrier systems of the country by equalizing their load. It should have the effect of reducing the price of coal to the consumer.

"The way in which to reduce the overdevelopment of the mining industry is fraught with so many complications, not all of which are evident at first glance, that the commission has not yet had time to ascertain sufficient facts on which to base any recommendations now to be made to the Congress. While it might be expected that in an overdeveloped industry aggressive competition would have driven out mines with high producing costs and forced prices to the consumer down to a minimum, so many such complex factors have operated to prevent the free play of economic forces that a very detailed and comprehensive investigation is required before a valid conclusion can be reached.

"The inquiry involves the whole question as to what is best for the people, free competition, government or private ownership, regulation or control in the coal industry. Should the operators in given areas be permitted to combine so that the low-cost mines would furnish the product to the people and the high-cost mines kept in abeyance to meet an emergency, properly regulated as to price and profit by some governmental agency, or should this prime necessity of life and business be left wholly to open competition in the market? This problem is of so great moment, with reference not only to theories of government but also to the economic life of the the Republic, that the view of the commission must be left to its final report.

"There can be no satisfactory agreement as to wage rates and no lasting peace between operators and men unless steadier employment can be provided. There can be no satisfactory solution of our transportation problem as long as the railroads are subjected to sudden peak loads of coal traffic at the season when the demands of agriculture and industry are at their height.

"The commission believes that the public interest in coal raises fundamental questions of the relation of this industry to the nation and of the degree to which private right must yield to public welfare. It may be that both private property in an exhaustible resource and labor in a public service industry must admit to certain modifications of their private rights, receiving in return certain guarantees and privileges not accorded to purely private business or persons in private employ.

"JOHN HAYS HAMMOND, Chairman,
"THOMAS R. MARSHALL,
"CLARK HOWELL,
"GEORGE OTIS SMITH,
"EDWARD T. DEVINE,
"CHARLES P. NEILL."

"I approve, and if a qualified member of the commission would sign the foregoing report. While appointed and confirmed as a member of the commission, being a Federal judge, I could not lawfully at the same time hold the commissionership without authorization by Congress. But at the request of the President and of the commission I have been present and advised with the commission in all its proceedings, without having qualified as a member of it.
"SAMUEL ALSCULER."

Anthracite Output Hits Lowest Level Since 1902

Five Months Tie-up Cuts Total to 52,465,000 Net Tons in 1922 Compared with 90,474,000 Tons in Preceding Year—Operators Co-operate with Federal and State Officials to Hold Prices Down

BY W. A. WHITE

VIRTUAL paralysis of mining caused by the 163-day tie-up of the mines, of course, was the outstanding feature of the anthracite industry during 1922. Production records show how seriously the strike affected the output of hard coal—52,465,000 net tons was mined in 1922 as compared with 90,474,000 tons in 1921, and the output was less than in any of the years since 1902. Production during the last twelve years is shown in the following table:

ANTHRACITE PRODUCTION, 1911-1922, IN NET TONS.

	Million Tons		Million Tons
1911	90	1917	100
1912	84	1918	99
1913	92	1919	88
1914	91	1920	90
1915	89	1921	90
1916	88	1922	52

Early in 1922 production lagged because of market conditions. Even the approach of the strike failed to stimulate prices and demand, and it was not until well into March that there was much real buying activity. Retailers' stocks were as heavy as in the preceding spring and the feeling existed, as in the bituminous-coal trade, that "something would avert a long tie-up and make excessive stocking unnecessary."

Prices dropped lower and lower and early in the year independent steam coal was in distress much of the time and the larger producers ran heavily to storage. Even domestic sizes were placed in storage against the inevitable rush that was to come. The year opened with independent prices averaging approximately $5.96 for all sizes. Severe coal-burning weather raised this to $6.19 in the first 60 days of 1922, but the market failed to sustain this level, and even in the face of the strike the independent average dropped to $6.09 for March.

Aside from a few cars per day of small sizes dredged from the rivers, anthracite production was nil from April 1 until Sept. 11. Producers' storage tonnage was quickly moved and the independent product soared. Long before the strike ended producers were besieged with orders for delivery at the earliest possible moment, with price to be determined when mining was resumed.

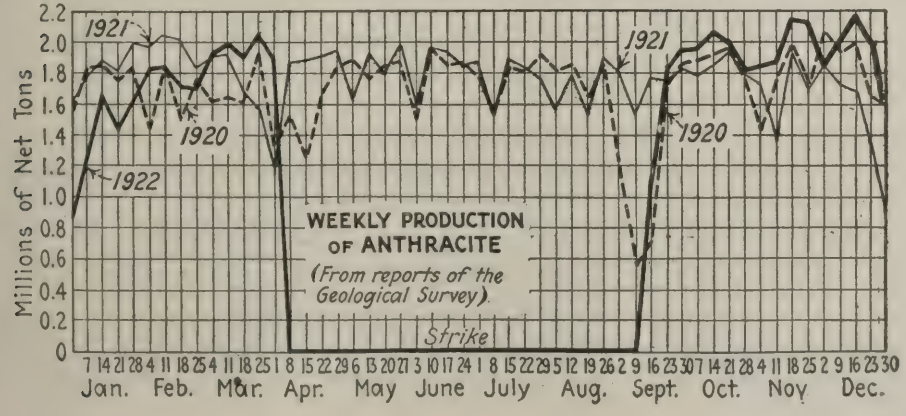
The rush to cover became a mad scramble when mining started and prices for independent tonnage increased by leaps and bounds. Winter scarcity of domestic sizes was foreseen and steps were taken to safeguard the supply and restrain exorbitant prices. On Aug. 1 the Governor of Pennsylvania appointed a State Fuel Commission of seven members, headed by W. D. B. Ainey, Chairman of the Public Service Commission, to cooperate with the federal authorities in the distribution of coal. At a joint meeting of this commission and Secretary Hoover, on Sept. 7, a Committee on Distribution of Anthracite was appointed, headed by S. D. Warriner, chairman of the General Policies Committee of the Anthracite Operators, with E. W. Parker as Director of Distribution. The committee immediately directed each producer to distribute his tonnage in the normal way, that each state receive approximately its proper share of current production.

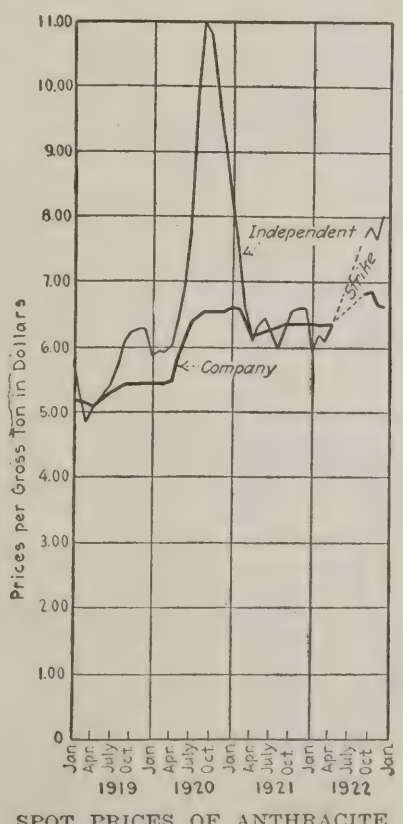
Mine prices became the subject of immediate attention and on Sept. 20 a decision of the Pennsylvania Fuel Commission was made public fixing $8.50 per gross ton as the maximum mine price for stove and chestnut sizes, but stating that a Fair Practice Committee, empowered by the commission, would consider the cases of operators unable to sell at such maximum. Independent quotations were $9@$9.50 at the time this announcement was made, although some coal moved as high as $14. Independent operators protested against the $8.50 maximum and threatened, if they failed to receive a price in excess of that announced by the committee, to ship their product outside the State of Pennsylvania and beyond the jurisdiction of that body. Examinations of production costs were made from time to time and individual operators' schedules raised in accordance with their cost data. Pending these examinations the independent

SPOT AND RELATIVE PRICES OF ANTHRACITE, WEIGHTED AVERAGE OF ALL SIZES
Per Gross Ton f.o.b. Mines, 1921-1922

	1921			1922		
	Company	Independent	Relative*	Company	Independent	Relative*
Jan.	$6.57	$8.22	251	$6.34	$5.96	221
Feb.	6.56	7.54	243	6.33	6.19	223
Mar.	6.31	6.58	227	6.33	6.09	222
Apr.	6.18	6.10	218	6.33	6.30	224
May	6.20	6.32	221		Strike	
June	6.23	6.44	223		Strike	
July	6.29	6.20	222		Strike	
Aug.	6.32	5.97	221		Strike	
Sept.	6.35	6.28	224	6.81	7.67	251
Oct.	6.35	6.53	227	6.85	7.83	253
Nov.	6.35	6.58	228	6.62	7.66	246
Dec.	6.35	6.58	228	6.61	8.02	249

* Relative price is comparison with average spot prices in the 12 months preceding the war, July 1913, to June, 1914.





SPOT PRICES OF ANTHRACITE, WEIGHTED AVERAGE, ALL SIZES PER GROSS TON, MINES

operators were authorized to charge prices that were considered fair by the Fair Practice Committee of 1920.

As the year closed the Pennsylvania Fuel Committee approved a final set of fair prices for individual operators as shown in the accompanying table of prices.

Fully two weeks elapsed after mining was resumed before the old-line companies announced their new price circulars. Tonnage held at terminals pending price determination was released by the publishing of temporary prices ranging $7.75@$8.35 for domestic coal. Increases of 15c@30c as compared with latest pre-strike quotations were made, presumably to cover the Pennsylvania state production tax.

Company Quotations

Following are the company quotations per gross ton f.o.b. mine as quoted on the New York market, announced after the resumption of mining:

Lehigh Valley—Broken, $7.90; egg, $8.10; stove, $8.15; chestnut, $8.15; pea, $6.15; buckwheat, $4; rice, $3; barley, $2.

Williams & Peters (Erie)—Broken, $7.75; egg, $7.75; stove, $8; chestnut, $8; pea, $6.15; buckwheat, $4; rice, $3; barley, $2.

Lackawanna — Broken, $7.75; egg, $8; stove, $8; chestnut, $8; pea, $6.15.

Lehigh & Wilkes-Barre Coal Co.—Broken, $7.75; egg, $8; stove, $8; chestnut $8; pea, $6.15; buckwheat $4; rice, $3; barley, $2; boiler, $2.50.

Lehigh Coal & Navigation Co.—Broken, $8.10; egg, $8.35; stove, $8.35; chestnut, $8.35; pea, $6.20; buckwheat, $4; rice, $2.75.

Hudson—Broken, $8.15; egg, $8.15; stove, $8.15; range (new size) $8.15; buckwheat, $4; birdseye, $2.75.

Philadelphia & Reading — Broken, $7.90; egg, $8.10; stove, $8.20; chestnut, $8.20; pea, $6.20; buckwheat, $4; rice, 2.75; barley, $2.

Quotations on steam sizes also were increased, in line with soft-coal prices.

Fair Prices Usually Adhered To

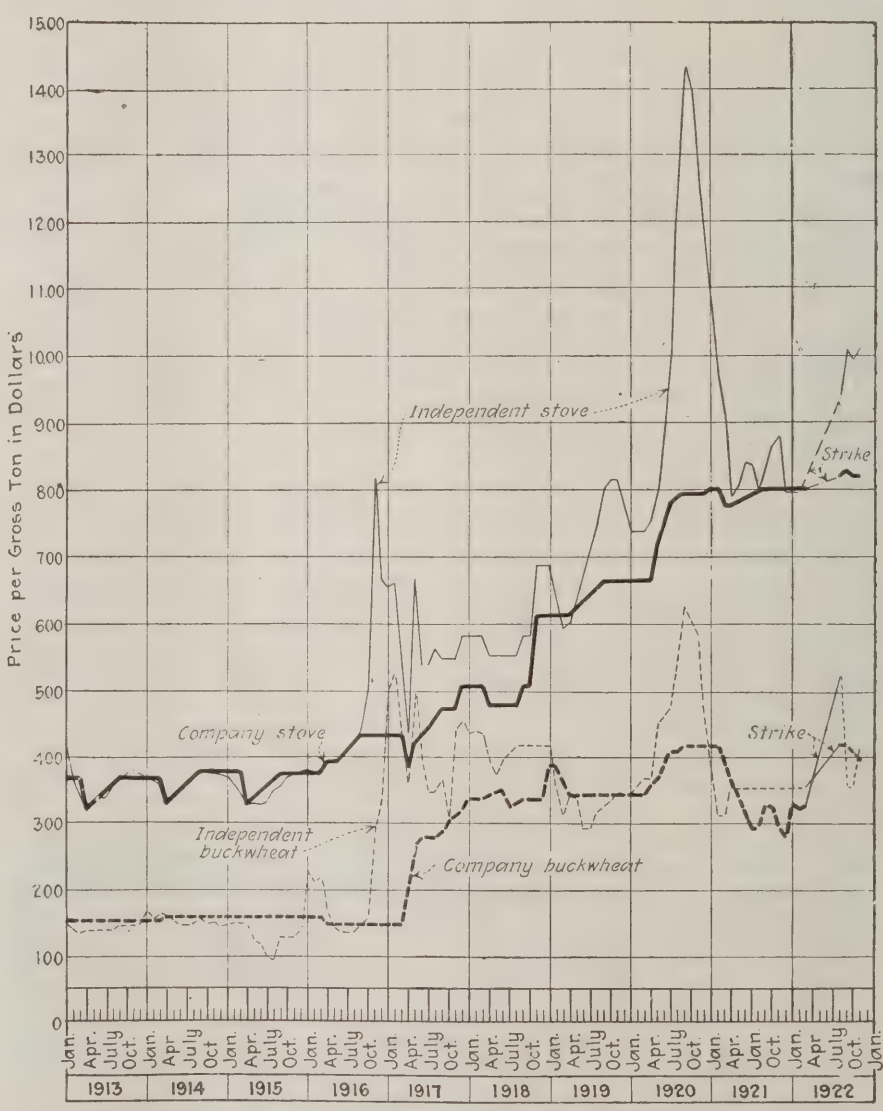
Although the majority of the individual operators adhered to the fair price lists authorized for them, there were a few who insisted upon going above these prices. This premium tonnage was small, both because dealers were loath to pass extra costs on to their household trade and the capacity output of these producers amounted to very little when compared with the total anthracite production.

Canada, however, presented an alluring market for high-priced coal. Early in the autumn these buyers began to flock to the United States and doubtless weaned away considerable coal by offering fancy prices for it. When cold weather came, their importuning increased and so did their scale of prices until $14@$16 coal was moving across the border. So urgent was this Canadian demand in December that cash payments were made before the coal was loaded—another inducement to insure prompt order filling. Naturally this augmented flow of coal away from domestic points where it was urgently needed is causing much complaint and some attempts are being made to stop it.

Car shortage, which played such havoc with the bituminous-coal industry, had little effect in the anthracite region. There was, however, an embarrassing variety of equipment placed for loading, some of it of a type which retarded production. The late summer and autumn was marked by one of the worst droughts in the history of the anthracite industry. In order to operate it was necessary in many cases to haul fresh water in tank cars, and this made maintenance of production difficult and added to the operating expense.

The U. S. Supreme Court in the last week of November upheld the Pennsylvania Anthracite Tonnage Act of 1921. This act, which places an additional burden on anthracite consumers both within and without Pennsylvania, fixes a tax of 1½ per cent of the market value of the coal at the mine, when prepared for market, became effective July 1, 1921, and the estimated amount of tax due by the end of that year was $3,273,840.61. Pennsylvania authorities estimate a yearly yield from this tax of around $7,000,000, which probably levies 15c on each ton of domestic fuel produced. This tonnage tax was tested out in the Dauphin County Court at Harrisburg, decision upheld, appealed to the Pennsylvania Supreme Court, where it was again upheld. Finally, the U. S. Supreme Court sustained the state court and upheld the distinction between anthracite and soft coal as a legitimate one for tax purposes.

The Kohler mine-cave act, with which the Fowler act is linked, was upheld by the Pennsylvania Supreme Court. The former gave wide discretionary powers to municipal officers over the mining of hard coal within municipal limits and made it a criminal offense to conduct mining operations which result in injury to surface property or to individuals on the surface. The Fowler act created a fund for the repair of surface damage due to mining and any coal company accepting the act was to pay regularly into the fund



ANTHRACITE PRICES FOR TEN YEARS

This diagram shows in dollars per gross ton the average company circular prices and average spot quotations on "independent" stove and buckwheat sizes of Pennsylvania anthracite at the mines. Prices shown are averages of the range as quoted on the New York market.

Fair Prices Established Jan. 1, 1923, by Pennsylvania Fuel Commission

The commission only fixed prices in cases where the mining companies had been charging more than $9.25 a ton, no prices having been set for those companies, including nine big anthracite operators, whose selling prices at the mines range $8.00@$8.35.

The prices which have been established by company operators, f.o.b. mines, are as follows: Glen Alden Coal Co., $8; Hillside Coal & Iron Co., $8.25; Hudson Coal Co., $8.25; Lehigh Coal & Navigation Co., $8.35; Lehigh Valley Coal Co. and Coxe Bros., $8.15; Lehigh & Wilkes-Barre Coal Co., $8.00; Pennsylvania Coal Co., $8.25; Philadelphia & Reading Coal & Iron Co., $8.30, and Scranton Coal Co., $8.25. Other operators' prices follow:

OTHER PRODUCING COMPANIES

Price, Gross Tons

1920 Output	Operator	f.o.b.	Mines
451,668	Alden Coal Co.	$10.00	Incl. 20c. com. to Whitney & Kemmerer
128,281	Archbald Coal Co.	12.00	Incl. selling costs
56,975	Bald Mountain Coal Co.	9.50	Incl. 20c. com. to Whitney & Kemmerer
29,126	Bergen Coal Co.	12.00	No selling com. to be allowed; includes $1.50 for hauling mines to cars
242,658	Buck Run Coal Co.	10.50	25c. selling com. to be added
5,618	Butcher Creek Coal Co.	11.00	Does not provide for com.
34,351	Carney & Brown Coal Co.	11.25	Selling cost incl.
75,069	Central Coal Co., W.-Barre	12.00	
73,930	John Conlon Coal Co.	10.25	To which a com. of not exceeding 25c. may be added
	Cullen Fuel Co., Inc.	12.00	No com.
202,446	Darkwater Coal Co.	11.00	25c. com. to be added
183,809	East Boston Coal Co.	12.00	Incl. com.
271,461	East Bear Ridge Collieries	11.00	Com. of 25c. to be added
56,839	East Point Coal Co.	12.00	
61,290	Ebans Colliery Co.	9.25	
216,160	Excelsior Coal Co.	9.25	
191,114	Haddock Mining Co.	10.50	
24,787	Humbert Coal Co.	11.50	No com. allowed
40,874	M. S. Kemmerer & Co.	10.00	Incl. 20c. com. to Whitney & Kemmerer
975,411	Kingston Coal Co.	9.75	Com not to exceed 25c.
128,221	George F. Lee Coal Co.	10.00	Com not to exceed 25c.
277,589	Leggitt's Creek Anth. Co.	11.50	Incl. com.
	Madeira, Hill & Co.	10.50	Incl. selling costs
284,079	Connell Anth. Mng. Co.	9.25	
494,164	Mt. Jessup Coal Co., Ltd.	10.00	Incl. 20c. com. to Whitney & Kemmerer
67,951	Nay Aug Coal Co.	12.00	Com. not to exceed 25c.
277,865	Pine Hill Coal Co.	10.50	Com. of 50c. may be added
179,481	Oak Hill Coal Co.	10.50	
162,699	Pittston Coal Mining Co.	9.25	
15,545	Plymouth Red Ash Coal Co.	11.00	Com. of 25c. may be added
388,116	Price Pancoast Coal Co.	10.00	Incl. 15c. com.
158,889	Racket Brook Coal Co.	12.00	Com. not to exceed 25c.
97,999	Raub Coal Co.	11.00	Com. not to exceed 25c.
300,348	St. Clair Coal Co.	11.00	Additional 25c. for com.
144,048	Shipman Coal Co.	11.00	
84,391	E. S. Stackhouse Coal Co.	12.00	
1,438,448	Temple Coal Co. Kacka. Coal Co., Ltd. Northwest Coal Co. Sterrick Creek Coal Co. Mt. Lookout Coal Co. Harry E. Coal Co.		
	Forty Fort Coal Co.	9.25	Incl. 20c. com. to Thorne, Neale & Co.
172,546	Traders Coal Co.	11.00	Com. of not more than 25c.
155,072	Treverton Colliery Co.	11.50	Not to exceed 25c. com.
198,411	A. S. Van Wickle Estate	11.00	
118,813	J. S. Wentz Co.	9.25	

and be relieved of liability for monetary damage. This act was not accepted by operators and the Kohler act was deemed so strict that a number of mines in the Scranton district have been closed for nearly a year rather than take chances by operating. The United States Supreme Court on Dec. 11 declared the act unconstitutional.

Another disturbing feature during 1922 was the effort of Schuylkill and Northumberland counties to greatly increase the taxation on anthracite properties under the regular triennial assessment of 1922. Final settlement of these matters is still pending. Coal lands in Schuylkill County given a total valuation for taxation purposes in 1921 of $62,348,514 were placed at $437,878,684 under the triennial assessment of 1922; Northumberland County's 1921 figures of $24,134,661 were changed to $50,553,541 by the county authorities.

Quick recovery of mining following the strike settlement was possible as maintenance work had been continued with good effect. But even this feature was insufficient to overcome the tremendous handicap imposed by the long idleness.

ANTHRACITE SHIPMENTS, BY MONTHS

(In Gross Tons)

	1921	1922
January	5,740,538	4,848,053
February	5,966,101	5,239,014
March	5,737,771	6,778,667
April	5,967,465	
May	5,793,895	
June	6,031,937	
July	5,462,760	4,507,132
August	5,575,115	
September	5,519,412	
October	5,872,783	6,567,928
November	5,314,014	6,420,102
December	4,635,922	*6,454,876
Totals	67,617,713	40,815,772

*Estimated

ANTHRACITE PRODUCTION BY WEEKS, 1921–1922

(In Net Tons)

Week Ended	1921	1922
Jan. 7	1,597,000	1,242,000
Jan. 14	1,895,000	1,643,000
Jan. 21	1,819,000	1,443,000
Jan. 28	1,999,000	1,607,000
Feb. 4	1,985,000	1,811,000
Feb. 11	2,048,000	1,822,000
Feb. 18	2,010,000	1,703,000
Feb. 25	1,816,000	1,701,000
March 4	1,902,000	1,913,000
March 11	1,925,000	1,982,000
March 18	1,687,000	1,907,000
March 25	1,564,000	2,095,000
April 1	1,157,000	1,896,000
April 8	1,865,000	9,000
April 15	1,885,000	6,000
April 22	1,903,000	6,000
April 29	1,945,000	5,000
May 6	1,663,000	6,000
May 13	1,938,000	7,000
May 20	1,794,000	8,000
May 27	1,988,000	9,000
June 3	1,575,000	8,000
June 10	1,963,000	13,000
June 17	1,941,000	22,000
June 24	1,847,000	24,000
July 1	1,868,000	25,000
July 8	1,525,000	23,000
July 15	1,876,000	31,000
July 22	1,837,000	27,000
July 29	1,750,000	27,000
Aug. 5	1,772,000	27,000
Aug. 12	1,772,000	29,000
Aug. 19	1,529,000	39,000
Aug. 26	1,893,000	36,000
Sept. 2	1,770,000	36,000
Sept. 9	1,483,000	50,000
Sept. 16	1,749,000	1,107,000
Sept. 23	1,725,000	1,863,000
Sept. 30	1,802,000	1,947,000
Oct. 7	1,764,000	1,959,000
Oct. 14	1,813,000	2,075,000
Oct. 21	1,910,000	2,003,000
Oct. 28	1,751,000	1,804,000
Nov. 4	1,689,000	1,839,000
Nov. 11	1,350,000	1,863,000
Nov. 18	1,879,000	2,191,000
Nov. 25	1,650,000	2,174,000
Dec. 2	1,815,000	1,819,000
Dec. 9	1,675,000	2,038,000
Dec. 16	1,637,000	2,197,000
Dec. 23	1,316,000	1,976,000
Dec. 30	851,000	1,560,000

Distribution of Lake Cargo Coal (Bituminous) Loaded at Lake Erie Ports, Season 1922, Compared with Previous Seasons*

(In Net Tons)

Destinations	1922 Total for Season	1921 Total for Season	1920 Total for Season	1919 Total for Season	1918 Total for Season
Lake Superior Ports					
Duluth Superior and Two Harbors	5,406,912	8,679,763	7,774,764	7,806,277	10,022,016
Ashland-Washburn	457,944	514,545	604,062	589,705	914,389
Copper Range (1)	602,216	572,738	641,039	776,194	1,427,885
Marquette	233,338	140,596	310,422	233,313	359,989
Ft. William, Pt. Arthur and Jackfish	1,890,918	1,968,322	906,978	1,533,084	2,046,866
Other Lake Superior Ports	11,412	37,750	58,074	61,167	108,091
Totals	8,602,740	11,913,714	11,295,339	10,999,740	14,879,236
Lake Michigan Ports					
Milwaukee-Racine	2,482,401	2,759,327	2,578,085	3,256,650	3,607,347
South Chicago, Ind. Harbor and Gary	1,494,641	1,698,614	1,180,749	1,811,310	1,487,816
Sheboygan to Escanaba (2)	1,341,781	1,493,721	1,500,905	1,413,722	2,037,776
Other Lake Michigan ports	166,968	220,951	199,780	202,565	273,987
Totals	5,485,791	6,172,613	5,459,519	6,684,247	7,406,926
St. Mary's River ports					
Detour and Lime Island	584,684	244,943	397,579	196,664	428,460
Sault Ste. Marie, Can	413,494	751,839	1,092,428	809,548	1,143,096
Sault Ste Marie, American	91,548	90,814	164,915	150,835	159,351
Totals	1,089,726	1,087,596	1,654,922	1,157,047	1,730,907
Lake Huron ports	197,648	232,483	211,166	297,957	376,268
Detroit & St. Clair River ports	1,112,325	1,137,140	1,288,970	713,188	1,024,125
Lake Erie Ports					
Buffalo-Fairport and Toledo	1,078,654	244,116	53,758	67,101	131,683
Other ports (regular)	166,898	91,644	43,422	48,384	42,878
Totals	1,245,552	335,760	97,180	115,485	174,561
Georgian Bay ports	574,103	766,149	1,008,473	751,583	1,195,328
Welland Canal, Lake Ontario and St. Lawrence River ports	214,257	766,925	1,392,786	994,094	1,365,966
Grand totals	18,522,142	22,412,380	22,408,355	21,713,341	28,153,317

(1) Hancock, Houghton, Hubbell, Lake Linden, Portage and Torch Lake.
(2) Escanaba, Green Bay, Marinette, Menominee, Manitowoc and Sheboygan.
* Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, Manager.

Strike Runs Violent Course for 137 Days

Hampers Industry Almost as Much as War—Miners Win Wage Demands and Stave Off Arbitration, Which Constitutes Victory—But Industry May Benefit Vitally from Coal Commission's Work

By E. W. Davidson

THE strike of 1922 paralyzed the union coal fields of America for four months and fifteen days beginning April 1, exhausted the country's monumental soft-coal stock of more than 60,000,000 tons in spite of non-union production that ran as high as 5,000,000 tons a week, and disturbed both the industrial and economic structure of the nation as nothing has disturbed it in years except the Great War. The conflict was a victorious one for the United Mine Workers of America in the sense that the union forced the continuance all winter of war-time wages and successfully resisted wage arbitration. The operators were the losers in the sense that they lost every important point for which they contended, were more than ever maligned by the public for soaring coal prices and fuel shortage, and because they failed absolutely to develop any unity or cohesive strength among themselves.

The country as a whole and possibly the industry as a whole, however, may have won something vital out of all the travail of 1922 because the government was moved to create the United States Coal Commission, which is now making a study of all phases of coal with a thoroughness never equalled in this country. If its recommendations are sound and put into practice, miners, operators and the public may have won future content that will be worth the price paid during 1922 in losses, suffering and violence.

Two Refuse to Attend

At the very outset of the year two of the important operator elements in the Central Competitive Field—southern Ohio and western Pennsylvania—declared they would not attend the usual four-state scale meeting, scheduled for Pittsburgh, Pa., Jan. 6, because they were determined upon separate district negotiations. This was the first bombshell dropped into the mine-labor situation, which promptly grew strained. The fact that Illinois, which, with Indiana, composed the balance of the four-state wage-making field, wrote John L. Lewis that it would meet only if a majority of the field did, contributed little toward peace and a settlement.

Confronted by the three important refusals to attend the Pittsburgh meeting, Mr. Lewis, on Jan. 4, called it off and notified all those who had accepted that he was sorry the session could not be held. He said, however: "Representatives of the miners will hold themselves in readiness to take part in such a meeting whenever it becomes possible for them to do so." He asserted that all operators in the Central Competitive Field were violating their agreement by not attending the meeting and declared that "in due time circumstances will compel such a meeting."

In the first weeks of the year the anthracite labor situation was agitated by two factors: The mines were running low because of heavy stocks throughout the country—which set up a good deal of union propaganda that the operators were deliberately trying to starve the miners into a 20-per cent wage reduction—and the miners in various parts of the field were industriously resolving for wage increases varying from 30 to 48 per cent.

Indicating the necessity for a general downward trend of miners' wages around the country, wages in southeastern Kentucky and eastern Tennessee had already been ordered reduced 20 per cent by the permanent arbitration board for that region. No less than thirty mines there had previously reduced wages to the 1917 scale.

Baltimore Meeting Futile

In the Georges Creek and Upper Potomac fields a real effort was made to get a wage adjustment without a strike but after three days of conference in Baltimore nothing had been accomplished. The miners wanted a two-year contract. The operators refused. The operators proposed an agreement without the provision confirming the U. S. Bituminous Coal Commission award. The miners refused. The miners proposed that the old agreement be continued. Then they withdrew that proposal. Finally, with nothing done, the meeting adjourned, leaving about 90 per cent of the Maryland coal fields on a distinctly unsatisfactory basis, unable to sell coal that was produced by miners paid $1.31 a ton for pick work and $7.42 a day for eight-hour day workers.

In the New River field the union lost much prestige among its own members by its refusal even to consider a wage reduction. By the middle of January about 100 mines in that field—virtually the entire field—had made a reduction of $1.40 a day and 10c. a ton in the mining rate, which meant a return to the 1917 scale. Many union locals in District 29 turned in their charters. The checkoff therefore was abolished and the field was practically on a non-union basis.

Early in January it became increasingly apparent that the government proposed taking a hand in the coal situation in case the dispute between miners and operators menaced the public. It was stated at the White House Jan. 13 that several members of the Cabinet were "particularly interested," meaning Secretaries Hoover and Davis.

The non-union operators of the country assured the government that in case of a strike they would be able to produce at least 6,000,000 tons a week and possibly 7,500,000. This was supposed to have had a distinct influence against government interference, which soon became the chief point of speculation in the whole situation. On Jan. 19 Secretary Hoover made a public statement warning the country that the stage was all set for an industrial conflict of the first magnitude. Then followed various political efforts at Washington.

Kenyon Makes His Report

Senator William S. Kenyon on Jan. 27 filed in the Senate his momentous personal report and set of recommendations for governmental action in the coal industry, following the investigation which his Committee on Education and Labor made into the mine-labor "war" along the borders of West Virginia and Kentucky. He classed coal as a public utility and therefore a proper resource for public control. He proposed the adoption of an "industrial code" for the settlement of disputes in the mining industry and that there be created a federal board of three miners, three operators and three men representing the public to adjudicate such disputes. His commission would have no judicial, executive or police power but would hear all sides of any important mine-labor dispute and publish the arguments, that the public might make its own decision.

In the "code" Senator Kenyon proposed that collective bargaining and the right of both miners and operators to organize be recognized and affirmed and that no strikes be called until "a hearing be held the determination of the facts and principles" made.

On Jan. 26 and Jan. 28 the Pittsburgh Coal Producers' Association and the southern Ohio coal operators each announced a new scale they were willing to pay to miners after April 1. The Pittsburgh scale, providing heavy reductions to 77c. a ton for thin vein and 68c. for thick vein pick mining and $4.60 a day for motormen, was offered as being 36 to 40 per cent higher than pre-war wages. The southern Ohio scale showed reductions of from 30 to 47 per cent from the existing scale. Pick mining would pay 77c. as compared with $1.11, machine mining 60c. instead of 94c. and day work $3.75 and $4 instead of $7.50. The announce-

ments of these scales provoked no direct answer from the union, which was demanding no reductions.

Early in February Phil Penna, secretary of the Indiana Bituminous Coal Operators' Association, made a public statement favoring a 30-per cent reduction in miners' wages and a scale made by the Central Competitive Field that could be altered at intervals during the life of the contract to conform to industrial conditions. William Mitch, secretary-treasurer of the miners in the Indiana district, opposed this scheme as one that "would make the operators dictators."

On Feb. 4 the Monongahela Coal Association, in the Scotts Run Field of West Virginia, with sixty-five mines, announced a scale effective April 1 providing a wage cut of 30 per cent and abolishing the check-off. A resolution passed Feb. 10 by the Southern Appalachian Coal Operators' Association in Knoxville, Tenn., declaring against the "closed shop" for that field and against the check-off, was taken to mean that operators there would refuse after April 1, to make agreements even by districts, but that every company would attempt to make its own agreement.

Shamokin Declares for Strike

The anthracite miners made their demands clear at the convention of the three districts in Shamokin, Pa., Jan. 17-21. Contending that "Mine workers have never been paid in a manner commensurate with their hard labor and hazardous employment," the convention decided to demand a 20-per cent increase in tonnage rates, a flat $1 a day increase for day men, restoration of the old differentials existing before the award of the Anthracite Coal Commission and sixteen other things. They authorized a strike April 1 if these were not granted. The General Committee of Anthracite Operators said this would add $1.30 per ton to domestic-coal prices.

With little prospect of agreement in sight joint conferences started in New York March 21 even as President Lewis, of the United Mine Workers, was issuing the national strike order while strike votes from the bituminous regions were still being counted. The only thing the first conferences produced was an agreement to keep 3,000 miners in the anthracite properties to maintain them during the strike about to start. The strike was to be a "suspension" as far as anthracite fields were concerned.

Hard-Coal Operators' Scale

By April 11 the negotiations between anthracite miners and operatiors had merely got to the point of the operators beginning to state their case. A joint subcommittee was doing the negotiating by this time. For weeks the miners tried to get the operators to declare what they were willing to pay. The operators merely persisted in refusing the miners' demands. S. D. Warriner, for the operators, on May 8 declared that setting a wage level acceptable to operators would merely be "trading," and this the operators would not do.

Finally on May 18 the operators formally refused the miners' demands and proposed: (1) Contract rates be decreased 18 per cent; (2) day rates for men be reduced $1.20 and (3) for boys 72c. "This general wage structure," said the operators, "represents an average decrease of approximately 21 per cent, and will, therefore, fully maintain the purchasing value of wages as established by the Anthracite Coal Commission of 1920." The signers were Mr. Warriner, W. J. Richards, W. L. Connell and W. W. Inglis. The miners declined this proposal May 28, saying that further negotiations would be fruitless unless the operators agreed to an increase in wages.

On June 2 the operators proposed arbitration by a commission to be named by the President of the United States. After consideration by the miners in convention at Hazleton, Pa., June 6-7, the miners rejected the new proposal because they said the duties of the commission were too loosely defined, because the commission appeared to be directed to adjust rates according to the operators' May 18 proposal, because no mention was made of the miners' three fundamentals: A living wage, an eight-hour day, and complete recognition of the union; and finally because royalties, freight rates and profits were not to be considered as well as wages.

Wait on Soft-Coal Pact

Negotiations dragged though anthracite operators conferred with miners and with Secretary of the Interior Fall at Washington briefly on July 1 at the time of the White House coal conferences with miners and operators which failed to end the strike. On Aug. 11, just before the bituminous strike ended, President Lewis told the Mayor of Scranton the miners were ready to confer with the operators but that the latter would not make a scale preceding that for bituminous fields.

After the bituminous strike was closed and a contract signed to March 31, 1923, at the old scale, the anthracite miners said they were willing to continue the old scale for two years in the anthracite fields. The operators would not. On Aug. 17 through Senator Pepper, of Pennsylvania, President Harding called both sides to Washington to confer. After five days of insistence by the operators upon a long-term contract with provision for periodic wage adjustment by arbitration, which the miners flatly refused, the operators offered to continue the old scale to March 31, 1923, if the miners would agree to let wages after that date be fixed by the Anthracite Board of Conciliation, first for one year and then, beginning March 31, 1924, for two years. If the board failed to agree then the scale was to be made by three men chosen by the U. S. Circuit Court of Appeals. The miners refused to accept this.

Finally after negotiations had been broken off Aug. 22 in Philadelphia and resumed Aug. 29 in Washington, due principally to the efforts of Secretary Davis and Senator Pepper, the miners agreed they would go back to work at the old scale until Sept. 1, 1923. On the last day of August the operators agreed to this provided they got a "mandate" from the public, since the public would have to pay the cost of continuing the high wages. This was published broadcast and the "mandate" came in the form of many telegrams from over the country and from President Harding. On Saturday night, Sept. 2, a tentative agreement was entered into. On Sept. 11 the strike was officially ended and the mines reopened for another year at "war wages."

The United Mine Workers framed its program of demands at the reconvened session of the 28th annual convention in Indianapolis, Feb. 14-18 and authorized the scale committee to conduct a strike referendum before April 1. In spite of the fact that the scale committee brought in a comparatively "conservative" program, including the "maintenance of the present scale of wages," an eight-hour day underground and adjustment of various inequitable differentials, before the radical element in the convention got through, the "conservative" program had been trampled. The demand that existing wages be maintained was not changed, but the six-hour day and the five-day week were jammed into the list to be demanded of the operators.

Two days after the convention Mr. Lewis, who had declared frequently that the miners did not want a strike, issued another call for a Central Competitive Field meeting with operators at Cleveland March 2. Eastern Ohio, Illinois and Indiana reluctantly said they would attend if the rest did. The rest—southern Ohio and Pittsburgh—refused as flatly as before. The operators in both those districts said they were willing to meet the miners of their own territories only. The miners' union then began polling its membership on the question of giving the international officers the right to call a strike at midnight March 31 in case no agreement was reached by that time.

Rail and Mine Men Conspire

Directly after the Indianapolis convention Mr. Lewis and his principal officers attended a joint conference at Chicago with officials of fourteen railroad brotherhoods and succeeded in forming a rather vague sort of coalition more or less along the lines laid down by Mr. Lewis in letters directed to all the rail brotherhoods early in the month.

As March opened the operators of Illinois began playing hard for a separate state meeting with their miners, hoping that a fracture between the Illinois miners and the international might develop into a schism and permit such negotiations. Then began a series of higgles and haggles on the part of President Farrington of the Illinois union district which ran all spring and summer and resulted in nothing. Far-

rington made vitriolic statements against Lewis but never quite broke away from Lewis' domination.

In the meantime developments all over the country were leading directly up to a general striks. Nine thousand union miners in the western Canadian fields declared they would strike April 1 if wage reductions were put into effect. The operators of the Kanawha field served notice on the union that if the men did not confer with them on wages for that region before March 11 the opportunity would be withdrawn and a lower wage scale would be announced for April 1. The miners refused on March 25 to make any kind of contract. So on March 29 a new scale showing a 30-per cent cut was anounced. In Colorado the miners and operators met March 4 for half an hour and made no progress. Immediately the operators announced a scale showing a cut of 30 to 50 per cent, effective April 1.

Secretary of Labor Davis on March 9 asked all Central Competitive Field operators to confer with the union even though they did nothing but review the situation. Not one goup changed position.

"Hopelessly Messed" Industry

The Federal Council of Chuches of Christ in America had a word to say on March 16, when it issued a public statement urging both miners and operators to confer. On the same day the American Federation of Labor declared the cause of the miners was just and that the "great labor movement" of the country would lend its "undivided and unswerving support." The miners of District No. 2 in Pennsylvania issued a public statement asking the people of the land to demand that the government investigate "the hopelessly messed coal industry." Attorney General Daugherty's statement of March 25 said that he had assured operators and miners that no action under the Sherman law would be instituted by the government against anybody who might confer by groups on a wage scale and working conditions. Representative Bland of Indiana introduced a bill March 23 providing for a commission of three to be appointed by the President to investigate and report on the coal industry with the idea of curing some of the ills of the existing situation by publicity.

On March 21, without waiting for the finish of the miners' referendum authorizing it and without waiting for end of anthracite negotiations, President Lewis of the miners declared a strike effectitve at midnight March 31. The strike was to include all union miners in the United States and Canada except Nova Scotia, where there remained a shred of hope, and western Kentucky.

The Indiana operators scale committee, in two efforts to get a conference with Indiana miner officials, were unsuccessful. The committee framed up a proposed scale with a wage reduction running from 30 to 40 per cent and without the check-off. This scale had a clause in it providing for alterations in wages during the contract. The miners would not look at it. Central Pennsylvania, southern Ohio and Pittsburgh operators all invited their men to confer separately in those fields. The miners refused in central Pennsylvania and southern Ohio regions and simply failed to appear at the scheduled Pittsburgh meeting, leaving the operators sitting there alone. The miners of the Kanawha-Fairmont field met the operators but refused to negotiate.

Thus the country came to April 1 and crossed the deadline into a strike that was destined to run four months and fifteen days. Only the non-union fields, western Kentucky, whose union contract held until April 1, 1923, and Colorado, which was changing to non-union, continued to operate. The very first week in West Virginia the Pocahontas, Tug River, Kenova-Thacker and Logan fields were unaffected. Winding Gulf worked 90 per cent and New River shut down. About a dozen Kanawha mines went on working at the 30 per cent reduced wage scale. Eighteen out of 264 mines in the Fairmont region began working "open shop" while 17,000 men struck. A scattering few mines in northern West Virginia operated. Operations continued in the Upper Potomac region under a 90 day agreement pending an adjustment. In Pennsylvania the mines worked almost full in Connellsville, Uniontown, Johnstown and Somerset County fields. Northeastern Kentucky and southwestern Virginia worked regularly and about half the mines of Tennessee that were working during March kept on. The union centered its pressure upon all those fields. In the non-union Connellsville region the union finally almost shut down the field. Various government efforts were made to get miners and operators of striking fields together in conference. First Representative Nolan, of the House Committee on Labor, tried it. His invitation to the operators got no results worthy of the name. During the early days of April and up to the 10th the committee held hearings at Washington on the situation. This gave both miners and operators a chance to air their cases.

But the Law May Not Be Broken

Because the operators persistently declared the government would not permit a four-state agreement, citing the indictments brought the year before against 225 miners and operators at Indianapolis, Attorney General Daugherty made his famous trip to that city to talk with Federal Judge Anderson. It was supposed he went there to get the indictments quashed. He stayed two days and went away without a word. The indictments were not quashed.

By the middle of April the strike had slipped from front pages of the newspapers into more obscure positions. To counteract union efforts at disorganizing West Virginia fields that were at work, operators got a series of anti-union injunctions issued by Judge McClintic in the District Court of the southern district of West Virginia.

Before April 15, Representative Bland, of Indiana, brought in a new government fact finding commission bill extending the provisions of his previous bill. Two commission plans were suggested April 21 at a dinner of the Survey Associates in New York, one by Dr. Harry A. Garfield, Federal Coal Administrator in 1919, and Philip Murray, vice-president of the United Mine Workers. Dr. Garfield revived his 1919 suggestion for a commission for anthracite and a separate commission for bituminous, each to be supplied with complete statistics on cost of living by government agencies. Mr. Murray declared congressional action should end the strike and that a permanent commission be created to gather facts and work out policies for the coal industry. He said the miners would go back to work if Congress guaranteed the 1920 award of the Bituminous Coal Commission.

Resolutions by various miner groups to be loyal to their employers and posting of guards at some of the mines brought about the first rioting in the Connellsville region April 29. A mob attacked Tower Hill No. 1 mine, in the center of a coke territory the union had been trying desperately to organize. Two state police were shot and several men clubbed. Even women made a demonstration against the non-union men working at the mine. The state police squelched all this trouble.

Kentucky Coal Prices Climb

Early in May the Bland fact-finding commission bill was reported by the House Committee on Labor with modifications. Prices of coal, especially in Kentucky, had made such upward climbs along with general demand, that by the middle of May Secretary Hoover actively began his program of control that put real restraint on most fields thereafter.

On June 5 the Supreme Court's decision on the Coronado case proved an interesting topic in strike talk. The court reversed a previous decision of the Circuit Court of Appeals, Eighth Circuit, and held that the Coronado Coal Co. of Arkansas could not collect $600,000 for property damages in a 1914 strike, plus $25,000 attorneys' fees plus $125,000 interest from the United Mine Workers of the Arkansas district because the evidence did not prove that the union organization as a whole conspired to restrain commerce in violation of law. However the decision was important in that it made clear that unions can be sued "for torts committed . . . in strikes." The coal company asked a reargument.

Early in June there were various signs of a trend toward the ending of the strike. P. T. Fagan and William Petry, vice-presidents of the union in Pennsylvania and West Virginia respectively, declared in speeches that the strike would end by July 1. A small group of Ohio operators called on Secretary Davis at Washington, presumably urging a plan for quick settlement. But no miners would meet operators in district negotiations and the defections among operators were not important up to that time.

During the latter part of May and early June the union's grip on Connellsville appeared to weaken and at least 5,000 miners in central Pennsylvania went back to work during the last two weeks of May. In the Kanawha field, union since 1912, one-third of the total number of miners were working by June 20 at reduced wages.

By this time union officials, encouraged by a few northeastern Ohio operators, were feeling out the country with the idea of having a four-state wage conference with those scattered operators willing to make a scale. But Illinois and Indiana, once willing to meet, declared the time for that had passed. They would not take part in any four-state conference.

Numerous small disturbances occurred over the country. Attacks had been made so frequently upon little strip pits working in Indiana that finally a gang gathered and prepared to destroy the Drake mine near Terre Haute. Mrs. William Drake, wife of the mine's owner, stood off a crowd of 300 one night with a shotgun. Workers were attacked in Brownsville, in the Connellsville field of Pennsylvania, and injunctions were issued against strikers in the Scott's Run field of West Virginia and Somerset County, Pennsylvania.

Trouble in Utah, which had been brewing for two months with an occasional outbreak, finally developed into a big gun fight in Carbon County, the shooting up of a train and other violence which caused Governor Mabey to put the county under martial law. State troops in the field got the situation pretty well in hand and production increased some. The Governor warned operators he would not permit kiting of prices. Troops remained in the field until after the general strike was settled.

Miners Massacre Twenty-one

The massacre at Herrin, Ill., June 22 roused the country by its brutality and put the strike back on the front page of every newspaper. The Southern Illinois Coal Co., with a strip mine six miles south of Herrin, in "bloody" Williamson County, broke an agreement with the union and tried shipping coal with non-union labor under guard. A mob unhampered by local law officers, besieged the mine, took the 48 occupants in surrender and then shot and cut 21 of them to death in a barbaric orgy. The day before, President Lewis of the United Mine Workers had telegraphed that the strip miners ought to be treated like any other strike breakers. Officials of the state were charged with dereliction of duty.

In view of the fact that Williamson County is solidly union in its sentiments not an arrest was made for weeks. A coroner's jury blamed the coal company for the deaths and held nobody. Fear was in the hearts of the populace. But a special grand jury in September and October returned 416 indictments involving 72 men, charging murder, conspiracy to murder and like crimes. Most of the indicted men were rounded up at once. Many of them were union members and officials. The Illinois miners' union defended them and by a special assessment of 1 per cent of every Illinois miners' earnings beginning Oct. 1, a defence fund was raised. The state had no funds for such a special prosecution, so the Illinois Chamber of Commerce raised approximately $50,000.

The trials started in December after two months of difficult choosing of jurors. When the twelve men were finally seated in the jury box many of them were union miners and admitted contributors to the defense fund, which prompted observers to prophesy that no convictions could be obtained from such a jury. The state's case in the first trial—that for the murder of Howard Hoffman, one of the employees of the strip mine and one of the six tied by the neck in the Herrin cemetery—was in by Dec. 20 and the defense had put on a few witnesses when the court adjourned over the Christmas holidays, thus ending the case until the new year.

During late June the strike wore on apace. President Lewis, of the miners, conferred in Washington June 26 with the President and Secretary Davis, but no official announcement of results was published.

By July 1 the country's stocks had dropped to 20,000,000 tons of bituminous and no anthracite, and the consumption was estimated at 30,000,000 tons per month while production during June ran only a little over 20,000,000 tons. The United States Chamber of Commerce issued a warning that a coal famine was immediately ahead. All sorts of resolutions were introduced into Congress at Washington urging federal action to end the strike. Disturbances in western Indiana kept many small mines closed. The union established commissaries.

The first White House general conference of miners and operators started on Saturday, July 1, at the call of the President. Mr. Harding opening the conference by pointing out the seriousness of the situation from the standpoint of the American people and urging the two sides to come to an agreement. The conference remained in session all day Sunday. On Monday the session had accomplished nothing except that the operators proposed a redistricting of the country and district settlement by district arbitration boards to be appointed by the President. Disputes unsettled by July 15 would go to a national arbitration board. This the miners rejected and the session adjourned until July 10, the operators making it plain that if the miners did not agree to something by that time mines would be opened in various states for a test of industrial strength.

Orders a Return to Work

At the start of the July 10 meeting the President, perceiving that the conference was deadlocked, flatly proposed that the mines be reopened and the men go back to work, the old scale to be in effect until Aug. 10 pending the making of a new scale by that date by a commission of three operators, three miners and five representing the public, whose findings should hold until March 31, 1923. Anthracite operators, bituminous operators and miners each retired and considered the proposal all day.

It was freely said among operators that the President had called his conference at a most unfortunate time, for the miners had been practically beaten to the point of surrender.

The President, recognizing that both operators and miners were trembling on the verge of refusal, issued on July 15 a letter explaining his proposal further. This made no modification of the plan but appeared to indicate that a settlement on the old Central Competitive Field Basis was desirable and that the check-off should be continued.

The miners refused finally. The operators, after most vitriolic sessions among themselves, made a general reply, agreeing with the President upon the general principle of arbitration but permitting each group of operators to reply for itself. Most of the country in these separate replies accepted the President's plan, but Indiana and the unionized fields of Pennsylvania refused.

His efforts to settle the strike having failed, President Harding in disappointment on July 17 said to the operators: "I invite you to return to your mining properties and resume operations," a statement which caused a good deal of speculation as to its exact intent.

Order Is Promised at Last

The President wired twenty-eight governors to protect such operations as might resume. All but Governor Ritchie of Maryland and Governor Morrison of North Carolina replied favorably. Few if any operations started, however. The Governor of Michigan threatened to open a few mines to be run by the state. The union "would not permit it." Governor McCray of Indiana took over a poorly equipped stripping operation, surrounded it with a heavy guard and tried digging coal with little success. The little coal shipped to state institutions was said to have cost the state $20 a ton.

The most serious outbreak in a mining field except the Herrin massacre was an attack made July 17 by 300 men on the Richmond Mining Co.'s Clifton mine, near Cliftonville, W. Va., in which Sheriff Duval and five non-union men were killed. Weeks later 218 were indicted for this, 71 for first-degree murder. More West Virginia injunctions against interference with miners were issued at various towns. In Indiana masked and hooded Ku Kluxers beat up men at work.

During the first weeks of July President Harding was urged from various sources to have a coal investigation commission set up. A. M. Ogle, president of the National Coal Association, wired July 23 asking that a non-partisan board be put to work at once gathering facts.

By this time prices of certain coals, especially those of western Kentucky, where operators had refused to

abide by Hoover prices, had hiked skyward. Western Kentucky mine-run began leaping upward as much as $1 a day to $12 a ton and the market was demoralizing. Then the government's plan for controlling car supply under the direction of Secretary Hoover and the Interstate Commerce Commission went into effect.

By July 20 acts of violence had become so frequent in parts of Pennsylvania that Governor Sproul sent state troops into Washington, Westmoreland, Cambria, Indiana and Somerset Counties. In West Virginia the state authorities said they had unearthed a plot for a campaign of frightfulness against non-union miners following the attack on the Cliftonville mine. A train of miners was dynamited in Boone County.

About Aug. 1 strike developments began to take a definite turn. In Illinois, Frank Farrington, state president, first agreed to revive the question of state negotiation and called a state union convention to authorize it. Then he suddenly called it off and hurried to Philadelphia for the conference which President Lewis called with all his district presidents. While miners were returning to work in larger numbers in central Pennsylvania, the troop-guarded Pittsburgh region improved not at all.

President Lewis called a meeting to be held in Cleveland Aug. 7 of miners' representatives and operators of the old four-state field, evidently feeling that enough operators were ready to sign the dotted line so that such a conference could be held. When Lewis' invitation to this meeting went out the operators of Illinois held a meeting Aug. 4 proposing to President Farrington that the 92,000 miners of that state go back to work at the old scale pending arbitration, which was almost exactly the proposal of President Harding to the operators of the country. Farrington replied he could do nothing until after the Cleveland meeting.

All Invited but Few Came

So many groups of operators declined to go to Cleveland that the conference merely marked time for the first several days. Illinois, Indiana, Pittsburgh and southern Ohio all stayed away as the conference began. At the first session on Monday, Aug. 7, about 30 per cent of the four-state tonnage was represented and scattering operators from other fields. The Pittsburgh Vein Operators Association of Ohio was there, however, and Michael Gallagher, president of the association, was made chairman of the conference.

Even as the conference was making its inauspicious start a new element popped up. It was the Crews-Glasgow plan of settlement, worked out at Pittsburgh by Ralph Crews and W. A. Glasgow, attorneys for interests on both sides. The conference was adjourned in Cleveland for two days to give this plan a whirl, in the hope that more operators would be drawn in by its aid. Mr. Lewis was announcing day by day that he would not deal with a minority of Central Competitive Field tonnage but that more was surely coming in.

All that week Lewis held a skeleton of a four-state conference together in Cleveland while vigorous efforts were made to draw in more tonnage. Illinois and Indiana refused unless arbitration of the next wage scale was agreed to by the miners. They refused. This drove such northeastern Ohio interests out of the conference as Michael Gallagher and S. H. Robbins. A letter from President Harding supported the demand for arbitration.

Immediately a new conference was organized by the acceptance of representatives from central Pennsylvania, an outlying district, and other regions. The union was willing by that time to consider an adaptation of the Crews-Glasgow plan as worked out by T. H. Watkins who had been urging it from outside the conference for days. It provided for compulsory investigation and a fact-finding commission but not compulsory arbitration, which Mr. Watkins inveighed against. Thus the union abandoned its announced determination to deal only with the Central Competitive Field. Although all operators outside that field had been ejected from the conference the Thursday previous, on Monday, Aug. 14, they were taken in and the conference went into its final stage.

By evening of Tuesday, Aug. 15, the strike was broken. The contract negotiated provided that all signatories should resume mining at the old scale and conditions to March 31, 1923, as soon as they signed supplementary contracts. The other points in the agreement were:

(1) Participants of the conference agreed to send delegates to a Cleveland meeting Oct. 2 to appoint a commission of operators and miners to devise a method for future negotiations, to be reported back to the main conference Jan. 3, 1923.

(2) The Oct. 2 conference was to select a fact-finding committee.

(3) The conference participants agreed to meet Jan. 3 in conference to finally determine the method of future negotiations and to see that such negotiations were started by Jan. 8.

Come and Sign One by One

The signatories of this agreement at Cleveland were from scattered mining regions. Important ones in the central Pennsylvania field were Mr. Watkins' Pennsylvania Coal & Coke Corporation, the Clearfield Bituminous Coal Corporation and the Allegheny River Mining Co. These with several smaller operations signed up at once and went to work while 200 other operators in the same field held off for several days before they surrendered. The Southern Ohio Coal Exchange left the matter to its individual members to do as they liked. Eventually they all signed. In northern West Virginia the Consolidation Coal Co. and 50 others lined up on Aug. 17 while the remainder held out for a while. Many mines stayed on an open-shop basis. Georges Creek operators met Aug. 18 and refused to recognize the union. Connellsville operators also refused. The Pittsburgh operators held out defiantly after most of the country was working but capitulated Aug. 29. The following day the Pittsburgh Coal Co., acting independently, also signed.

After days of deliberation with President Farrington of that state, Illinois finally signed on Aug. 22, but would not agree to attend the Oct. 2 conference or make any other promises for the future except to resume mining at the old scale until March 31, 1923. Indiana deliberated awhile also, in an effort to find some way to avoid swallowing the union's entire dose, ending up by signing but not "approving" the Cleveland agreement. The Southwest followed on Aug. 23. On Aug. 28 British Columbia and Alberta made the Cleveland settlement but western Canada had to accept a 15-per cent wage cut.

Thus the bituminous coal strike ended in almost complete victory for the miners' union. The union maintained the existing wages and working conditions, the apparent dissolution of the Central Competitive Field was not necessarily final and the union had staved off wage arbitration.

Always Ready to Try Again

The Nova Scotia dispute, mainly between the British Empire Steel Corporation and its coal miners, which ran from Jan. 1 on, was not settled until two wage commissions had made their findings and an upheaval had taken place within the union of the Nova Scotia district. A board of conciliation headed by U. E. Gillen recommended a wage cut running from 12½ to 20 per cent in February. The union rejected this but some men went to work under the award. District Secretary-Treasurer J. B. MacLachlan advised them to "soldier" on their jobs. Chairman Gillen and another member of the conciliation board resigned and a new board took up the case, with D'Arcy Scott as chairman. On May 5 this board recommended a 20-per cent wage reduction. The miner minority, however, recommended an increase of 60 cents a day to $3.45. The district convention of miners refused to accept the majority recommendation though President Baxter of the district approved it. Baxter was charged by MacLachlan with "selling out" the union. He charged MacLachlan with bolshevism.

In August the men of the whole district struck. The companies offered an increase from $2.85 to $3.25 and a 10-per cent increase in contract rates, which the union demanded be increased 20 per cent. On Aug. 25 the companies finally raised the contract offer to 12½-per cent increase and the strike ended in some mines. Meantime, President Baxter had been beaten in a district union election by Dan Livingstone, who lives outside the district, and the radical element gained complete control of the district organization. On Sept. 18 the district settled complete with all operators on the $3.25 scale.

Immediately upon the settlement of

the strike in the United States upon the Cleveland basis, the Pocahontas Operators' Association advanced wages in their territory to the 1920 scale, thus putting the whole of southern West Virginia back on a war-time wage basis. It was estimated that the union had lost 25,000 members in West Virginia during the summer. In the Kanawha, Georges Creek and Upper Potomac regions the anti-union basis of employment was maintained in spite of violence and intimidation, which was held partly in restraint by injunctions.

On Sept 22 the government's fact-finding commission bill passed, so that when Oct. 2 rolled around and the second Cleveland conference of operators and miners started the plan for setting up a miner-operator fact-finding board was practically stalled.

"Peace" was the keynote of the Oct. 2 conference. In spite of previous refusals to agree to attend, operator groups from fifteen mining districts, covering practically all union bituminous territory, were there. The first day there was much violent disagreement between operator groups, especially against such leaders as T. K. Maher, Thomas H. Watkins and W. H. Haskins, who were credited with making the Aug. 15 settlement with the union possible. A peace address by President Lewis, of the miners, delivered in joint session appeared to have a soothing effect. He appealed to both sides to "bury the hatchet" in the interest of the industry and all concerned with it, indicating an astonishingly friendly spirit on the part of the union.

Although Mr. Maher was chairman of the original Cleveland conference, Phil, H. Penna, of Indiana, was made permanent chairman of the second one. Mr. Haskins, in an early meeting of the operators at the conference, made a fiery speech, declaring the "little group" which broke the strike on Aug. 15 intended to stand by the Cleveland agreement even if no other operators did, but when it became evident among the operators that the meeting was not going to be dominated by a "small minority," they all went into it and in three days the business was done.

Action of Conference

The conference did these five things:

(1) Created a "reorganization committee" of two miners and two operators from each of the fifteen mining districts represented.

(2) Instructed this committee to work out a method for future wage negotiations which may or may not be adopted.

(3) Instructed the committee to begin work in Chicago Nov. 14 and report to the whole conference Jan. 3, 1923.

(4) Did not set up a fact-finding commission but deferred to that of the government.

(5) Operators declined to comply with a request from Washington for a panel of twenty names suggested by the joint conference as possible members of the government fact-finding commission. The miners, however, suggested ten.

Before the conference ended the miners' scale committee announced that it would demand the platform laid down by the union convention of Feb. 14, that is, maintenance of the present scale of wages and insistence upon the adoption of a five-day week, a six-hour day, time and a half for overtime, double time for Sundays, and some other contract changes. This was regarded by the operators as not exactly bearing out the peaceful position taken by President Lewis when the conference opened.

On Oct. 7 martial law was lifted in Mingo County, West Virginia, after fifteen months. It had been established June 27, 1921, when war between union and non-union miners had grown so violent as to require federal troops. Late in October the union gave up the fight to get ousted union men back into the mines and moved them away.

"Outliers" Want Voice

When the "reorganization committee" selected at the Cleveland conference met in Chicago, Nov. 14, a battle was started at once by the outlying districts trying to win a voice in whatever method of wage negotiations the committee might recommend to the main conference. Both H. N. Taylor, of Kansas City, and C. H. Jenkins, of Fairmont, W. Va., proposed plans for making a national wage scale from which variations could be arranged by districts. Also national arbitration was proposed in various forms. The operators' half of the committee could not agree upon anything and the union would not entertain any arbitration suggestion. So the first session of the committee accomplished nothing and adjourned after four days of it, to reconvene Dec. 6.

When the operators' half of the committee assembled two days before the whole conference, it failed to agree upon the four-state plan which was expected to be adopted. Instead it worked out a proposal for district settlements, with a sliding scale of wages and arbitration by either a non-partisan board to be appointed by the President of the United States or a board made up of miners, operators and public representatives. The union would have none of this, so the committee adjourned a second time. It expected to meet for a final word an hour before the main joint conference assembled in Chicago Jan. 3, in the hope that something might happen in the meantime to make it possible for the committee to report something better than complete and absolute failure to agree upon any future method of negotiation.

On Dec. 13 the United Mine Workers essayed a stir by inviting the United States Coal Commission to probe conditions in Logan County, West Virginia.

Although there were many who would have liked to see the United States Coal Commission mediate in the coal industry's wage tangle, the commission made it plain late in December that it did not expect to overstep its fact-finding limitations. Thus the industry entered the year 1923 with no definite plan for putting its own house in order and for avoiding another strike.

Bituminous Coal Production, Mine Price and Index, by Weeks, 1921-22

Week Ended	1921 Production (Net Tons)	1921 Average Mine Price	1921 Coal Age Index	1922 Production (Net Tons)	1922 Average Mine Price	1922 Coal Age Index
Jan. 7	9,633,000			7,476,000	$2.29	189
Jan. 14	9,936,000			8,302,000	2.29	190
Jan. 21	9,184,000	$3.26	270	8,782,000	2.22	183
Jan. 28	8,570,000			9,620,000	2.21	182
Feb. 4	8,132,000			9,714,000	2.21	182
Feb. 11	7,859,000			10,309,000	2.22	183
Feb. 18	7,489,000	2.77	229	10,285,000	2.20	182
Feb. 25	7,432,000			10,402,000	2.18	180
Mar. 4	7,278,000			10,541,000	2.17	179
Mar. 11	6,900,000			11,102,000	2.16	178
Mar. 18	6,512,000	2.63	217	10,843,000	2.10	173
Mar. 25	6,457,000			11,448,000	2.05	170
April 1	5,822,000			10,469,000	2.06	171
April 8	6,120,000			3,835,000	2.19	181
April 15	6,528,000	2.62	217	3,656,000	2.23	184
April 22	6,815,000			3,575,000	2.49	206
April 29	6,984,000			4,175,000	2.67	221
May 6	7,391,000			4,164,000	2.78	230
May 13	8,009,000			4,433,000	3.16	261
May 20	7,989,000	2.68	222	4,481,000	3.67	303
May 27	8,166,000			4,889,000	3.25	269
June 3	6,835,000			4,616,000	3.08	255
June 10	8,010,000			5,136,000	3.44	284
June 17	7,551,000	2.52	208	5,013,000	3.31	274
June 24	7,704,000			5,363,000	3.44	284
July 1	7,658,000			5,226,000	3.51	290
July 8	6,165,000			3,678,000	3.64	301
July 15	7,401,000			4,123,000	3.89	321
July 22	7,380,000	2.40	198	3,692,000	5.57	460
July 29	7,319,000			3,952,000	6.73	556
Aug. 5	7,186,000			4,313,000	6.18	511
Aug. 12	7,771,000			4,606,000	6.66	550
Aug. 19	7,708,000	2.42	200	4,609,000	6.41	530
Aug. 26	7,753,000			6,736,000	5.29	437
Sept. 2	7,606,000			9,359,000	5.08	420
Sept. 9	7,083,000			8,791,000	5.17	427
Sept. 16	8,187,000			9,737,000	4.99	412
Sept. 23	8,527,000	2.37	196	9,747,000	5.06	418
Sept. 30	8,890,000			9,822,000	4.89	404
Oct. 7	9,134,000			9,736,000	4.60	380
Oct. 14	9,711,000			10,110,000	4.45	368
Oct. 21	11,049,000	2.33	193	10,378,000	4.26	352
Oct. 28	10,956,000			10,683,000	4.19	346
Nov. 4	9,327,000			10,666,000	4.16	344
Nov. 11	8,592,000			10,147,000	4.12	340
Nov. 18	8,871,000	2.35	194	11,215,000	4.15	343
Nov. 25	7,101,000			11,100,000	3.99	330
Dec. 2	7,105,000			10,387,000	3.95	326
Dec. 9	7,312,000			11,495,000	3.93	325
Dec. 16	7,063,000	2.26	187	10,666,000	4.07	336
Dec. 23	7,450,000			10,031,000	4.23	349
Dec. 30	.....			.....	4.47	369

Northwest Is Saved from Suffering When Uncle Sam Strikes Great Lakes Shipping Into Action

Coal Distribution System Demolishes Obstacles and Delivers Four-Fifths Normal Supply of Bituminous in Spite of "Impossibilities"—Region Gets Only One-Third Enough Anthracite by Lake Route, However

"THE heroic rescue of the Northwest" might well be the title of the story of coal shipping on the Great Lakes in 1922. The history of the season is a tale of obstacles choking off the stream of fuel for the states about the upper Lakes, of how that great region called to the government of the United States to give it coal, and of how the Hoover coal administration hacked a way through the obstacles and delivered the coal. In spite of a miners' strike which shut every mine through half the season of navigation, in spite of a railroad strike which hamstrung roads that should have dumped non-union Lake coal all summer, in spite of political and commercial opposition, and, finally, in spite of a Lake seamen's strike at the height of an autumn burst of vessel transportation, still the Lakes got 18,522,142 tons of soft coal, which is but 3,866,213 tons short of the record 1920 total of 22,408,355 tons of cargo coal. It is true the Northwest got less than a third of its normal Lake supply of anthracite—the total dumped at Lake Erie ports being only 1,070,680 tons, which is far short of the 3,810,315 tons of 1921—but it was supplied with its fuel necessities. The luxuries it may get by rail.

Year Opened with Big Stocks

Docks were piled high and 500,000 tons in winter cargoes lay alongside when 1922 opened. At first there was a shiver of uncertainty among dock men because the volume on hand was so mountainous. Cold weather of February boosted prices an average of 50c. a ton on bituminous, and demand became so keen that the apprehension was removed. The certainty of a strike April 1 made the carry-over of 3,500,000 tons of soft coal and 416,000 tons of anthracite at Duluth-Superior and other large stocks at Milwaukee seem only a comfortably large amount. The Northwest at once assumed an air of confidence because of these huge piles and at first refused to worry about the strike in its early weeks. This very confidence later led to the shipment of a good deal of coal from the Head-on-the-Lakes docks back along the other lake ports. From Duluth-Superior alone 229,000 tons was shipped out at various times.

The first Lake vessels ventured out of lower Lake ports April 11, opening the season. Dumpings were a little above 200,000 tons a week at the start. This was a great improvement over 1920 and 70 per cent of 1921. The first week of May saw an improvement to 250,000 tons, most of which went to lower ports, as the upper region was so full of coal. The week of May 22, the dumpings passed 300,000 tons for the first time, but the demand from Buffalo steel and coke plants was losing much of its insistence and the last week in May dumpings fell off to 250,000 tons again. By June 1 the total Lake movement up to that date was just under 2,000,000 tons, as compared with a little over 5,000,000 tons up to that date the year before. In other words, Lake shipping was only two-fifths of normal.

During June the Lake Superior Northwest awoke to the fact that its mountainous dock stocks were dwindling fast—shipments off the docks had started at the rate of 9,000 cars for April, which was a little above the average, and had accelerated more swiftly than the general public realized, for industrial consumers were buying—so Northwest inquiry for coal began to come in heavily. Only 247,000 tons was shipped through the "Soo" canals to Lake Superior ports during June and this dropped in July to 172,000, which was enough to send a fright through the whole region, as the railroad freight rate decrease on July 1 had not produced the flow of coal expected. Instead, July 1 had brought an increase of 50c. a ton on most coals at the Head-of-the-Lakes, which offset any benefit from the 35c. freight cut.

BITUMINOUS CARGO COAL LOADED INTO VESSELS AT LAKE ERIE PORTS
(Net Tons)

	1920	1921	1922
Season to Apr. 30	301,572	1,242,772	802,641
May	1,195,732	3,559,895	1,303,281
June	2,069,546	4,658,309	1,474,634
July	2,686,888	3,554,686	755,437
August	4,408,788	2,932,101	825,225
September	3,941,867	2,200,473	4,396,284
October	4,486,434	2,722,633	4,600,427
November	3,060,724	1,474,114	3,856,161
December	256,804	67,397	508,052
Totals	22,408,355	22,412,380	18,522,142

June dumpings had been more or less encouraging. They had totaled 3,712,000 tons, which was within 200,000 tons of June, 1920, though 600,000 tons short of 1921—a year in which Lake shipping had started off at a pace much faster than usual. The month of June had shown an advance of 1,540,000 tons over May, and there was hope of increasing the flow of non-union coal to Lake Erie. But just then the rail strike cut in. Rail congestion at junctions all the way from the coal fields to the Lakes, and stronger industrial demand growing up in other parts of the country to divert coal from the Lakes combined to drop dumpings toward the very bottom.

Panicky feelings began to keep the Upper Lake territory awake nights. Demand everywhere in the country was strengthening, prices were getting out of hand and had crossed the Hoover deadline on their way up, and the Head-of-the-Lakes commercial supplies were less than 550,000 tons of bituminous and 250,000 tons of fine anthracite. Total receipts for the year to July 1 at Duluth-Superior had been but 288,000 tons, as compared with over 4,000,000 tons up to that date in 1921.

July dumpings at Lake Erie ports slid down. Approximately 140,000 tons "went over" during the week ended the 24th with disastrous effect upon the Northwest. Bunker fuel scarcity forced cutting of ship schedules. Vessel receipts on Lakes Superior and Michigan by Aug. 1 totaled a trifling 2,866,742 tons, which was only 11 per cent of the requirements of the ports around those lakes. In 1921 the same ports had received by Aug. 1 a total of 21,677,513 tons. Up to Aug. 1 in the years 1917 to 1919 the average had been 26,130,000 tons.

The Northwest began to get desperate. It lifted up its voice in loud and mournful wailing with a distinct note of hysteria predominating at times. The government's fuel distribution system was set up just then with Henry B. Spencer as Fuel Distributor. The Northwest rushed at him almost before he had had time to get to his office the first morning. Some effect of previous pleading was noticeable in Service Order 23, issued July 25 by the Interstate Commerce Commission setting forth coal priorities for shipment. Class 1 was "for such special purposes as may, from time to time, be designated by the Commission." The Northwest did its best to get into Class I but landed in Class 3: "(As to each coal-loading carrier which reaches mines in Pennsylvania, Ohio, West Virginia, Kentucky, Tennessee, and Alabama)—For bituminous coal consigned to any Lake Erie port for transshipment by water to ports upon Lake Superior."

Washington authorities made a Northwest survey and announced it was still possible to supply that region before the end of the lake season with coal barely sufficient to meet its minimum needs, provided shipments started by Sept. 1. Early in August it was arranged that cars for contract shipments to upper Lake ports should be supplied and that the shipments should be through the agency of the Ore & Coal Exchange at Cleveland. However, Lake dumpings the first week in August dropped to the "new low" of barely 92,747 tons. This was the absolute bottom. A steady improvement followed. The Fuel Distributor agreed

tentatively that henceforth at least 250,000 tons a week should be supplied for the upper Lakes alone if it could be obtained.

The settlement of the strike Aug. 15 at Cleveland, and the reopening of a large number of mines in Ohio the day after, had a noticeable effect on Lake dumpings as early as the week of Aug. 21, when the total climbed to 162,000 tons, of which 28,000 tons was bunker fuel. Lake shipping was behind about 10,000,000 tons by that date and peculiar distribution giving Lake Erie ports about eight times as much as 1920 and Lake Superior ports only 16.5 per cent of the total instead of the 36.5 per cent they got in 1920 and 51.4 per cent in 1921 made Lake Superior's plight striking. Lake Michigan ports up to that time had obtained 41.3 per cent of the season's dumpings, as compared with 23.5 per cent two years before. From July 1 to Aug. 1 stocks of bituminous coal at Duluth, Superior, Ashland and Washburn, on Lake Superior, had dropped from 1,498,000 tons to 661,000 tons and anthracite from 364,000 to 170,000 tons.

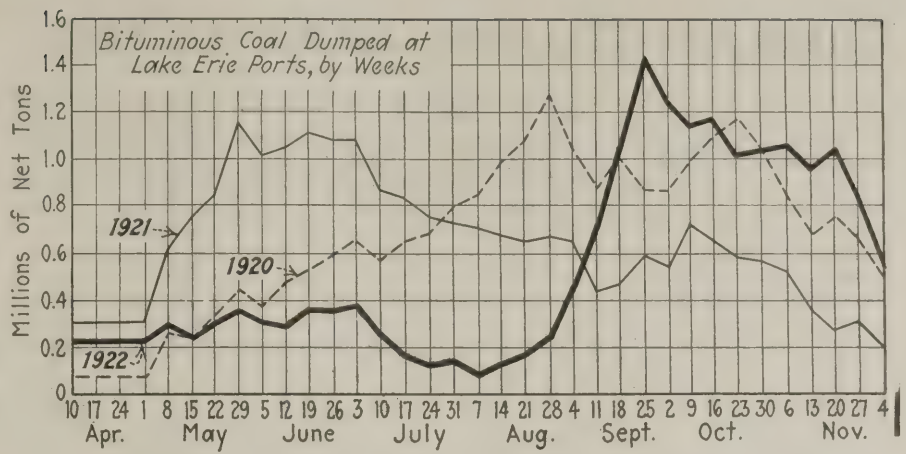
In view of all this the Fuel Distributor directed that on Monday, Wednesday and Saturday of the last week in August all coal loaded in the Kenova-Thacker, Logan and Kanawha fields on the C. & O. and in the Big Sandy, Elkhorn, Hazard and Harlan fields should go to the Lakes. The week's total dumpings went up to 258,898 tons, which was the first time the promised 250,000 tons had been delivered. The succeeding week the total reached 340,000 tons.

Priority Given to Lake Shipments

In order to improve the Lake situation further Lake shipments were put in priority Class 1. A pool was formed as during the war in the effort to get coal moved more quickly. Regardless of the complaint of poor quality which later arose in the Northwest over coal handled through this pool, shipments did increase, though Northwest dock reserves got down to 303,000 tons of bituminous and 92,000 tons of hard coal.

By Sept. 1 distribution of Lake cargo coal loaded at Lake Erie ports began to assume more normal proportions, even though totals were pitifully small. By that date loads for Lake Superior ports totaled 5,025,210 net tons, or 47.13 per cent of the Lake total to date. The total for those ports the year before to Sept. 1 was 9,486,736 tons. The grand total for the Lake ports to Sept. 1 was 10,662,526 tons, as compared with 15,840,744 tons the year before and 5,161,218 tons in 1920.

On Sept. 22 President Harding signed the Coal Distribution Act and soon thereafter Conrad E. Spens took office as Federal Fuel Distributor with Donald Conn, of Minneapolis, Minn.; C. P. White, of St. Paul, Minn., both Lake coal specialists, and H. M. Griggs, of the Ore & Coal Exchange, on his staff of assistants. Hope was expressed that 15,000,000 tons could be moved up the Lakes before the end of the season.



Lake Erie dumpings boomed upward during September with a high mark of 1,453,684 tons the week ended Sept. 24. This was a record week in the history of Lake shipping. At last Lake traffic was going full blast. But the fast gait could not be maintained. The very next week dumpings dropped to 1,241,086 tons.

Bituminous dumpings all through October were maintained above the million ton mark by main strength and government assistance, in spite of the Lake season's strike Oct. 1. Public utilities were asked not to stock any until the Lake season had closed. By Nov. 5 the bituminous movement for the season had been 15,577,786 tons. In the same period of 1921 the total was 21,972,375 tons. The last week in November saw dumpings slumping. In that week 812,117 tons was loaded at Lake Erie ports. An extension of the season was announced, mainly to permit more anthracite to get through. The "Soo" canals were kept open until Dec. 20, though there was little shipping of coal after Dec. 15. Duluth's season ended four days before that.

During the week of Dec. 11 dumpings totaled 288,869 tons, which was high for that time of year. This brought the season's total dumpings to a point a little in excess of 18,500,000 tons, which was approximately 4,000,000 tons behind the 1921 mark.

The anthracite mines began producing Sept. 12 and a little anthracite soon after appeared at Buffalo for shipment. This did not amount to much until October, however. In that month 267,744 tons went through the "Soo" canals for Lake Superior ports. In November the canals passed 281,746 tons and in December 97,000 tons, making the 1922 anthracite total for that lake, 670,447 tons. The total anthracite Lake dumpings during the week ended Oct. 23 were 153,553 tons, but they decreased during the next few weeks to less than 100,000 tons per week, only to spurt upward the middle of November to a high week of 151,000 tons and then down again. The December total to the close of navigation Dec. 15 at Buffalo was only 123,600 tons and the season total dumped there, 1,070,680 tons as compared with a 1921 total of 3,810,315 tons.

The Northwest, with only one-third of the usual anthracite receipts by Lake, was left to patch out its winter supply of anthracite by rail if it could. Milwaukee got only 314,253 tons of anthracite by vessel all season, which was 709,392 tons short of the 1,023,645 tons it got the year before. The Head-of-the-Lakes got 544,487 tons instead of 1,844,642 as in 1921. Practically all of this dock coal went to dealers as soon as it was received, so that the Lake supply sank out of sight quickly after the last boat had unloaded and it was estimated the last of it would be in householders' hands by Feb. 1, leaving no carry-over whatever for the spring of 1923.

Even though the superhuman efforts of the government and shippers toward the end of the navigation season brought the Northwest's total up within sight of the total of 1921, and it seemed that the upper Lake states certainly should feel no need for soft coal, yet it was estimated that only 700,000 tons were "free" on the Duluth-Superior docks, though the total on the docks was 2.765,924 tons compared with 5.663,477 tons as the end of the previous season. While Duluth docks contained 145,092 tons of hard coal when the last ship had unloaded, every ton of it was sold. In 1921 the carry-over there was 416,000 tons of anthracite and 3,500,000 tons of bituminous.

The Duluth total receipts for the season were 5,705,296 tons. The average for the past five years had been 10,104,828 tons there. Thus the Head-of-the-Lakes got half enough coal. Milwaukee got a better proportion. Its Lake total for 1922 was 2,330,507 tons of soft coal, which was only 243,867 tons short of 1921, but it got only 314,253 tons of anthracite, which was 709,392 tons short. The season total which passed through the "Soo" canals was 8,790,571 tons of soft and 670,447 tons of hard coal as compared with totals of 12.507,027 tons and 2,256,128 tons in 1921.

Following are revised figures giving the receipts of coal from all sources at Milwaukee during the year 1922:

Received by	Anthracite Tons	Bituminous Tons	Total Tons
Cargo vessel	360,070	2,331,407	2,691,477
Car ferry	108,620	272,664	381,284
Rail	879	428,805	429,684
Total, 1922	469,569	3,032,876	3,502,445
Total, 1921	1,168,625	3,623,086	4,791,711
Decrease	699,056	590,210	1,289,266

Tidewater Business Suffered Severe Shrinkage in 1922

Dumpings Into Vessels Drop 25 Per Cent from 1921 and Nearly 50 Per Cent from 1920—Exports Make Woeful Showing—Imports Increase Notably

By J. S. Burrows*

TWENTY-EIGHT million net tons of bituminous coal were dumped into vessels at the principal Atlantic ports in 1922. This comparatively small volume of tonnage represents but 75 per cent of the coal dumped in 1921 and slightly more than half of the peak tonnage of 1920, when our export business was so large. While the miners' and shopmen's strikes deserve first consideration as the cause of the loss of tonnage during the past year, actually had our export business and its attendant bunker requirements been as good in 1922 as in the previous year, there would not be the 25 per cent deficit in dumping which the figures reveal and in all probability 1922 would have been a better year than 1921, nothwithstanding the strikes.

In view of the curtailed production it might be imagined that there was not sufficient coal to export in 1922, which, however, is not the fact, for, bearing in mind that the bulk of our export business moves through Hampton Roads ports, which are served by non-union mines, there was coal available for export up to the last quarter of the year and a large surplus of tonnage during the first half.

Tidewater export business in the past year makes a miserable showing of 1,500,000 tons as compared with 9,600,000 tons in 1921 and over 21,000,000 tons in 1920. It is on account of this great disparity in the export division of the year's statistics that the entire subject is approached from the export angle rather than from the losses due to the great strikes.

Because of the strikes, however, the United States became a considerable importer of coals in the last half of the year, so that when a balance is struck between the quantity of coal that was exported overseas from the Atlantic seaboard and the quantity of coal that was imported from overseas at Atlantic ports an excess of several million tons of imported coal will be found. This was the second great factor in the Tidewater business of 1922. When, during the strike period, scarcity of coal enhanced prices to about $7.50 at Hampton Roads, British shippers were able to deliver cargoes of Welsh coal alongside New England wharves and in New York harbor at about the price on cars at Hampton Roads, thereby saving to buyers the cost of freighting from Hampton Roads to port of delivery. In most cases the British coal could be bought at from a dollar to a dollar and a quarter under the price of American coal.

No better illustration than this importation of British coal could be found to explain why our export business languished during the past year. Owing to the high cost of production and resulting high prices for American coal, plus our inability to maintain a competing merchant marine, the foreign buyer of coal has been going to England instead of the United States for his supplies. Nor has Great Britain lacked sufficient coal to meet this world-wide demand. Her coal industry, on which she is vitally dependent as a merchant nation, has made a most remarkable recovery despite the dire predictions of a year or so ago. While we shipped last year 1,500,000 tons of export coal, Great Britain exported nearly 65,000,000 tons, which is within 10 per cent of equaling her record pre-war year. This also shows that there has been a considerable market for coal abroad in which the United States has not been able to compete.

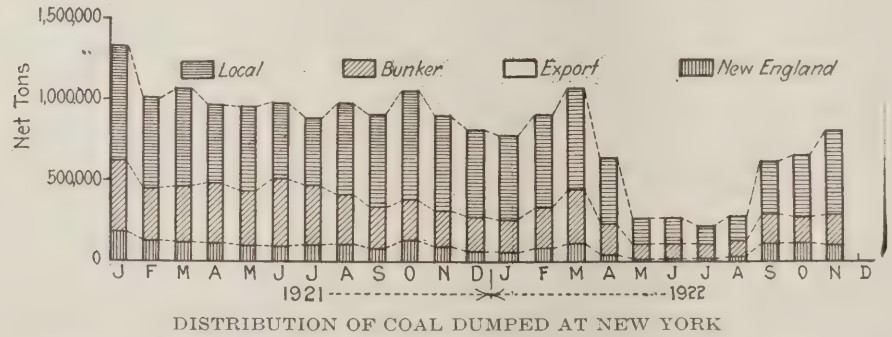
The loss of export business and the bringing of British coal to our shores are the outstanding features of the Tidewater business of 1922. The other divisions of Tidewater tonnage were affected largely by strike conditions.

Bunker business was nearly cut in half, less than 4,500,000 tons being supplied. This business increases or decreases with export trade but the great-

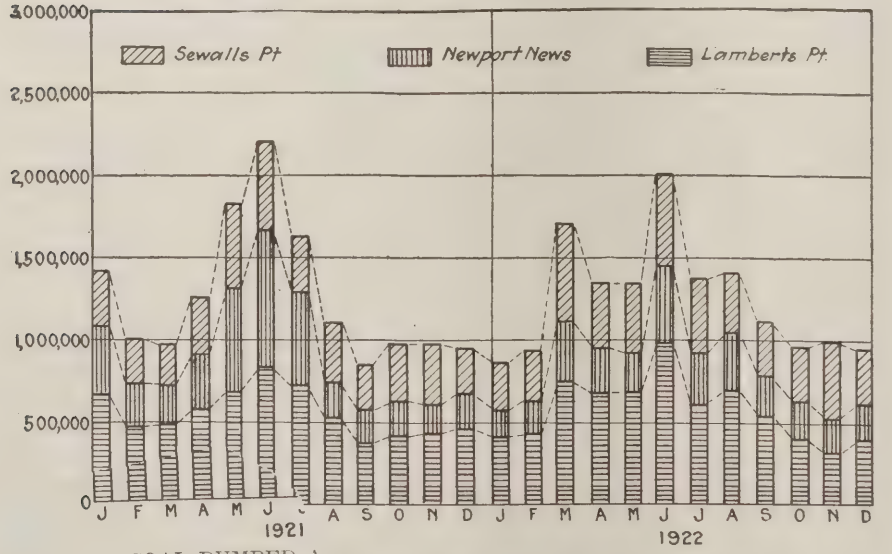
*Of Castner, Curran & Bullitt, Inc., New York City.

COAL DUMPED AT HAMPTON ROADS, BY MONTHS AND PIERS, 1922
(In Gross Tons)

Months	Lamberts Pt.	Newport News	Sewalls Point	Totals
January	423,196	163,049	281,454	867,699
February	443,933	214,669	284,012	942,614
March	753,429	369,645	591,863	1,714,937
April	689,345	268,095	387,748	1,345,188
May	694,660	234,835	416,201	1,345,696
June	995,468	472,353	537,994	2,005,815
July	610,758	324,652	443,147	1,378,557
August	704,141	344,209	354,102	1,402,452
September	556,529	230,284	320,708	1,107,521
October	414,985	208,282	340,002	963,269
November	330,646	204,057	459,533	994,236
December	408,376	203,414	330,542	942,332
Totals	7,025,466	3,237,544	4,747,306	15,010,316



DISTRIBUTION OF COAL DUMPED AT NEW YORK



COAL DUMPED AT THE THREE HAMPTON ROADS PIERS

est loss was due directly to the strike shortage of coal at New York, Philadelphia and Baltimore, and to the fact that steamers avoided coaling in this country as much as possible during the strike period. During the time of greatest scarcity steamers in New York were bunkered with coal shipped from Hampton Roads, more than a million tons being shipped to New York harbor from the Southern piers. This coal does not show in the bunker dumpings but partly accounts for the great increase in the division of "other tonnage" at Hampton Roads.

It will be noted at Hampton Roads that so-called "other tonnage" jumped from less than 750,000 tons in 1921 to about 3,500,000 tons in 1922. Hampton Roads became the emergency fuel station of the Atlantic coast cities during the strike and Pocahontas and New River coals were shipped in considerable quantities to Baltimore and Philadelphia as well as to New York.

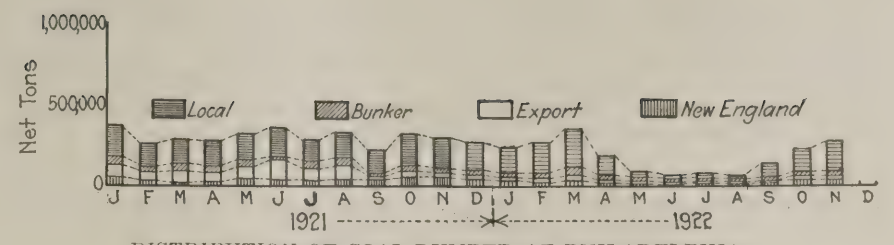
Total dumpings of coal for New England at all ports amounted to 10,750,000 tons, an increase of nearly 2,000,000 tons over 1921. This is surprising in view of the fact that the New England railroads bought during the late months of the year enough British coal to take care of their full requirements. Reserve stocks of coal, however, had nearly been wiped out during the strike and British coal may be regarded as replacement of reserve while the tonnage from Atlantic ports indicates about the average yearly shipments.

The individual ports fared variously throughout the year according to the extent of their dependence on union or non-union mines and the transportation conditions on the railroad serving them. Hampton Roads piers were least affected by the strike and were the main beneficiary of strike losses at other ports. Hampton Roads dumped 60 per cent of the total tidewater tonnage in 1922 as compared with 46 per cent in 1921 and 45 per cent in 1920, a record year.

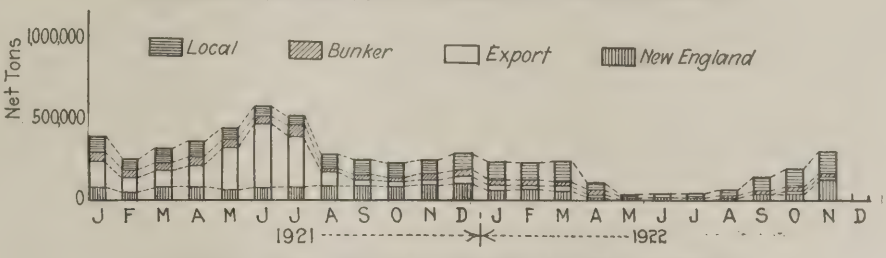
New York, the second largest port, dumped 25 per cent of the total tonnage in 1922 as compared with 32 per cent with 1921, a decrease of over 4,500,000 tons. Philadelphia dumped only 8 per cent of the total tonnage, as compared with 10 per cent in 1921, and Baltimore had 6 per cent, as compared with 11 per cent in 1921. The actual decreases in tons are shown in the accompanying summary.

As might be expected, prices of coal at Tidewater fluctuated widely throughout the year, influenced to a great extent by artificial causes during most of the strike period. Such influences which interfered with the law of supply and demand were the "Hoover fair prices," generally agreed to by the producers in most of the coal fields; propaganda on the part of the press as well as influential trade associations to prevent a panic of buyers, and the power delegated to but not used by the Interstate Commerce Commission to withhold cars from profiteering shippers.

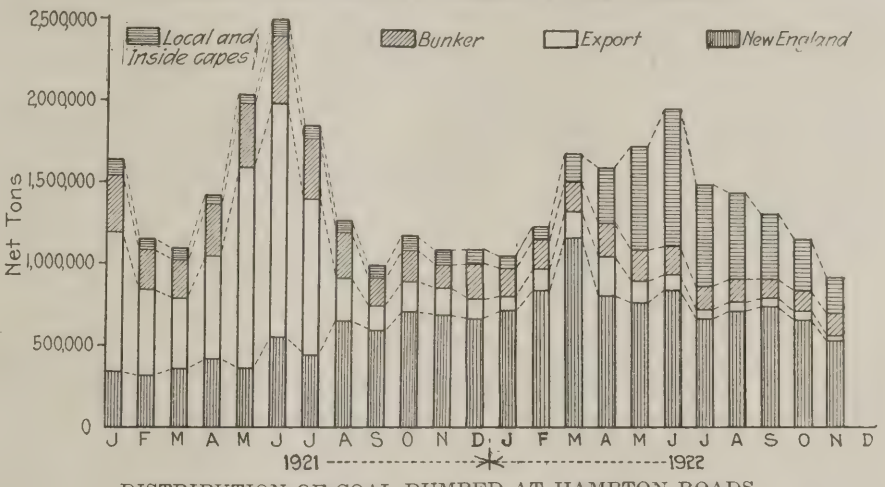
Taking New River and Pocahontas



DISTRIBUTION OF COAL DUMPED AT PHILADELPHIA



DISTRIBUTION OF COAL DUMPED AT BALTIMORE

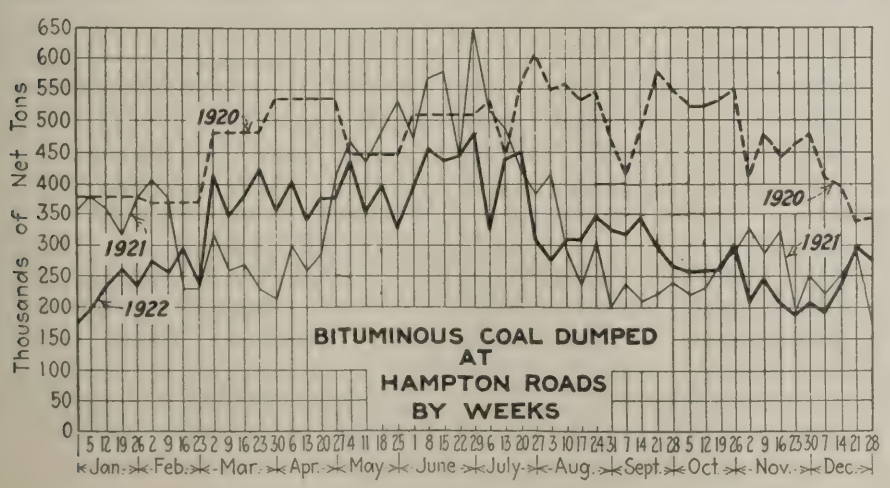


DISTRIBUTION OF COAL DUMPED AT HAMPTON ROADS

Shipments of Bituminous Coal to Tidewater, 1918-1922

(In Net Tons)

	1918		1919		1920		1921		1922 (11 mos.)	
By Ports:	Tons	Per Cent	Tons	Per Cent	Tons	Per Cent	Tons	Per Cent	Tons	Per Cent
New York	17,091,000	40	14,234,000	38	14,825,000	28	11,912,000	32	7,440,000	26
Philadelphia	3,121,000	7	4,411,000	12	6,191,000	11	3,641,000	10	2,158,000	8
Baltimore	3,641,000	8	3,467,000	9	7,831,000	14	4,136,000	11	1,917,000	7
Hampton Roads	18,977,000	44	14,630,000	40	24,026,000	45	17,242,000	46	16,626,000	58
Charleston	79,000	2	320,000	1	911,000	2	392,000	1	332,000	1
All Ports	42,909,000	100	37,062,000	100	53,784,000	100	37,323,000	100	28,473,000	100
Destination										
Coastwise to New England	15,248,000	36	8,386,000	23	10,457,000	19	8,859,000	23	10,892,000	38
Exports	3,741,000	9	8,292,000	22	21,778,000	41	9,633,000	28	1,613,000	6
Bunker	6,063,000	14	6,874,000	19	9,171,000	17	8,135,000	21	4,577,000	16
Inside Capes	4,476,000	10	3,438,000	9	3,410,000	6	3,251,000	8	3,332,000	12
Other tonnage	13,381,000	31	10,072,000	27	8,968,000	17	7,445,000	20	8,059,000	28
All Destinations	42,909,000	100	37,062,000	100	53,784,000	100	37,323,000	100	28,473,000	100



smokeless coal at Hampton Roads and Pool 9 coal at New York as typical examples of price fluctuation, prices were fairly constant at $4.50@$4.75 per gross ton at chutes for smokeless coal until April 1, with Pool 9 selling at $5.75@$6 per gross ton alongside in New York Harbor during the same period. The effect of the miners' strike was not felt until late in April, when southern smokeless sold at $5 and Pool 9 advanced to $6.50. Many saw a big advance in the New York market as union coal became scarcer and Pool 9 shot up to $8.50 while southern smokeless was beginning to feel the increased demand and went to over $7.

Prices slipped back somewhat in June but went up again in July, at the end of which month southern smokeless sold as high as $9.50 and Pool 9 reached $12. The highest prices of the year were reached in August, during the time of greatest stringency, when southern smokeless was sold at $10@$11 and Pool 9 at $12@$13. The settlement of the miners' strike naturally brought about a recession in prices during the early fall months, southern smokeless getting back to $7.25@$7.50 by the middle of October with Pool 9 at $8@$8.25.

With some further recessions of 25c. or more and some quick advances during the holidays the year 1922 closed around $9 with a strong market in prospect for the opening of year 1923.

Destination of Bituminous Coal Shipped to Tidewater In 1922, by Months

(In Net Tons)

	New England	Export	Bunker	Inside Capes	Other Tonnage	Monthly Total
NEW YORK						
January	58,000	1,000	219,000	.....	522,000	798,000
February	89,000	.....	251,000	.....	574,000	914,000
March	116,254	1,323	341,161	.....	617,452	1,076,190
April	42,000	.....	195,000	.....	406,000	643,000
May	16,000	.....	113,000	.....	135,000	264,000
June	10,626	.....	108,739	.....	150,229	269,594
July	16,000	.....	86,000	.....	113,000	215,000
August	40,000	1,000	101,000	.....	122,000	264,000
September	125,000	.....	173,000	.....	317,000	615,000
October	120,000	.....	169,000	.....	379,000	668,000
November	108,000	.....	186,000	.....	516,000	804,000
December	84,000	.....	224,000	.....	602,000	910,000
Total	824,880	3,323	2,160,900	.....	4,453,681	2,440,784
PHILADELPHIA						
January	42,000	14,000	32,000	156,000	2,000	246,000
February	21,000	27,000	31,000	180,000	1,000	260,000
March	47,962	26,416	50,073	225,268	3,499	353,218
April	7,000	13,000	28,000	127,000	1,000	176,000
May	7,000	10,000	15,000	52,000	.....	84,000
June	2,604	6,409	12,462	31,236	.....	52,711
July	9,000	1,000	11,000	32,000	.....	53,000
August	4,000	1,000	6,000	39,000	.....	50,000
September	28,000	.....	18,000	97,000	.....	143,000
October	45,000	22,000	21,000	143,000	.....	231,000
November	33,000	21,000	25,000	183,000	.....	262,000
December	37,000	13,000	22,000	174,000	.....	246,000
Total	283,566	154,825	271,535	1,439,504	7,499	215,929
BALTIMORE						
January	63,000	25,000	27,000	99,000	3,000	217,000
February	67,000	12,000	31,000	94,000	3,000	207,000
March	59,073	34,124	26,195	98,897	17,089	235,378
April	16,000	16,000	22,000	46,000	2,000	102,000
May	.....	.....	12,000	31,000	.....	43,000
June	.....	.....	7,778	25,965	.....	33,743
July	.....	.....	3,000	21,000	.....	24,000
August	5,000	.....	6,000	42,000	.....	53,000
September	48,000	.....	8,000	79,000	.....	135,000
October	45,000	8,000	15,000	111,000	7,000	186,000
November	136,000	10,000	17,000	135,000	1,000	299,000
December	166,000	9,000	24,000	175,000	5,000	379,000
Total	605,073	114,124	198,973	957,862	38,039	1,914,121
HAMPTON ROADS						
January	715,000	87,000	179,000	15,000	52,000	1,049,000
February	849,000	138,000	176,000	18,000	55,000	1,227,000
March	1,160,787	177,697	196,695	23,612	120,132	1,672,923
April	807,000	246,000	203,000	68,000	266,000	1,590,000
May	768,000	140,000	197,000	125,000	493,000	1,723,000
June	837,326	94,485	166,371	233,415	613,866	1,945,463
July	663,000	58,000	147,000	113,000	503,000	1,484,000
August	711,000	57,000	140,000	86,000	445,000	1,439,000
September	736,000	56,000	119,000	83,000	309,000	1,303,000
October	654,000	57,000	119,000	90,000	228,000	1,148,000
November	530,000	29,000	136,000	39,000	183,000	917,000
December	664,000	53,000	123,000	62,000	247,000	1,149,000
Total	9,088,113	1,193,182	1,896,066	934,027	3,514,998	16,626,396
CHARLESTON						
January	.....	14,000	1,000	.....	.....	15,000
February	.....	14,000	3,000	.....	.....	17,000
March	.....	15,659	3,780	.....	.....	19,439
April	.....	27,000	5,000	.....	.....	32,000
May	16,000	7,000	7,000	.....	.....	30,000
June	25,824	3,144	6,785	.....	.....	35,753
July	22,000	21,000	8,000	.....	10,000	61,000
August	1,000	3,000	4,000	.....	6,000	14,000
September	.....	8,000	2,000	.....	18,000	28,000
October	4,000	8,000	1,000	.....	4,000	17,000
November	10,000	13,000	5,000	.....	8,000	36,000
December	10,000	13,000	6,000	.....	.....	29,000
Total	88,824	146,803	52,565	.....	46,000	334,192
ALL PORTS (Net Tons)						
January	879,000	141,000	456,000	270,000	579,000	2,325,000
February	1,017,000	191,000	492,000	292,000	633,000	2,625,000
March	1,384,076	255,219	611,904	347,777	758,172	3,357,148
April	873,000	302,000	453,000	240,000	675,000	2,543,000
May	807,000	157,000	344,000	208,000	628,000	2,144,000
June	876,380	104,038	302,135	290,616	764,095	2,337,264
July	710,000	80,000	255,000	166,000	625,000	1,837,000
August	761,000	62,000	257,000	167,000	573,000	1,820,000
September	937,000	64,000	320,000	259,000	644,000	2,224,000
October	868,000	95,000	325,000	324,000	618,000	2,250,000
November	817,000	73,000	303,000	357,000	708,000	2,318,000
December	961,000	88,000	399,000	411,000	854,000	2,713,000
Total	10,892,456	1,612,257	4,577,039	3,332,393	8,059,256	28,473,401

Engineering Profession Entering New Era, Says Dean Cooley

The engineering profession is on the eve of great developments, Dean Mortimer E. Cooley of the University of Michigan, declared in his address to the American Engineering Council of the Federated American Engineering Societies at the annual meeting of the Council held at the Cosmos Club in Washington, Jan. 11-12. Dean Cooley, who was unannimously re-elected president of the Council for 1923, struck the keynote of the gathering in saying: "We are, I feel, entering upon a new era. The engineer, not so much in the technical as in the social sense, is about to take that part in the world which rightfully is his. I am speaking not of civil engineering, mechanical engineering, chemical engineering, electrical engineering or any other branch but of engineering as a whole.

Reviewing the year's work, Dean Cooley said that substantial results had been achieved, and that the Federation was progressing gradually and surely toward the fulfillment of its mission. His trip through eighteen states last spring, he said, inspired the conviction that the Federation was a necessary instrument of organized engineering and a source of opportunity for service both within and without the profession that exceeded the hopes even of its founders. The waste report and the report of the two-shift day in continuous industry he characterized as two outstanding accomplishments of world importance. A third undertaking of similar magnitude was likely to be set in motion in the near future, Dean Cooley announced.

Dean Cooley enumerated many activities in which the Federation might utilize the services of the engineer for the national good. Transportation he mentioned as a field for possible engineering effort through the Federation, whose work in reforestation, delayed by illness in the familiy of the committee chairman, would soon be constructively resumed.

Where Coal Originates and Where It Goes

Every Coal Field in United States Shown in Maps—Railroads Reaching These Fields and Market Areas Served Are Given in Tabulations

By Wayne P. Ellis

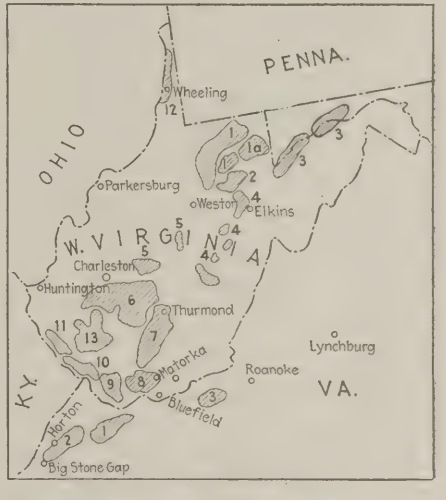
THE accompanying outline maps of coal producing fields, with the index of names and railroads serving each, were originally prepared by the Car Service Division of the American Railway Association. A few changes have been made in the outlines and railroads and there has been added for each producing field the principal market territory now being served by it.

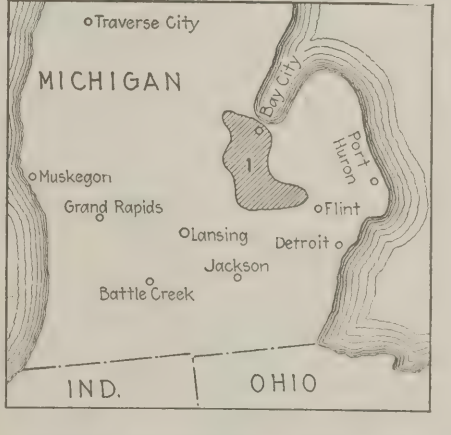
No maps are shown for the territory served by coal moving coastwise from Atlantic seaboard ports nor via Lake from Eastern producing fields through lower Lake Erie ports. The Atlantic coastwise movement is principally to New England, while the Great Lakes movement ultimately reaches destinations for the most part located in Michigan, Wisconsin, Minnesota and Ontario, Canada, and even as far west as the Dakotas.

The market territories from each district of origin for the most part can be clearly outlined, as the same general territory has been served for a number of years. Freight rates and mine costs have limited the sales territory in normal years through competition between fields producing similar quality coals suitable for general steam use. Due, however, to the rapid development of the byproducts coke industry and other consumption needs requiring special grades of coal there has resulted in recent years, an increased demand for and increased transportation haul of special high-grade coals produced only in certain districts, which are, generally speaking, the most remote from the market centers. Mention is made of this fact only to explain, in part, the reason for the widespread distribution of coal produced in southern West Virginia and eastern Kentucky.

WEST VIRGINIA

Map No.	Producing District	Originating Roads	Market Territory
1 and 1a	Fairmont and Cumberland-Piedmont	B. & O., Mong., Mong. & Wheeling and W. Va. Mid.; West. Va. Northern, Morgantown and Kingwood	Eastern Ohio, including Lakes, Northern West Virginia, Maryland, Eastern Pennsylvania, Southeastern New York, New Jersey, Delaware and New England including tidewater.
2	Phillippi	B. & O.	Eastern Ohio including Lakes, Northern West Virginia, Maryland, Eastern Pennsylvania, Southeastern New York, New Jersey, Delaware and New England including tidewater.
3	Upper Potomac	West. Md.	Maryland, Dist. of Columbia, Southeastern Pennsylvania, New York, New Jersey, Delaware, Southeastern New York, and New England including tidewater.
4	Junior	West. Md. and B. & O.	Eastern Ohio including Lakes, Northern West Virginia, Maryland, Eastern Pennsylvania, Southeastern New York, New Jersey, Delaware and New England including tidewater.
5	Coal & Coke	B. C. & G., and B. & O. (Coal & Coke)	Eastern Ohio, including Lakes, Northern West Virginia, Maryland, Eastern Pennsylvania, Southeastern New York, New Jersey, Delaware and New England including tidewater.
6	Kanawha	C. & O.	Eastbound to West Virginia, North and South Carolina including tidewater.
		C. & O., K. & M., Camp Cox, Kellys Cr.	Westbound—Central Freight Assn. Territory including Lakes.
7	New River and Winding Gulf	C. & O., Virginian, K. G. J. & E., and N. & W.	Virginia, Dist. of Columbia, North and South Carolina including tidewater.
8	Pocahontas	N. & W., and Virginian	Virginia, Dist. of Columbia, North and South Carolina including tidewater, and Central Freight Assn. Territory.
9	Tug River	N. & W.	Virginia, Dist. of Columbia, North and South Carolina including tidewater, and Central Freight Assn. Territory.
10	Thacker	N. & W.	Virginia, Dist. of Columbia, North and South Carolina including tidewater, and Central Freight Assn. Territory.
11	Kenova	N. & W.	Central Freight Assn. Territory.
12	Panhandle	B. & O., Penna., and P. & W. V.	West Virginia, Panhandle, Northeastern Ohio, including Lakes.
13	Logan	C. & O.	Eastbound to West Virginia, North and South Carolina including tidewater.
			Westbound to Central Freight Assn. Territory including Lakes.
			Westbound to Central Freight Assn. territory, including Lakes.



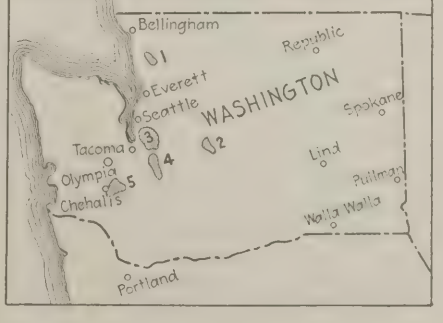


MICHIGAN

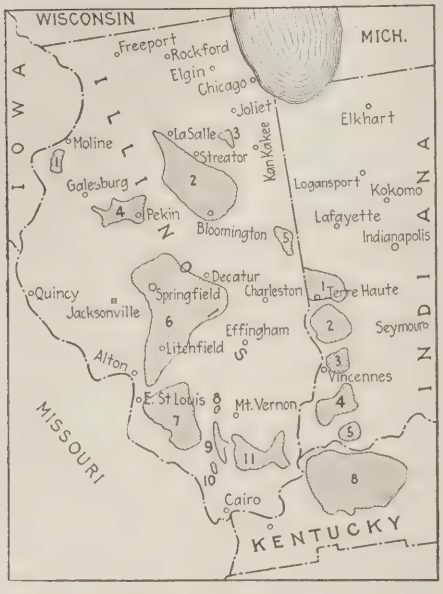
Map No.	Producing District	Originating Roads	Market Territory
1	Saginaw	N. Y. C., Mich. Cent., P. M. and G. T.	Coal shipped from mines in Michigan does not reach points outside of the state.

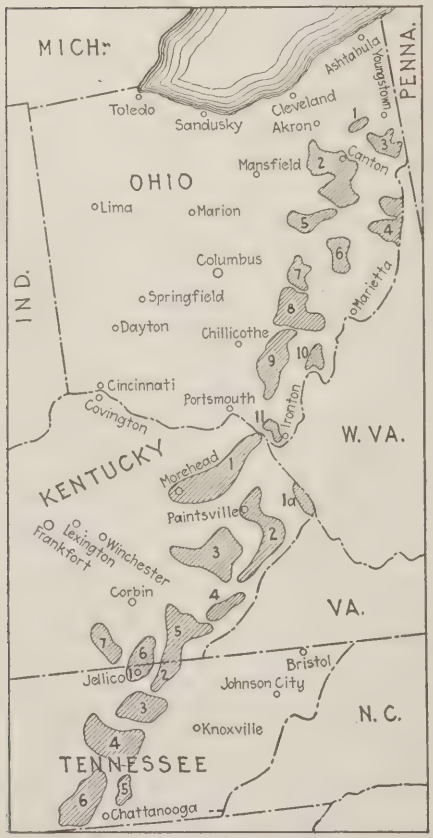
WASHINGTON

Map No.	Producing Districts	Originating Roads	Market Territory
1	Northern Puget Sound	G. N.	Washington and Canada.
2	Roslyn	N. P.	Washington, Idaho and Oregon.
3	King County	N. P., C. M. & St. P., Pacific Coast and Puget Sound Electric.	Washington and Oregon.
4	Southern Puget Sound	N. P.	Washington and Oregon.
5	Lewis County	N. P., G. N., C. M. & St. P., and Union Pacific (O. W. R. & N.)	Washington, Oregon and California.









*Kentucky, Tennessee, Indiana and Illinois

(continued on next page.)

PENNSYLVANIA

Map No.	Producing District	Originating Roads	Market Territory
1	Beech Creek	N. Y. C.	New York and New England.
	Snowshoe	Pa.	Pennsylvania, New York and New England.
2	Butler and Mercer	L. E. F. & C., P. L. & W., B. R. & P., B. & L. E., Penna., B. & O., and West. Alleg.	Northwestern Pennsylvania, Northeastern Ohio, Western New York, including Lake cargo.
3	Central Pennsylvania (Clearfield and Central-West Penna.)	B. R. & P., N. Y. C., Penna., Pitts. & Sus., Buff. & Sus., Alt. Nor., P. S. & N., Erie, Cam. & Ind., West. Alleg., and Pitts. & Shaw.	Pennsylvania east of Latrobe, New York, New Jersey, Delaware, Dist. of Columbia Eastern Maryland, New England and Eastern Canada via water and rail, including Tidewater.
4	Windber	B. & O., J. & S. C., Penna.	Pennsylvania, Johnstown and East, Southeastern New York, New Jersey, Delaware, Eastern Maryland, and New England including Tidewater ports Baltimore and north.
5	Broad Top	East Broad Top, H. & B. T. M.	Pennsylvania, Johnstown and East, Southeastern New York, New Jersey, Delaware, Eastern Maryland, and New England, including Tidewater ports, Baltimore and North.
6 and 6a	Somerset and Indian Creek	B. & O., West Md., C. H. & B., and United Indian Creek Valley	Eastern Maryland and Pennsylvania, Southeastern New York, New Jersey, Delaware, Dist. of Columbia, and New England, including Tidewater.
7	Connellsville	B. & O., Mong., P. & L. E., Wash. Run., Penna., and West. Md.	Western Pennsylvania and Northeastern Ohio, including lakes and Western New York.
8	Ligonier	Lig. Val.	Pennsylvania, Johnstown and East, Southeastern New York, New Jersey, Delaware, Eastern Maryland, and New England, including Tidewater ports, Baltimore and North.
9	Latrobe	Lig. Val. and Penna.	Pennsylvania, Johnstown and East, Southeastern New York, New Jersey, Delaware, Eastern Maryland, and New England, including Tidewater ports, Baltimore and North.
10	Greensburg and Westmoreland	Penna.	Pennsylvania, Johnstown and East, Southeastern New York, New Jersey, Delaware, Eastern Maryland, and New England, including Tidewater ports, Baltimore and North, Eastbound, also Western Pennsylvania and Northeastern Ohio.
11	Pittsburgh	B. & O., B. & L. E., B. R. & P., P. C. & Y., Montour, Penna., P. & W. V., P. & L. E., and Union.	Northeastern Ohio, Western Pennsylvania, Western New York, including Lakes.
12	Penna. Anthracite	D. L. & W., D. & H., Erie, L. & N. E., Lehigh Val., N. Y. O. & W., P. & R., Cent. of N. J., and Penna.	New York, Pennsylvania, New England, New Jersey, Delaware, Maryland. Dist. of Columbia, Northern Virginia and West Virginia, Northeastern Ohio, Eastern Canada and via Lakes.
13	Tioga	Erie, S. & N. Y., N. Y. C., and Penna.	Eastern New York and New England.

OHIO

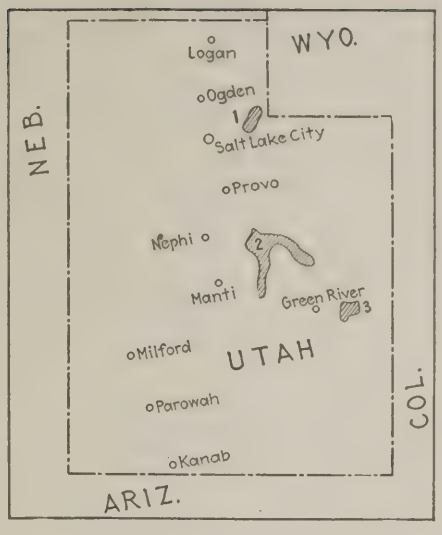
Map No.	Producing District	Originating Road	Market Territory
1	Palmyra	N. Y. C.	Northeastern Ohio, Northwestern Pennsylvania, and Western New York, including Lakes.
2	Massilon and Goshen	B. & O., Penna., and W. & L. E.	Northeastern Ohio, Northwestern Pennsylvania, and Western New York, including Lakes.
3	Lisbon	P. L. & W., Penna., Y. & O. R., and Erie.	Northeastern Ohio, Northwestern Pennsylvania, and Western NewYork,, including Lakes.
4	No. 8	B. & O., Penna., P. & W. V., W. & L. E., and N. Y. C.	Northeastern Ohio, Northwestern Pennsylvania, Western New York, including Lakes, Canada and Southeastern Mich.
5	Coshocton	Penna. and W. & L. E.	Northern Ohio, Southeastern Michigan, including Lakes.
6	Cambridge	B. & O. and Penna.	Northeastern Ohio, Northwestern Pennsylvania, Western New York, including Lakes, Canada, and Southeastern Mich.
7	Crooksville	Penna., Z. & W., W. & L. E., and B. & O.	Northwestern Ohio, Lower Peninsula of Michigan and Northeastern Indiana, including Lakes.
8	Hocking	Hocking Val., B. & O., T. & O. C., K. & M., and Z. & W.	Northwestern Ohio, Lower Peninsula of Michigan and Northeastern Indiana, including Lakes.
9	Jackson	B. & O., D. T. & I., Hocking Val.	Northwestern Ohio, Lower Peninsula o-Michigan and Northeastern Indiana, inf cluding Lakes.
10	Pomeroy	Hocking Val., B. & O., and K. & M.	Northwestern Ohio, Lower Peninsula of Michigan, and Northeastern Indiana, including Lakes.
11	Ironton	N. & W., and D. T. & I.	Northwestern Ohio, Lower Peninsula of Michigan, and Northeastern Indiana, including Lakes.

ILLINOIS

Map No.	Producing Districts	Originating Roads	Market Territory
1	Rock Island	C. R. I. & P., C. M. & St. P., C. B. & Q., and R. I. Sou.	Eastern Iowa and Northern Illinois.
2	Northern Illinois	C. B. & Q., I. C., C. & A., C. C. C. & St. L., C. R. I. & P., C. & N. W., C. M. & St. P., C. P. & St. L., A. T. & S. F., T. P. & W., Wabash and N. Y. C. (L. E. & W.)	Northern Illinois, Northwestern Indiana, Eastern Iowa and Southern Wisconsin.
3	Wilmington	E. J. & E., C. & A., A. T. & S. F., and C. C. C. & St. L.	Northern Illinois, Northwestern Indiana, and Southeastern Wisconsin.

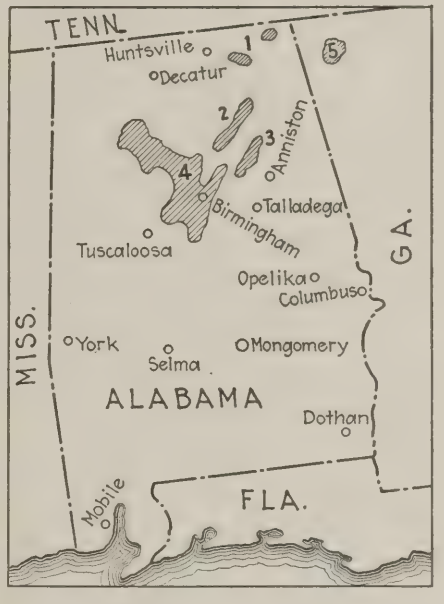
ILLINOIS, continued

4	Peoria and Fulton	C. B. & Q., M. & St. L., P. & P. U., T. P. & W., I. C., P. R. T., A. T. & S. F., C. C. C. & St. L., Penna., C. P. & St. L., C. & A., C. & N. W., and C. R. I. & P.	Northern Illinois, Northwestern Indiana, Northern Iowa, Southern Wisconsin, and Southern Minnesota.
5	Danville	C. & E. I., C. C. C. & St. L., Ill. Tract. and Wabash	Northern Illinois, Northern Indiana, Southwestern Michigan, and Southern Wisconsin.
6	Central Illinois	B. & O., C. & A., C. B. & Q., C. & E. I., C. P. & St. L., C. I. & W., Wabash, C. C. C. & St. L., C. & N. W., I. C., Ill. Tract., C. & I. M., T. St. L. & W., Penna., L. & M., and Spr. Terminal.	Illinois, Missouri, Iowa, Southeastern South Dakota, Southern Minnesota, Southern Wisconsin and Eastern Nebraska.
7	Belleville	E. St. L. & S., St. L. & B. E., St. L. & O. F., B. & O., Penna., St. L. T. & E., M. & O., L. & N., Southern, I. C., W. C. & W. and Ill. Sou.	Southern Illinois and Eastern Missouri.
8	Centralia	B. & O., C. B. & Q., I. C., C. & E. I., Southern and Ill. Sou.	Illinois and Eastern Missouri.
9	Du Quoin	I. C., W. C. & W., and Mo. Pac.	Northbound—Illinois, Missouri, Iowa, Eastern Nebraska, Southeastern, South Dakota, Southern Minnesota, Southern Wisconsin, Northwestern Indiana, and Southwestern Michigan.
10	Murphysboro	I. C., Mo. Pac., and M. & O.	
11	Southern Illinois	C. C. C. & St. L., L. & N., I. C., C. B. & Q., M. O. Pac., C. & E. I., B. & O., and M. & E.	Southbound—Illinois, Western Kentucky, Tennessee, Mississippi, Louisiana, Eastern Texas, Arkansas and Missouri.



INDIANA

Map No.	Producing District	Originating Road	Market Territory
1	Brazil and Clinton	Penna., C. & E. I., I. C., C. C. C. & St. L., C. I. & L., Cent. of Ind., C. M. & St. P., C. I. & W., and T. St. L. & W.	Indiana, Southern Michigan, Northern Illinois and Southern Wisconsin.
2	Sullivan and Linton	C. M. & St. P., Penna., C. I. & L., I. C., and C. & E. I.	Indiana, Southern Michigan, Northern Illinois and Southern Wisconsin.
3	Knox County	B. & O., Penna. and C. C. C. & St. L.	Indiana, Southern Michigan, Northern Illinois, and Southern Wisconsin.
4	Princeton and Ayrshire	Southern, C. C. C. & St. L., and C. & E. I.	Indiana, Northwestern Kentucky, Illinois, and Southwestern Wisconsin.
5	Booneville	Southern	Indiana and Illinois.
6	Evansville and Newburg	I. C., C. & E. I., E. S. & N., E. & O. V., C. C. C. & St. L., and E. & I.	Indiana, Northwestern Kentucky and Illinois.

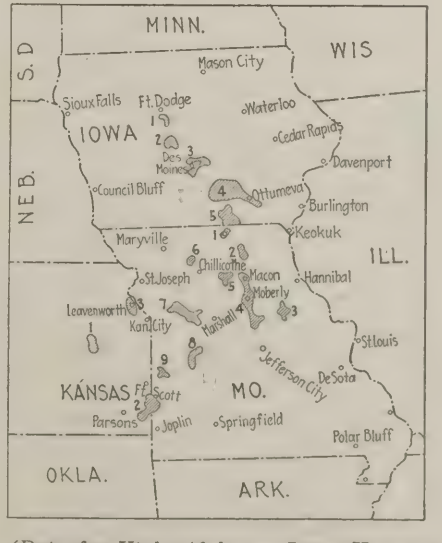


KENTUCKY

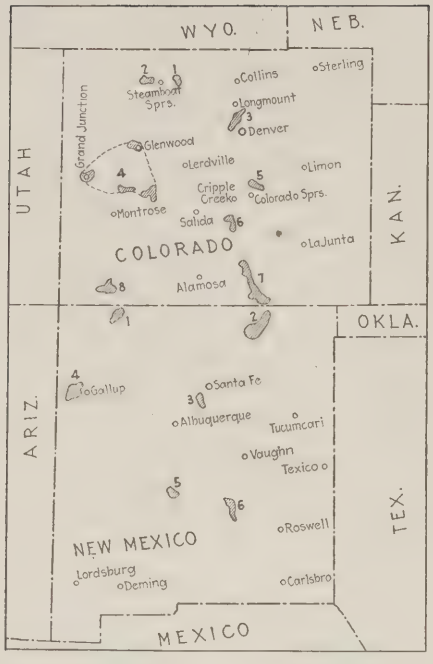
Map No.	Producing District	Originating Road	Market Territory
1	Grayson	East Ky., M. & N. F., and A. C. & I.	Northern Kentucky and Centra Freight Association territory, including Lakes.
1a	Thacker	N. & W., W. & P. C., and B. S. & C.	Virginia, D. C., N. Car., S. Car., including tidewater and Central Freight Association Territory.
2	Elkhorn and Paintsville	C. C. & O., C. & O., L. & N., S. V. & E., Long Fork, Miller's Creek and Big Sandy & Ky. River.	Northern Kentucky and Central Freight Assn. territory, including Lakes.
3	Hazard	L. & N., and Ohio & Ky.	Northern Kentucky and Central Freight Assn. territory, including Lakes.
4	Harlan	L. & N.	Kentucky and Central Freight Assn. territory, including Lakes.
5	Middlesboro	L. & N., Southern, Cumberland, and Cumberland & Man.	Northbound—Kentucky and Central Freight Assn. territory, including Lakes. Southbound—Eastern Tennessee, Georgia, North and South Carolina, and Florida, including tidewater.
6	Jellico	L. & N. and Southern	Northbound—Kentucky and Central Freight Assn. territory, including Lakes. Southbound—Eastern Tennessee, Georgia, North and South Carolina, and Florida, including tidewater.
7	Cincinnati Southern	K. & T., and Southern	Northbound—Kentucky and Central Freight Assn. territory, including Lakes.
8	Western Kentucky	I. C., L. & N., L. H. & St. L., and Ky. Mid.	Northbound—Western Kentucky, Indiana, Illinois, Southeastern Wisconsin, and Eastern Missouri. Southbound—Western Kentucky and Tennessee, Mississippi, Louisiana, Eastern Arkansas, and Texas.

TENNESSEE

Map No.	Producing District	Originating Road	Market Territory
1	Jellico	L. & N., and Southern	Northbound—Kentucky and Central Freight Assn. territory including Lakes. Southbound—Eastern Tennessee, Georgia, North and South Carolina and Florida, including tidewater.
2	Middlesboro	Southern	Northbound—Kentucky and Central Freight Assn., territory including Lakes. Southbound—Eastern Tennessee, Georgia, North & South Carolina, and Florida, including tidewater.
3	La Follette and Windrock	Southern, L. & N., On. & Wn., Mor. & Fen., and Tenn.	Northbound—Kentucky and Central Freight Assn. territory including Lakes. Southbound—Eastern Tennessee, Georgia, North and South Carolina, and Florida, including tidewater.
4	Rockwood	Tenn. Cent. & Southern	Tennessee, Georgia, North and South Carolina and Florida.
5	Soddy	Southern	Tennessee, Georgia, North and South Carolina and Florida.
6	Tracy & Sparta	N. C. & St. L.	Tennesee, Georgia, North and South Carolina and Florida.

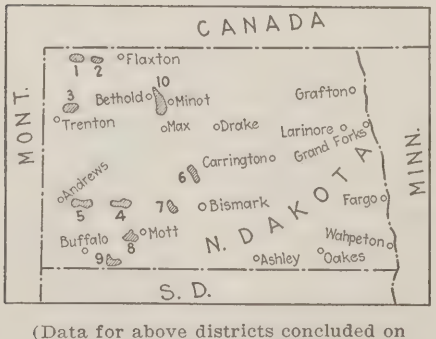


(Data for Utah, Alabama, Iowa, Kansas and Missouri continued on following pages.)









(Data for above districts concluded on following pages.)

UTAH

Map No.	Producing District	Originating Roads	Market Territory
1	Summit County	Union Pacific	Utah and Wyoming.
2	Carbon and Emery Counties	D. & R. G. W. and Utah	Utah, Nevada and California.
3	Grand County	D. & R. G. W.	Utah, Nevada and California.

ALABAMA AND GEORGIA

Map No.	Producing District	Originating Roads	Market Territory
1	Jackson County	N. C. & St. L. and Southern	Northern Alabama and Southern Tennessee.
2	Blount Mt.	L. & N., and N. C. & St. L.	Alabama, Tennessee and Georgia
3	Coosa	S. A. L., Cent. of Ga., and Southern.	Alabama, Georgia, Tennessee, South Carolina and Florida.
4	Warrior River and Cahaba	L. & N., A. B. & A., Ala. Cent., Bir. Sou., Southern, M. & O., Cent. of Ga., I. C., St. L. S. F., Mary Lee, Th. & S., Wood. & Bloc., and Woodward Iron.	Alabama, Georgia, Tennessee, South Carolina, Florida, Mississippi, Eastern Texas, and Eastern Arkansas.
5	Georgia	Cent. of Ga.	Georgia and Tennessee.

IOWA

Map No.	Producing District	Originating Roads	Market Territory
1	Coalville	C. G. W., M. & St. L., and Ft. D. D. M. & S.	Northern Iowa, Southeastern South Dakota, Eastern Nebraska and Southern Minnesota.
2	Boone	C. M. & St. P., Ft. D. D. M. & S., C. & N. W., and M. & St. L.	Northern Iowa, Southeastern South Dakota, Eastern Nebraska, and Southern Minnesota.
3	Des Moines	C. R. I. & P., C. & N. W., C. G. W., C. M. & St. P., and Interurban.	Iowa, Southeastern South Dakota, Eastern Nebraska, and Southern Minnesota.
4	Albia	C. R. I. & P., C. B. & Q., Wabash, C. & N. W., M. & St. L., C. M. & St. P., and I. S. U.	Iowa, Northern Missouri, Eastern Nebraska and Southern Minnesota.
5	Appanoose	C. R. I. & P., C. M. & St. P., C. B. & Q., M. & St. L., and I. S. U.	Southern Iowa, Northern Missouri, and Eastern Nebraska.

KANSAS

Map No.	Producing District	Originating Roads	Market Territory
1	Osage	Mo. Pac. and A. T. & S. F.	Western Missouri and Kansas.
2	Pittsburg	St. L. S. F., Mo. Pac., A. T. & S. F., M. K. & T., K. C. S. and J. & P.	Western Missouri, southwestern Iowa, Kansas, southeastern Nebraska and Oklahoma.
3	Leavenworth	U. P., A. T. & S. F., Mo. Pac.	Western Missouri and Kansas.

MISSOURI

Map No.	Producing District	Originating Roads	Market Territory
1	Mendota	C. B. & Q.	Northern Missouri and Southern Iowa.
2	Novinger	Q. O. & K. C., Wabash and C. B. & Q.	Northern Missouri and Southern Iowa.
3	Vandalia	C. & A., Wabash and St. L. & H.	Northern Missouri.
4	Brevier	Wabash, M. K. & T., C. B. & Q., C. & A., and Brevi. & South.	Missouri and Southern Iowa.
5	Marceline	A. T. & S. F., and C. B. & Q.	Missouri and Southern Iowa.
6	Grundy County	Q. O. & K. C.	Missouri and Southern Iowa.
7	Lexington	Mo. Pac., Wabash, A. T. & S. F., and C. & A.	Missouri, Eastern Kansas, and Eastern Nebraska.
8	Lewis and Jordan	St. L. S. F., K. C. C. & S., A. T. & S. F., C. R. I. & P., and M. K. & T.	Missouri, Eastern Kansas and Eastern Nebraska.
9	Bates County	Mo. Pac., and St. L. S. F.	Missouri, Eastern Kansas, and Eastern Nebraska.
10	Pittsburg	St. L. S. F., Mo. Pac., A. T. & S. F., M. K. & T., and K. C. S.	Missouri, Eastern Kansas and Eastern Nebraska.

MARYLAND

Map No.	Producing District	Originating Roads	Market Territory
1	Cumberland and Piedmont	B. & O., Cumb. & Penna., and West. Md.	Maryland, District of Columbia, Northern West Virginia and Virginia, Southeastern Pennsylvania, New Jersey, Delaware, Southeastern New York and New England, including tidewater.
2	Upper Potomac	West. Md.	Maryland, District of Columbia, Northern West Virginia and Virginia, Southeastern Pennsylvania, New Jersey, Delaware, Southeastern New York and New England, including Tidewater.

VIRGINIA

Map No.	Producing District	Originating Roads	Market Territory
1	Clinch Valley	N. & W.	North and South Carolina, Virginia including Tidewater.
2	SouthesternVirginia	N. & W., Southern, C. C. & O., L. & N., Interstate and Norton & Northern.	North and South Carolina, Eastern Tennessee, Georgia and Florida.
3	Pulaski County	N. & W.	Virginia, North and South Carolina.

MONTANA

Map No.	Producing District	Originating Roads	Market Territory
1	Sheridan County	G. N. and Soo Line	Northern Montana and Northwestern North Dakota.
2	Blaine County	G. N.	Northern Montana.
3	Cascade County	G. N.	Montana, North Dakota, Washington and Idaho.
4	Roundup	C. M. & St. P.	Montana, South Dakota, Idaho and Washington.
5	Bridger and Red Lodge	M. W. & S. and N. P.	Montana and Wyoming.
6	Trail Creek	N. P.	Montana.

COLORADO

Map No.	Producing Districts	Originating Roads	Market Territory
1	North Park	C. W. & E.	Colorado
2	Yampa	D. & S. L.	Colorado
3	Boulder Co.	Colo. & Sou., C. B. & Q., D. & I. M., and Union Pacific.	Colorado, Wyoming and Nebraska
4	Crested Butte and Grand River	D. & R. G. W., Colo. Mid., Unitah and Book Cliff	Colorado
5	El Paso Co.	A. T. & S. F., D. & R. G. W. and C. R. I. & P.	Colorado.
6	Canon City	A. T. & S. F. and D. & R. G. W.	Colorado.
7	Trinidad	D. & R. G. W., Colo. & Sou., Colo. & Wyo., and A. T. & S. F.	Colorado, Nebraska, Kansas, New Mexico, Texas and Oklahoma.
8	Durango and Gallup	D. & R. G. W.	Colorado, New Mexico, and Kansas.

NEW MEXICO

Map No.	Producing District	Originating Roads	Market Territory
1	San Juan	D. & R. G. W.	New Mexico, and Colorado.
2	Raton	S. F. R. & E., E. P. & S. W. and A. T. & S. F.	New Mexico, Kansas, Texas, Colorado and Oklahoma.
3	Cerilles	A. T. & S. F., N. M. Cent., and New Mexico Midland.	New Mexico.
4	Zuni (Gallup)	A. T. & S. F.	New Mexico, Arizona and California.
5	Carthage	New Mexico Midland	New Mexico.
6	Capitan	E. P. & S. W.	New Mexico and Texas.

OKLAHOMA

Map No.	Producing Districts	Originating Roads	Market Territory
1	Tulsa County	A. T. & S. F., M. K. & T., and St. L. S. F.	Oklahoma, Southeastern Kansas, and Southestwen Missouri.
2	Henryetta-Dewar	A. T. & S. F., M. O. & G., St. L. S. F., and Ft. S. & W.	
3	Poteau	Mid. Val., C. R. I. & P., X. C. S. and Ft. S. & W.	Mainly astern Texas and Arkansas.
4	McAlester-Wilburton	C. R. I. & P., M. K. & T., Ft. S. & W., Mid. Val. and K. C. S.	
5	Lehigh	A. T. & S. F., M. K. & T., and C. R. I. & P.	

TEXAS

Map No.	Producing Districts	Originating Roads	Market Territory
1	North Central Field	T. & P., C. R. I. & P., G. T. & W., and W. F. & S.	
2	Titus County	St. L.-S. W.	
3	Camp Hopkins and Wood Counties	M. K. & T. and Texas Short Line.	
4	Nacogdoches County	S. P. in T. & L.	
5	Houston County	I. & G. N.	
6	Leon and Madison Counties	S. P. in T. & L. and T. & B. V.	Practically all coal mined in Texas is consumed within the state.
7	Milan and Robertson Counties.	I. & G. N.	
8	Washington and Fayette Counties.	S. P. in T. & L.	
9	Bastrup County	M. K. & T.	
10	Medina County	I. & G. N.	
11	Eagle Pass	S. P. in T. & L.	
12	Laredo	R. G. & E. P.	

ARKANSAS

Map No.	Producing Districts	Originating Roads	Market Territory
1	Sebastian County	Mid. Val., St. L. S. F., C. R. I. & P., Mo. Pac. & Ark. Cent. and Ark. Wn.	Eastern Kansas, Arkansas, Western Missouri-Oklahoma and Texas.
2	Arkansas Anthracite	Mo. Pac., Ark. Cent., and Ft. S. S. & E.	Eastern Kansas, Arkansas, Western Missouri. Texas and Oklahoma.

NORTH DAKOTA

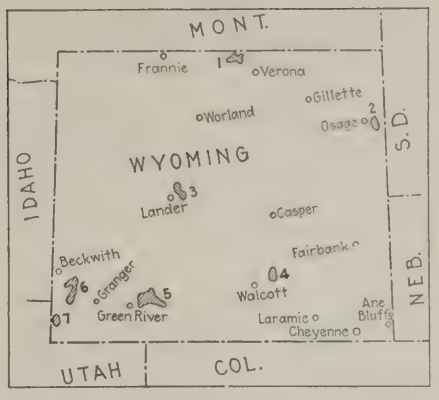
Map No.	Producing Districts	Originating Roads	Market Territory
1	Divide County	G. N.	
2	Burke County	G. N. and Soo Line	
3	Williams County	G. N. and Soo Line	
4	Billings County	N. P.	
5	Stark County	N. P.	
6	Burleigh County	N. P. and Soo Line	No coal is shipped outside of the state except small tonnage to Central Minnesota and Eastern South Dakota.
7	Morton County	N. P.	
8	Hellinger County	C. M. & St. P.	
9	Adams County	C. M. & St. P.	
10	Ward County	Soo Line	

SOUTH DAKOTA

Map No.	Producing District	Originating Roads	Market Territory
1	Isobel	C. M. & St. P.	All South Dakota coal is consumed in the state.

WYOMING

Map No.	Producing District	Originating Roads	Market Territory
1	Sheridan County	C. B. & Q.	Montana, Eastern Wyoming, South Dakota, Nebraska and Western Iowa.
2	Cambria (Weston Co.)	C. B. & Q.	Eastern Wyoming, Nebraska and Western Iowa.
3	Hudson (Fremont Co.)	C. & N. W.	Eastern Wyoming, Nebraska, South Dakota, and Western Iowa.
4	Hanna (Carbon Co.)	Union Pacific	Wyoming, Nebraska, and Western Iowa.
5	Rock Springs	Union Pacific	Wyoming, Colorado, Nebraska, Idaho, Washington and Oregon.
6	Kemmerer	Union Pacific (O. S. L.)	Wyoming, Utah, Idaho, Oregon and Washington.
7	Evanston (Unitah Co.)	Union Pacific	Wyoming, Utah, Oregon and Washington.



British Columbia Output Gains

By Robert Dunn

The coal output of British Columbia for 1922 should be approximately 150,000 tons better than it was in the previous year. Up to the end of October, according to monthly returns submitted by the collieries, it had totaled 2,120,637 tons. Official returns for the whole of 1921 show a production of 2,628,672 tons. Thus, if the output for November and December average 250,000 tons, the aggregate will be, as stated, a little better than it was in 1921. It should be remembered, however, that usually there is a shrinkage when the annual compilation is compared with that arrived at every month. For this reason it is not safe to say that the official statistics, when issued, will show that the past year has improved, to a very material extent, over that immediately preceding.

In the Crow's Nest Pass district, eastern British Columbia, the situation has become better during the past few months. The pick-up of output since the cessation of the strike has been remarkable. Notwithstanding the effects of the United States tariff of 53c. a ton the Crow's Nest Pass Coal Co. is reported to be doing a good trade with the Great Northern Ry., to which coal is supplied at a figure approximating $5 a ton. The coal retails in Fernie and other centers adjacent at about $8.25. The collieries are making a strong effort to extend their market throughout the prairies, particularly in Manitoba, and the prospects of success are good, providing satisfactory transportation can be obtained, as there is no doubt that the quality of the fuel from this region will make it popular with the consumer.

There has been considerable development of the coal fields of central British Columbia—the Nicola-Princeton zone. The Coalmont Coal Co. is producing at the rate of from 700 to 800 tons a day. The coal is high grade and 500 tons a day is reported to be going to the Great Northern Ry. A considerable local market is being found for the product of the Middlesboro collieries. The Kettle Valley Ry. uses some of this for fuel requirements and the coal retails in Princeton at about $7.50. Exports from this field to the coast, while growing, have not yet reached large proportions.

Miners' Union at Bottom of Nation's Coal Troubles, Non-Union Operators Tell Coal Commission

In a statement to the United States Coal Commission on Jan. 12 the non-union operators of southern West Virginia present their case. Extracts follow:

"These operators of West Virginia have no proper place before your board. Our own labor difficulties have never deprived the people of their coal; rather we have always supplied the nation when there were labor disturbances elsewhere. Our mines are not overdeveloped; instead we must constantly expand them to meet the demand for our coal. Our business is not seasonal; on the contrary we have the central west throughout the year and the Lake trade to serve in summer, the industries of the East and New England to support and a foreign commerce to sustain, all of which keeps us constantly engaged. Our prices, as a whole, have created no scandal; rather we have always joined hands with the government in every effort to control the whole market in the interest of the public. And, on only rare occasions—and then due to outside influences—have our transportation difficulties risen to the dignity of a public menace. On these accounts we do not belong in the throng which crowds your anteroom to explain their misdeeds.

"And yet, we men of West Virginia are here. You have drawn us in. The public will not be satisfied unless we appear. We have come, therefore—and gladly—to say this one thing and to prove it:

Troubles Come from Outside

"West Virginia's difficulties have all been imported. They were carried into our borders. And they originate in the fact that others having fallen into a quagmire are and have been trying to drag us in with them."

Then follows a recital of the history of the coal-mining industry of southern West Virginia, how the country was developed—towns, roads and the many things that make life comfortable were brought in by the operators and their men. The interdependence of the proprietors and their labor is pointed out, how in this primitive section of the world every facility must be provided, and how the operators and men made progress together. The picture is one of internal accord, until outside influences were brought to bear. The growth of the industry in these fields is stated and the part of southern West Virginia in producing the coal needed during the war is set forth.

How these operators met the wild demands of 1920, the deflation of 1921 and how they co-operated with the government in holding prices down in 1922 are stressed. Mr. Hoover's commendation for their part in keeping the market in bounds last summer is recited with pride. The statement continues:

"We have now shown our relations and their fruits. We have produced coal in season and out of season. We have received modest prices except when a world upheaval created conditions beyond our control. Our record is that as soon as an abnormal situation disappeared, the normal tendency asserted itself and prices declined. We now come to a new set of conditions which were imposed upon us from without—and for reasons which we will recite.

"From the beginning of the coal industry in West Virginia, it has been the policy of the operators to conduct the business on a non-union basis. This policy on the part of the operators is shared by a great number, if not all, of their employees, many of whom frankly state they will not work under the union; they will abandon mining rather than do so, and will seek other occupations. Notwithstanding the legal right of the operator and the miner to agree upon terms of employment satisfactory to themselves, we have, for a generation, been interfered with almost without cessation in every way the United Mine Workers of America could devise to accomplish the conquest of our state. . . .

"The initial conspiracy had its origin in a contract entered into at a joint conference between the miners and operators of the Central Competitive Field in Chicago, Jan. 17-28, 1898. From that contract we quote the eighth clause, which is as follows:

"'That the United Mine Workers Organization, a party to this contract, do hereby further agree to afford all possible protection to the trade and the other parties hereto against any unfair competition resulting from the failure to maintain scale rates.'

"(See Hearings before the Committee on Education and Labor, United States Senate, S-RES. 80, Page 394.)

"The true meaning of the clause just quoted, as understood by the parties thereto, appears in the minutes of the various joint conferences held after that time, from which we give only three excerpts out of many which might be given.

"At the conference held in Pittsburgh, Jan. 18, 1899, John Mitchell, National President of the United Mine Workers of America, said:

"'I want to say to the operators that an effort has been made in the past year to curtail the West Virginia coal by preventing its sale on the market.'

"(See Hearings before the Committee on Education and Labor, United States Senate, S-RES, 80, page 395.) . . ."

Another excerpt is given from the records of the joint interstate conference tending to show that the United Mine Workers were attempting to unionize West Virginia in order to eliminate competition with the organized fields on the north. It is pointed out that the national strikes of 1919 and 1922 caused cessation of some 60 per cent of the coal output. The story of high prices is hitched to these strikes, the statement continuing:

"It may fairly be said that except as to the unusual situations heretofore referred to, the high prices of coal during recent years have been the direct result of the actions of the United Mine Workers of America in calling nation-wide strikes, such strikes being made possible by its absolute control of mine labor in such a large part of the country."

The story of the efforts of the United Mine Workers to organize these fields are recited. Paint Creek in 1912, Glen White in 1917, Willis Branch and finally the armed march on Logan are cited in detail. The men who participated in these raids, their convictions in the courts and the lengths of their jail sentences are given.

Finally it is shown that the mines of the country have ample capacity to produce all the coal the country requires and it is concluded that the cause of shortages must be sought in some other direction. The statement concludes:

"Our mines, today, are running at less than 50 per cent capacity. This is due solely to a lack of transportation. We cannot supply our market if the railroads cannot carry more than half of what we can produce.

"As we have shown, every period of shortage—except that caused by the war demand—has been preceded by a strike of the union miners.

"This leads us to suggest: Stripped of all non-essentials, the two questions before you are:

"(1) How can the periodic interruptions of coal production be stopped?

"(2) How can the wild fluctuations of coal prices be brought to an end?

"Answering these questions categorically, the interruptions of production can be stopped if you can arrange to prevent, forever, the union from calling a nation-wide strike. . . .

"The price fluctuations will disappear if, and when, the great strikes cease and when the railways can carry our coal to market.

"Your commission represents the whole people of the United States. If you feel that the consumers should continue to pay present—or higher—prices for coal, the miners' union should be encouraged by new concessions. If you feel that the people are paying prices which are too high, an effective curb should be put upon its activities—by removing exceptions to the anti-conspiracy laws, and by protecting all American citizens in their right to work unmolested under such conditions as they elect."

French Coal Industry Experienced Poor Market in 1922

Had Keen Competition from British Product Till American Orders Relieved Pressure—Longer Workday Sought as Safeguard —Production Shows Marked Advance Over Preceding Year

By M. Victor Truant
Paris, France

A POOR market was the main characteristic of the French coal industry during the first six months of 1922. Under the pressure of British coals, which, owing to the low wages paid to miners in Great Britain, managed to compete with French coals into the very heart of the Nord and Pas-de-Calais coal field, the output of the French collieries was sold with the utmost difficulty and stocks accumulated at the pitheads. It is reckoned that in April or May last, in the Nord and Pas-de-Calais coal field alone, pithead stocks aggregated about 2,000,000 tons.[a]

After July the situation radically altered. Orders from North America diverted from France the pressure of British coals and at the same time a revival in French metallurgical and textile trades increased the demand for industrial coals. French domestic coals can now be obtained only with protracted delays in delivery, and industrials are in strong demand. Pithead stocks have been gradually melting away, and we are told that in the Nord and Pas-de-Calais they do not now exceed the comparatively modest figure of 300,000 to 400,000 tons.

More British Coal Coming Again

Recently British coal exports to France again have been on the increase, but the general coal demand is now much better than in the first months of the present year and besides the rise of sterling is limiting to the coasting areas the inroads of British coals. It should also be borne in mind that, owing to the wilful destruction by the Germans of all the occupied French collieries, the coal output of the Nord and Pas-de-Calais field is still 1,100,000 tons per month behind its normal level.

Official prices quoted by the collieries of the Nord and Pas-de-Calais have varied little since Jan. 1, 1922. Some time before, owing to slackness of trade and to a keener competition of British coals, they had been reduced as follows per ton: 10-15 f. for raw industrial coals; 20-31 f. for washed coals; 39-49 f. for briquets.

On April 16, 1922, some slight reductions were made: 3 f. on industrial run-of-mine; 5 f. on washed pea and on slack; 4 f. on fat coals run-of-mine; 5-6 f. on rough slack; 8-10 f. on washed smalls; 4 f. on screened semi-fat coals. Besides, a rebate for summer delivery, varying from 3 to 8 f. per ton, was granted on certain classes of sized coals.

On July 1, selling prices were again lowered as follows: Flaming coals, 1 f.-5 f. on rough slack, pea and washed coals; fat coals, 2 f.-5 f. on run-of-mine, washed pea and washed smalls; semi-fat coals, 1 f. on run-of-mine, 3-8 f. on washed pea; 3 f. on washed smalls; lean coals, 1 f.-2 f. on slack.

Since then the official schedule of prices of the Nord and Pas-de-Calais, an abstract of which we reproduce below, has not been modified (all prices are f.o.b. mine):

	Whole Range of Prices for the Four Selling Zones	Prices for the Selling Zone Exposed to the Competition of Foreign Coals
FLAMING COALS		
Slack	48– 60 f	48– 56 f
Screened	87–111 f	87–107 f
Run-of-mine	66– 75 f	66– 71 f
Peas	76– 80 f	76 f
Washed smalls	68– 72 f	68 f
Washed pea	88– 95 f	88– 91 f
FAT COALS		
Slack	54– 62 f	54– 58 f
Run-of-mine	66– 75 f	66– 71 f
Smithy pea	105–113 f	105 f
Washed pea	92–100 f	92 f
Washed smalls	74– 77 f	74 f
Washed coking smalls	72 f	72 f
Screened	89–115 f	89–113 f
Washed nuts, 30/50 mm	105–107 f	105 f
Washed nuts, 20/30 mm	102–104 f	102 f
SEMI-FAT COALS		
Slack	53– 61 f	53– 57 f
Run-of-mine	66– 75 f	66– 71 f
Washed pea	86– 95 f	86– 88 f
Washed smalls	70– 77 f	70 f
QUARTER-FAT COALS		
Slack	48– 59 f	48– 55 f
Run-of-mine	67– 73 f	65– 69 f
Washed pea	80– 92 f., 50	80– 84 f., 50
Washed smalls	62– 77 f	62– 69 f
LEAN COALS		
Slack	40– 58 f	40– 54 f
Run-of-mine	63– 71 f	63– 67 f
Washed pea	70– 90 f	70– 81 f, 50
Washed smalls	75– 74 f	57– 64 f

Reductions up to 1 f. 50c. per ton are officially granted for large tonnages.

We must mention that the mines of the Nord and Pas-de-Calais are not strictly conforming to their official schedule and while in the first months of this year they often agreed to unofficial reductions in order to obtain contracts, they are now availing themselves of the improvement of the market for quoting prices materially higher than the schedule.

In January the daily wages of the miners of the Nord and Pas-de-Calais were reduced as follows: 3 f. 25c. for adult workers (2 f. as from Jan. 16 and 1 f. 25c. as from April 16); 2 f. 25c. for underground boys (under 16 years old); 2 f. for surface boys. Allocations for high cost of living were maintained.

Before the end of the first half year, coal owners of the Nord and Pas-de-Calais, realizing that they could not meet the competition of British coals unless they substantially lowered their costs, decided, since it was not possible to inforce a further decrease of wages in the present conditions of living in the devastated areas, to ask of Parliament a modification of the Eight Hour in Mines Act, in order to increase the 6 hours 15 minutes per shift of effective work underground resulting from the application of that act. It does not seem likely, however, that this modification will be passed by Parliament, and, as the French coal market had improved meanwhile, the operators renounced their ultimatum of a wage reduction failing their obtaining, on Oct. 15 at the latest, the hoped-for extension of the day's work.

In the middle of the year some slight abatements on export rail transportation rates were granted to permit certain collieries to ship abroad a part of their stocks. Reductions on inland traffic likewise have since been granted to coal mines of the Nord and Pas-de-Calais, Lorraine and the Saar district for distances over 150 km.; but these reductions are deemed to be insufficient to enable French collieries to withstand British competition if it again becomes as aggressive as it was at the beginning of this year.

Output Ahead of 1921

During the first ten months of 1922, France produced 26,295,000 tons of coal (including anthracite and lignite), as against 20,343,000 tons during the first ten months of 1921. In 1913 the French coal output was 40,922,000 tons, or 3,410,000 tons per month, to be compared with 2,629,000 tons in 1922. It must however, be observed that the latter figures include the production from Alsace-Lorraine (367,000 tons in October, 1922), which is of course, not included in the pre-war output. Altogether, therefore, present production is about 1,100,000 tons per month behind the rate of 1913.

In 1913, mines of the Nord and Pas-de-Calais produced 27,520,000 tons of coal, a monthly average of 2,293,000 tons, while their monthly output during the first ten months of 1922 was only 1,263,000 tons. The production of the devastated mines is steadily increasing; from 587,000 tons in April last, it rose to 694,000 tons in September and to 728,000 tons in October.

Coke ovens annexed to collieries produced 807,000 tons of coke during the first ten months of 1922, as against 617,000 tons during the corresponding period of 1921. Pre-war French coke production was 2,655,000 tons (for the

[a] All tons in this review are metric tons of 2,204 lb.

whole year 1913), of which 2,445,000 tons was in the Nord and Pas-de-Calais. The difference still to be made up is therefore 140,000 tons per month. The production of coke of the Nord and Pas-de-Calais during the first ten months of 1922 was 324,000 tons. There also was coke production from ovens belonging to metallurgical works, which during the first six months of 1922 aggregated 636,000 tons.

During the first ten months of 1922 France produced 2,211,000 tons of briquets, instead of 1,962,000 tons during the same period in 1921. In 1913 the monthly production was 306,100 tons. The Nord and Pas-de-Calais alone in 1913 produced a monthly average of 150,000 tons of briquets, and for each of the first ten months of this year an average of 112,800 tons.

In spite of a lesser industrial activity, the destruction of the collieries in the Nord and Pas-de-Calais makes it a necessity that France import more coal than before the war. During the first ten months of 1922 French coal imports aggregated 18,192,000 tons, or 1,820,000 tons per month, while average monthly imports in 1913 were 1,558,000 tons. British coals imported up to Oct. 31, 1922, were 9,622,000 tons of which 999,000 tons was received in October.

France imported during the first ten months of 1921 14,583,000 tons, of which, owing to the British miners' strike, only 3,726,000 tons was from Great Britain, and 919,000 tons was from the United States.

Coke Imports Larger

French coke imports during the first ten months of 1922 were 4,162,000 tons; during the same period of 1921, 2,523,000 tons. Germany's part in these imports in 1922 was 3,522,000 tons and in 1921, 2,423,000 tons. Belgium supplied 409,000 tons in 1922 and almost none in 1921. In 1913 France imported 3,071,000 tons of coke.

France imported during the first ten months of 1922 1,125,000 tons of briquets, as against 810,000 tons during the first ten months of 1921, of which 398,000 tons were lignite briquets from Germany in 1922 and 322,000 tons in 1921, and from Belgium 607,000 tons and 284,000 tons, respectively.

EXPORTS OF FUEL FROM FRANCE
(In Metric Tons)

	Jan. to Oct. 1922	Jan. to Oct. 1921	Monthly Average in 1913
Coal	1,552,000	1,532,000	109,000
Coke	383,000	367,000	19,250
Briquets	80,000	80,000	16,000

It may seem strange that France, which has never been a coal exporting country, but which is, on the contrary, in need of large fuel supplies from abroad is now an exporter of sizeable quantities. This is due primarily to the fact that all the western part of France is more easily accessible to imported coals than to the products of the distant French coal fields, and this explains why coal mines of the Nord and Pas-de-Calais are fighting so strenuously for a reduction in transportation rates. On the other hand, the very fact that these exports are of exactly the same importance this year as last year shows that they are a consequence of long-established connections. Most of the 383,000 tons of coke exported by France from Jan. 1 to Oct. 31 was from the Loire coal field, where the metallurgical industry is not reviving to the same extent as in the East, to Switzerland and Italy.

During the first ten months of 1922 Germany delivered to the various Entente countries 15,092,000 tons of coal, coke calculated as coal, and briquets. To France alone, shipments aggregated 3,860,000 tons of coal, 3,680,000 tons, of coke equivalent to 4,906,000 tons of coal, and 392,000 tons of lignite briquets, a total of 9,158,000 tons.

Indemnity of 7,000,000 Tons

According to paragraph 2, Annex V, Part 8 of the Versailles Treaty, Germany was to deliver to France in 1922: (1) A fixed annual indemnity of 7,000,000 tons of coal; (2) The difference between the pre-war and the present output of the Nord and Pas-de-Calais coal mines, which on the basis of the monthly average output during the first ten months of this year would have been 1,030,000 tons per month. If the provisions of the Versailles Treaty has been strictly carried out, Germany ought therefore to have delivered to France 1,613,000 tons of coal per month, whereas she delivered only 915,800 tons during each of the first ten months of 1922.

It seems probable that 1923 will continue the transition to better times from the acute depression of 1921. France consumed in 1913 about 63,000,000 tons of coal, production plus imports less exports, including the equivalents in coal of coke and briquets. To this must be added the normal consumption of Alsace-Lorraine, which is about 9,000,000 tons. This indicates that the normal annual fuel requirements of France are 72,000,000 tons.

The following figures show the coal consumption of France in 1921 and in 1922 in metric tons, without, however taking any account of stocks:

	1921	1922 (Two Months Estimated
Coal	37,523,000	48,335,000
Coke (coal equivalent) *a*	4,650,000	6,113,000
Briquets (coal equivalent)	3,235,000	3,050,000
Totals	45,408,000	57,498,000

(*a*) Calculated as 4 tons of coal for 3 tons of coke and briquets as 92 per cent coal.

French mines contributed 24,847,000 tons or 55 per cent in 1921 and 31,550,000 tons (two months estimated) or 55 per cent in 1922.

Results of Reconstruction

When the reconstruction of devastated collieries in the Nord and Pas-de-Calais is completed French coal production will be 45,015,000 tons, almost exactly the French coal output in 1913, 40,922,000 tons plus the coal production of Alsace-Lorraine, 4,400,000 tons.

It does not seem probable that the devastated mines of Northern France will be able to recuperate their full capacity of production before about four years, and they also will have to overcome a serious labor shortage.

SOURCES OF FRENCH COAL IMPORTS

	First 10 Months of 1922 Metric Tons
1—Great Britain:	
Coal	9,621,000
Coke	42,000
Briquets	116,000
Total (coke and briquets converted into coal)	9,784,000
2—Germany:	
Coal	3,111,000
Coke	3,522,000
Briquets	398,000
Total (coke and briquets converted into coal)	8,175,000
3—Belgium	
Coal	2,010,000
Coke	409,000
Briquets	607,000
Total (coke and briquets converted into coal)	3,114,000
4—Saar Territory	
Coal	2,912,000
5—Netherlands (partly in transit from Germany)	
Coal	510,000
6—Various countries	
Coal	
Coke (including probably some coke in transit from Germany)	189,000
Briquets	4,100
Total (coke and briquets converted into coal)	282,800
Total	24,777,800

From the above figures it is evident that when French coal output and consumption are normal, France will still be dependent upon other countries for her coal supply to the extent of 27,000,000 tons per annum (as against about 26,000,000 tons this year and 22,000,000 tons in 1913).

If 1923 is marked by a real industrial revival and French coal requirements climb toward their normal level of 72,000,000 tons, France, with the reconstruction of her devastated collieries still far from being complete will experience serious difficulties in obtaining the coal. A general revival of trade would, of course, be felt also in Great Britain, and it is not therefore to be expected that exports could be increased beyond the present shipments to France of 11,000,000 tons. Belgium, which already is having difficulty in meeting the demands upon her production, especially for domestic coals, would certainly not be able to send more than her present 3,700,000 tons.

American Coals May Be Needed

From the Saar territory some relief might be expected, but it is unlikely that it would be sufficient and American coals alone might fill the breach. But will political and economic circumstances permit such a genuine revival to take place as soon as this year? This seems to us rather doubtful. The French metallurgical trade, though, would have a higher output but for lack of coke.

No reduction of wages is to be expected soon in French collieries and, as the men's leaders have pledged themselves to oppose any modification of the Eight Hour in Mines Act, it seems most probable that Parliament will not pass the proposed amendment. French collieries' costs therefore probably will remain at their present high level.

After Poor Start, British Coal Trade Had Good Year

Improvement Laid to Better Co-operation Between Operators and Miners and American Demand for British Coal—Management Better, Costs Lower and Output Higher—Outlook is Bright

By C. H. S. Tupholme

On the whole, the past year was a good one for the British coal industry. The year 1922 opened badly, it is true, but matters gradually improved, until December went out with production consistently above the 5,000,000-ton per week mark, prices steady, exports up and pre-war buyers returning.

This improved outlook finds its basis in two factors. The first is the better co-operation between operators and miners, arising from an appreciation of elementary economic facts, and the realization that the welfare of the men depends upon that of the industry and *vice versa*. The second factor is, or was, the demand from America for British coal.

Better co-operation has resulted in improved management, lower costs and better output. The second factor has demonstrated to potential coal buyers that Great Britain is willing to sell coal on a business basis, can supply in practically any quantity and is not anxious to benefit from the misfortunes of others. The strike in the United States exerted a strong influence in bringing back customers who had held off; here I might instance South America and Germany. Both of these countries, with others, have, since the American demand on British production, enormously increased their orders.

Production is indeed very good. In 1921 the weekly output only once reached the 5,000,000-ton level, and that was at the end of December. During the past year output has steadily mounted and, for the past few months—i.e., since the American demand—has consistently exceeded a level thought unattainable under the seven-hour day.

Rate of Output Increases

For the first half of the year the output was at the rate of some 213,000,000 tons per annum and during the last few months of the year the rate increased to approximately 272 000,000 tons. In other words, an increase in annual production rate of 60,000,000 tons is shown, or nearly 30 per cent. All the coal mining districts of Britain contributed toward this increase and it is practically impossible to pick out any one area as being exemplary.

Individual production, never very high, nevertheless improved. At the end of 1921 the pits employed 1,070,000 men; the figure is now 1,030,000. Individual output has risen to 18 cwt. per man-shift worked.

Production costs have decreased satisfactorily. When a government-controlled industry, costs per ton, other than wages, were 9s. 9d., of which 6s. 5d. represented timber and stores and 3s. 4d. other costs. Since decontrol of the industry, the cost of timber and stores per ton produced has fallen to 2s. 5d.; other costs, such as management, are now 3s. 3d.; royalties are 7d. and the contribution to the Miners' Welfare Fund per ton is 1d. Labor charges per ton are 12s. 7d. The net cost of a ton of coal at the pithead is now 18s. 11.58d.

This production cost figure nearly balances the proceeds from commercial disposals, but not quite. The proceeds per ton are now 18s. 11.41d., showing a loss per ton of 0.17d.

Though export figures for October and November are not as high as in September, they show a definite improvement over last year's figures. The United States demand, of course, was abnormal and the British operators wisely recognized it as such and did not count September's exports as an example of what was to be expected from then on. In spite of a fall during October, however, the exports for that month were 700,000 tons over the figure for October, 1921.

This increase cannot be attributed to abnormal demand from any one source. It is believed that this increase will continue and that exports of British coal to such destinations as Continental Europe, South America and India this year will reach their pre-war level.

This year will see fairly extensive development of coal-bearing areas, particularly in Wales. In the anthracite districts enterprise is encouraged by the prospect of Canada and certain areas of the United States becoming permanent customers for Welsh anthracite. The present production of anthracite in South Wales is about 4,000,000 tons annually, or about one-thirteenth of the output of the Welsh coal field, and developments in the steam-coal area are on a much larger scale.

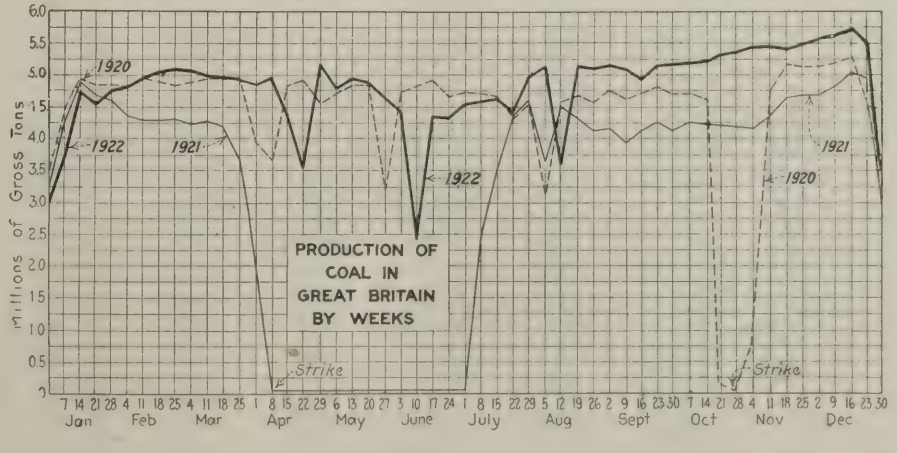
The more important development schemes include the Taff Merthyr Colliery Co., which has acquired 1,500 acres of virgin coal in the heart of the steam-coal area. Two pits are to go down to the steam-coal measures and one to the bituminous seams, which are at a much shallower depth. Work is to be started early this year, and the colliery will be operated on the same lines as all the new pits of the Powell Duffryn Co., by electricity, which will be supplied by that company's power plant at Bargoed. These plans will also be aided by the intention of the Great Western Ry. to electrify certain of its lines in the South Wales fields.

Great hopes have been raised by the anticipation of an early report from an advisory committee appointed by the Mines Department to investigate the question of economies in the cost of production, transport and handling of coal. This committee consists of the former government Coal Controller, the president of the Mining Association of Great Britain, the secretary of the Miners' Federation and the president of the Coal Merchants' Federation. It is known that the committee has collected a mass of statistics, and the recommendation of a number of possible lines of economy on a moderate scale is expected.

Outlook Is Promising

What does 1923 hold for the British coal industry? I believe it holds much that is good and little that is bad. There is no doubt that the owners, by wisely cutting profits to obtain customers, have largely restored their prestige in the export markets, and foreign buyers now feel that they may place orders with British collieries with a large measure of confidence that their contracts will be filled on time.

Prices are not likely to fall materially. For the last few months they have been affected in only a minor



degree, which is only to be expected. On the other hand, I do not think they will rise to any extent. Britain's chief market is Europe and what she can get for her coal depends largely on how the exchanges stand. These exchanges are not likely to fall further; indeed, in many cases, they could not. I believe that the prices obtainable at present will rule within a shilling or so throughout the year.

A large measure of the coal industry's prosperity is dependent, of course, on the country's home industries. These have touched bottom during 1922 and are now definitely on the turn, as is shown by a gradual increase in home demand for coal. A better home demand will do much to stabilize prices and provide steady work for more mine workers.

American Emergency Benefited British Coal Industry

Prolonged Miners' Strike Caused Seaboard Industrial Consumers to Replenish Stocks with Welsh Fuel—Canadian Buyers Also Forced to Turn to Mother Country—3,000,000 Tons Shipped Here

GREAT BRITAIN'S coal industry benefited considerably during the latter half of 1922 from the emergency market in North America, created by the prolonged miners' strike in the United States. Not only did large industrial consumers along our seaboard take in considerable tonnage of British coals, but Canadian buyers also placed their orders to fill in the gap caused by the cessation of shipments across our northern border.

Boston and New York were the main ports of arrival in this country, although Baltimore and Philadelphia also received considerable quantities. Of lesser importance as ports of arrival were Portland and Providence.

It is estimated that 250,000 tons of Welsh coal were brought into Montreal alone last year. The majority of this tonnage was for industrial use, although Canada, feeling the shortage of anthracite more keenly than the United States, took a much larger proportion of British coal for domestic purposes in comparison with her requirements than did the United States. Despite active selling campaigns along the Atlantic Coast, Welsh semi-anthracite coal failed to find a ready market as a substitute for our domestic anthracite. Some of the advertisements were misleading as they gave the uninitiated an impression that British anthracite was being sent over in volume, while in reality, because of its prohibitive price, only a few cargoes of real English hard coal were shipped. The domestic coal really received in most cases was not well taken, as it would not stand handling as well as our own bituminous prepared sizes, which began to appear in the Eastern centers when it was apparent that anthracite would not be obtainable in the required volume. Also its distribution area was limited as railroads had published no tariffs, nor were they equipped to carry it inland.

Dry Welsh coals in low ash and volatile content were exploited as a domestic fuel and could be utilized for household consumption. Some houses handling these coals, however, were either unknown or employed sales methods which led to criticism and distrust and reduced the volume of possible trading to a considerable extent.

Varying results were reported from the use of British industrial coal in this country. Railroads and utilities in New England and New York were the heaviest buyers. The D. L. & W. Ry. purchased over 100,000 tons, 40 per cent of which was high volatile, and results were generally satisfactory. The New York Central purchased over 150,000 tons of high-volatile and experienced some trouble at first as the fire boxes were not adapted to it. Later, after the coal had been in use for some time familiarity with it obtained better results. The Seaboard By-Products Co. used a large tonnage at the time the shortage of American coal was most acute and also obtained good results. On the other hand, it is understood that some large consumers such as public-utility plants along the seaboard found that British coal was unsatisfactory and discontinued its use at the first opportunity. The Interborough Rapid Transit Co., of New York, found that it caked when performance was forced,

British Production and Prices, by Weeks, 1921 and 1922

	1921						1922					
Week Ended	Production (Gross Tons)	Admiralty Large Cardiff	Steam Smalls Cardiff	Best Steams New Castle	Best Gas New Castle	Best Bunkers New Castle	Production (Gross Tons)	Admiralty Large Cardiff	Steam Smalls Cardiff	Best Steams New Castle	Best Gas New Castle	Best Bunkers New Castle
Jan. 7	4,344,600	70s.@75s.	32s.6d.@35s.	62s.6d.	60s.@62s.6d.	50s.@55s.	3,675,000	24/6@25s.	18/6@19	23/6	21/6@22	21s.@21/6
Jan. 14	4,897,000	62s.6d.@65s.	32s.6d.@35s.	60s.	55s.@60s.	47s.6d.@52s.6d.	4,720,000	24/6@25s.	18@19	23/6@24	21@21/6	20/6@21
Jan. 21	4,691,000	60s.@62s.6d.	30s.	55s.	55s.	47s.6d.	4,561,000	24/6@25s.	18@18/6	24s.	20/6@21/6	20/6@21
Jan. 28	4,606,000	57s.6d.@60s.	25s.@30s.	55s.	55s.	47s.6d.	4,739,000	24/6@25s.	17/6@18/6	25s.	21@22	21s.
Feb. 4	4,418,000	57s.6d.@60s.	25s.@27s.6d.	50s.@55s.	55s.	40s.@42s.6d.	4,803,000	24/6@25s.	18@19	24@25	21/6@22	21@22
Feb. 11	4,345,000	59s.@60s.	20s.@22s.6d.	50s.	47s.6d.@50s.	35s.@40s.	4,900,000	24/6@25s.	18@19	24/9@25	22/6@23	22@2/6
Feb. 18	4,284,000	59s.@60s.	20s.@25s.	50s.	45s.@47s.6d.	40s.@42s.6d.	5,001,000	25@25/6	18@19	24/9@25	23s.	23s.
Feb. 25	4,321,000	57s.	20s.	47s.6d.	42s.6d.@45s.	35s.@37s.6d.	5,047,000	27@27/6	19/6@20	25s.	23@24	22/6@23
Mar. 4	4,259,000	57s.@58s.	20s.@21s.	47s.6d.	42s.6d.@45s.	35s.@40s.	5,039,000	27@27/6	19/6@20	25s.	23@24	23/6@24
Mar. 11	4,275,000	57s.@58s.	20s.@25s.	47s.6d.	42s.6d.@45s.	35s.@40s.	4,996,000	27@27/6	19/6@20	25s.	24s.	23@24
Mar. 18	4,240,000	57s.@58s.	20s.@25s.	45s.	42s.6d.	37s.6d.@40s.	4,957,000	27@27/6	19@20	25s.	24@25	23/6@24
Mar. 25	3,660,000	57s.@58s.	27s.6d.@30s.	42s.6d.	40s.@42s.6d.	37s.6d.@40s.	4,920,000	27@27/6	19@20	24/6	24@25	22/6@23
April 1	1,950,000	57s.@58s.	27s.6d.@30s	42s.6d.	40s.@42s.6d.	35s.@37s.6d.	4,825,000	27@27/6	19@19/6	23@23/6	24@24/6	22@22/9
April 8	.....	62s.6d.@65s.	27s.6d.@30s.	.....	.....	.....	4,961,000	27/9@28/3	19@19/6	23/9@24/3	24@25	23/6
April 15	.....	62s. 6d.@65s.	30s.@35s.	.....	.....	.....	4,384,000	28@28/6	19/6@20	24s.	24@24/6	23/9
April 22	.....	62s.6d.@65s.	30s.@35s.	.....	.....	.....	3,544,000	28/6@29	19@20	3/9@24/3	24@24/6	22/6@23
April 29	.....	62s.6d.@65s.	30s.@35s.	.....	.....	.....	5,160,000	28/6	19@20	23@24	23@24	22@22/6
May 6	.....	62s.6d.@65s.	30s.@35s.	.....	.....	.....	4,765,000	28/6@28/9	19@20	23@24	24	22/6
May 13	.....	59s.@60s.	24s.@25s.	.....	.....	.....	4,945,000	28/6@29	19@20	23/6@24	23@24	22/6
May 20	.....	59s.@60s.	24s.@25s.	.....	.....	.....	4,804,000	28/6@28/9	19@20	23s.	23@24	22/6
May 27	.....	59s.@60s.	24s.@25s.	42s.6d.	.....	.....	4,630,000	27/9@28	18/6@19	23/6@24	23/6	22/6@23
June 3	.....	59s.@60s.	24s.@25s.	.....	.....	.....	4,441,000	27@27/3	18/6@19	23s.	22/6	21@22
June 10	.....	59s.@60s.	25s.	.....	.....	.....	2,441,000	26/9@27	18/6@19	24s.	22/6	21@21
June 17	.....	47s.6d.@52s.6d.	18s.@25s.	45s.	42s.6d.	36s.	4,350,000	26/6@26/9	18@18/6	23/6@24	21/6	20@21
June 24	.....	45s. @ 47s.6d.	20s.@25s.	.....	50s.	.....	4,354,000	25/9@26	17/6@18/6	24s.	21/6	19@20
July 1	.....	45s.	20s.@25s.	40s.@42s.6d.	.....	35@37/6	4,530,000	25@25/6	17/6@18/6	24s.	21/6@22/6	18/6@20
July 8	2,355,000	47s.6d.@50s.	24s.@25s.	.....	40s.	40s.@42/6	4,598,000	24/6@25	17/6@18	24s.	21/6@22	20/6
July 15	3,927,000	47s.6d.@50s.	25s.@30s.	45s.@50s.	.....	40s.@42/6	4,627,000	24@24/6	17/6@18/6	23@24	21/6@22/6	20/6
July 22	4,332,000	47s.6d.@50s.	25s.@30s.	4 s.@ 50s.	.....	38/9@40s.	4,391,000	25s.	18@18/6	24@25	22/6@24	21 6
July 29	4,587,300	45s.@46s.	25s.@27s.	42s.6d.	38s.9d.	35s.@37/6	4,898,000	29@30	17@21	24@25	25s.	23@25
Aug. 5	3,619,000	40s.@42s.6d.	20s.@22/6	37/6@40s.	37s.6d.	35s.@37/6	5,122,000	29@31	21/6@22/6	25s.	25s.	25s.
Aug. 12	4,537,000	37/6@38/6	19s.@20s.	32s.6d.	35@37/6	30s.	3,623,000	29@31	21/6@22/6	25@26	25s.	25s.
Aug. 19	4,334,000	36@37/6	19s.@20s.	27/6@32/6	31@32/6	32s.6d.	5,158,000	30@32/6	22@22/6	25@26	25s.	25s.
Aug. 26	4,102,300	32s.6d.	17s.6d.	30s.	30s.@33s.	27s.@28s.	5,148,000	31@32/6	22@22/6	25@26	24@25	23/6@24/6
Sept. 2	4,143,900	32/6@33/6	18/6@19/6	27/6@30	28s.	27s.@28s.	5,204,000	30@31	22@22/6	25@26	24s.	23/6@24
Sept. 9	3,940,000	32/6@33/6	18/6@19/6	27/6@30	27s.@28s.	28s.@29s.	5,161,000	29s.	19s.	24/6@25	24s.	21/6@22
Sept. 16	4,161,500	31/6@32/6	19@19/6	28@30	27/6@28/6	27@28	4,995,000	27/6	18@19	24@24/6	23/9	22/6@23
Sept. 23	4,273,900	30@32/6	19@19/6	28@30	27/6@28/6	27@28	5,144,000	26/6	16/6	24@24/6	23/9	22/6
Sept. 30	4,114,000	30@32/6	17/6@19	27/6	27@28	27s.	5,177,000	26@27	16@16/6	24/6@25	23@24	23s.
Oct. 7	4,287,000	30@32/6	19@20	27/6	27@28	27s.	5,209,000	27@28	16@16/6	25@26	23@23/6	22/6@23
Oct. 14	4,238,000	30@31	19@20	27@27/6	27@27/6	26@27	5,255,000	27/6@28	16@16/6	25/6@27	23/6@24	22/6@23/6
Oct. 21	4,235,000	29@30	19@20	25@27/6	25@26	25@26	5,355,000	27/6@28	16@16/6	27s.	24@25	23/6
Oct. 28	4,210,200	28@29	19@20	24@25	25@26	24@25	5,388,000	27/6@28/6	16@16/6	27s.	24@25	23/6
Nov. 4	4,182,000	27@28	18/6@19/6	23@23/6	24@24/6	23@23/6	5,423,000	28@29	16@17	27s.	24@25	23/6
Nov. 11	4,373,000	26/6@27	18/6@19/6	22/6@23	24@24/6	23@23/6	5,441,000	28@28/6	16@17	25/3@27	24@25	23@24
Nov. 18	4,646,000	26@26/6	18/6@19/6	23s.	24s.	22@23	5,376,000	28@28/6	16@17	25/3@27	24@25	23@23/6
Nov. 25	4,674,000	25/6@26	18/6@19/6	23@24	23s.	21/6@22	5,472,000	28@28/6	16@17	25@25/3	24@25	23/6@24
Dec. 2	4,693,000	25/6@26	18@18/6	25s	22@22/6	21/6@22	5,573,000	28@28/6	16@16/6	25/6@26	24@25	22/6@23/6
Dec. 9	4,855,000	25/6@26/6	17/6@18/6	24/6@25	22@22/6	21@22	5,592,000	28/6@29/6	17@18	25/6	24@24/6	23/6
Dec. 16	5,027,000	25/6@26/6	18/6@19/6	24@25	22@22/6	21/6@22/6	5,742,000	28@28/9	16/6@18/6	25/6@26	24@25	22/6@23/6
Dec. 23	4,965,000	25/6@26/6	19/6	2 s	21/6@22/6	21/6@22	5,506,000	28@29	17/6@18	25s.	24@24/6	22@23
Dec. 30	3,050,000	25/6@26/6	18/6@19/6	23/6@24	21/6@22	21@22	.....	28@28/6	18@19	25s.	25s.	22@23

and though this was remedied somewhat by experiments, purchases were stopped as soon as possible. Some New England railroads which bought heavily during the emergency obtained fairly good results from gas or locomotive fuels from the Eastern ports of England and availed themselves of British offerings right up to the close of the year.

The Boston & Maine R.R. purchased about 380,000 tons of British coal and received approximately 290,000 tons during 1922, 95 per cent of which was high volatile. Only a small percentage of this was satisfactory, however, the objection on some of the coals, as North Wales unscreened, Yorkshire, Derbyshire and Lancashire being the low fusibility of the ash, which caused excessive clinkering. The large percentage of ash in the coals of higher fusibility was very unsatisfactory, even in those fuels which were bought "all-large."

During the period of real emergency the Southern coals from Hampton Roads filled in remarkably well but with the easier prices which followed the resumption of union mining, the smaller receipts of British coals were offered at prices that were difficult to meet. The Southern fuels, finding the Western market in need of tonnage, were able to obtain their own price in that territory and New England railroads were able to eke out their requirements with British coal at attractive figures.

In all, about 3,000,000 tons of British coal was sent to this country, shipments being about equally divided between the British Channel and eastern ports. The movement started late in July; during August slightly less than 1,000,000 tons were sent forward to the United States and Canada and about 1,250,000 tons during September. The October figure was not so large and shipments declined steadily until a few scattered cargoes for New England railroads now represent the only activity in the markets of the United States. The total quantity moved to this country last year approximates the volume that Great Britain imported in 1921 during her strike troubles, but for which she paid exorbitant figures when compared with the prices at which British coal entered North America.

UNLOADING FACILITIES UNEQUAL TO LOAD

The sudden strain on our port unloading facilities caused a heavy congestion of loaded boats almost at the outset. Many diversions of cargoes from one port to another were necessary, but they failed to do more than slightly lighten the demurrage costs caused by the long delay in unloading. Another bad feature was the type of vessels which brought in this emergency fuel. In many cases the hold construction was so different from our own vessels that the unloading machines were slowed down to a degree that caused heavy demurrage penalties.

The cost of the coal laid down on this side for a few of the railroads in New England ranges cheaper at this writing than on our own coals and results show that the differential can still be narrowed considerably before the competitive position of this foreign coal is menaced. Westbound cargoes of British coal can be taken as ballast for ships engaging in the South American trade and thus the cost of ocean transportation is minimized and Great Britain is enabled to partially maintain her exports of emergency fuel to this country.

A permanent market for this coal in New England is extremely unlikely, however. American coal shippers are rapidly getting into competitive position again, domestic qualities are more familiar and therefore preferred and Great Britain is out of line as soon as her normal markets recover from their long depression.

Shipments of British coal to New York, which had practically ceased in December, were resumed the last week and it was reported that contracts for large tonnages for January and February delivery had been awarded.

Germany Loses Rank as Second Largest Coal Exporter

Division of Upper Silesia Makes Nation Dependent on Imports—Production Suffered from Decreased Efficiency of Miners—Improvement Results from Overtime Shifts in Ruhr District

By H. O. Herzog
Berlin, Germany

THE year 1922 was an eventful chapter in Germany's coal situation. The division of Upper Silesia completed the great change wrought by the peace treaty, reducing Germany from her position of the second largest coal exporting country of the world to one dependent on imports. From being one of the main sources of Germany's wealth in pre-war times coal has become a source of constant worry and trouble; from a strong support of foreign trade balance into a deadweight on the country's already strained finances, which was in no slight degree responsible for the rapid fall of the mark in recent months. It is now a national problem of the first order and in its direct and indirect bearings the ruling factor of Germany's economical life. Coal prices determine the prices of all other products; their movement is the basic factor of the movement of wages. In one word, coal has become the real basis of the German currency.

Coal shortages have existed in previous years, but they were somewhat exaggerated in the interest of the constant struggle carried on for a more favorable adjustment of the coal tribute to the Entente countries. In 1922 the coal shortage became a real fact. Factors which combined to make the coal situation a precarious one was the loss of the greater part of Upper Silesia, the decline of production in the Ruhr district, the general business boom, and the railroad strike, which, although short, caused disorganization of traffic of some duration. Through the division of Upper Silesia Germany lost 75 per cent of that province's output, nearly half of its production of coke, and a large part of the country's most accessible coal reserves. Several months prior to the Upper Silesian plebiscite riots and political agitation exercised a disturbing influence upon the Upper Silesian coal production, while after the division, failure of the transportation system deprived the country for a time of the supply not only from the alienated part but also from the part remaining to Germany.

Production in all mine fields suffered under the falling efficiency of the workmen, which doubtless is due in some degree to their reduced physical ability but in the main to the latent labor conflict. This conflict is of a complicated nature. If the miners are to be believed, their attitude is caused by disappointment over the promised socialization of the mines. The true inner cause, however, is dissatisfaction with their wages. This dissatisfaction will and must exist as long as the men do not receive the full equivalent of their pre-war wages. Their leaders, however. evade the fact that against an increase of 35 per cent of the mines' complement stands a decline of 20 per cent in production. The following figures, showing the daily output computed per head of the complements in the Ruhr district and the ratio of the annual German output per head of the total number of the employed for the last three years in comparison with 1913, are illustrative in this respect:

	1913	1920	1921	(Jan.-Aug.) 1922
Daily output per head of Ruhr complement, in kg:...	883	592	561	556
Average output of total number employed in annual production, in tons:	280.7	188	181.7	179

Since September, 1922, an improvement has taken place in the Ruhr district, due solely to the overtime shifts consisting in an extension of the working time by two hours during three days of the week, or of 14½ per cent. As the result of this overtime work the rate of daily output per head increased

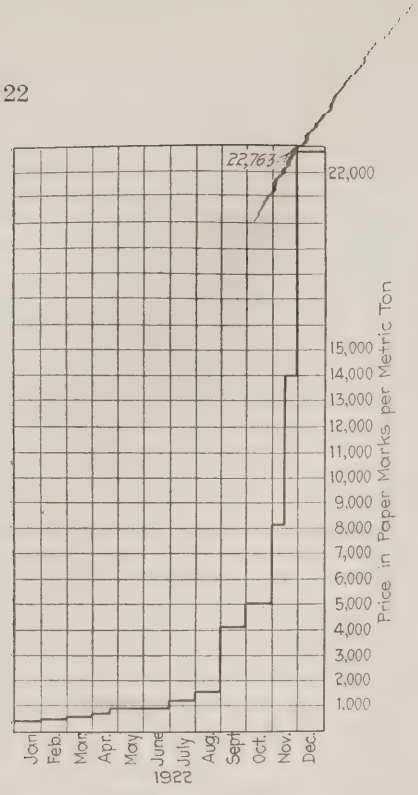


FIG. 1—TREND OF GERMAN COAL PRICES, 1922

in September to 571 kg., or 10.2 per cent, and in October to 610 kg., or 11 per cent. In November it advanced even to 620 kg. Taking into account the difference of working time, which in 1913 was nine hours per day, whereas it is now seven hours, the standard of efficiency of the miners is at present 80 per cent. If this appears satisfactory it has to be considered that the efficiency of equipment has been raised to some extent.

The monthly outputs in 1922 show considerable fluctuation. In the first three months the rate of production was improving in the following months it declined until August, when it sunk below the level of previous years. A recovery took place beginning in September, produced by the overtime shifts already mentioned. If the total falls behind the production of the preceding year by 8,000,000 tons, it is due to the territorial changes in Upper Silesia. The loss since the division of the province amounts to 14,000,000 tons.

The production of coke has advanced satisfactorily. The progress made in this respect since 1920 is over 4,000,000 tons. Of the 26,000 coking furnaces owned by Germany in 1913, 4,000 have been lost to Poland. Of those remaining only some 80 per cent were in operation at the end of 1921, which number has been steadily increased in the course of the year on the spur of pressing needs. Production of brown coal has only slightly advanced beyond the output of 1921. It seems that the rapid progress in the production of brown coal has for the time being come to a standstill.

The most marked change in the German coal situation during 1922 is the enormous rise of prices. Starting with 405 marks per ton at the beginning of the year, prices on Dec. 1 reached a level of 22,763 marks for the standard grade of Ruhr fat run of mine. The movement of prices is shown in Fig. 1.

The rise of prices was to some degree caused by the increase of the coal tax from 20 to 40 per cent, which took place in April, but in the main is due to the depreciation in exchange. The tendency was to keep prices at a level of approximately 8 gold marks without coal tax and turnover tax, but they have sunk considerably during certain periods of the year when depreciation in exchange was marked. Fig. 2, in which the stepped curve gives the ratio of coal prices to their pre-war price, and the dashed line the ratio of the exchange to pre-war parity, shows the tendency of the price movement.

Steeper still than the rise of coal prices was the increase in cost of mining material, many items of which have already reached the world market level.

With regard to miners' wages an important change took place in the course of the year 1922. In previous years they have been adjusted at considerable intervals by protracted negotiations. The rapid upward movement of the cost of living in 1922 practically installed the system of keying them to the index for the cost of living in the mining districts, adjustments being made from month to month. The average wages paid to miners at the beginning of the year was at the ratio to pre-war wages of 70 to 1; at the end of the year is was 450 to 1.

Basic factors in production costs and revenue at the end of the year, were at the following ratio to pre-war standard: Cost of material, 1,900; cost of labor, 450; price of coal (less taxes), 1,100. As can be seen, the net price paid to the mines for coal keeps somewhere midway between labor and the component parts of cost of production. In drawing conclusions with regard to the financial situation of the mines it must be considered that the level of wages paid, indicated by the ratio of 450 to 1 above pre-war level, is exclusive of the miners' other emoluments and takes no account of the fact that the ratio of expend ture in wages and salaries per ton of coal has risen by about 60 per cent on account of the lower efficiency of the miners and the increase of staff. The real margin between the price of coal and cost of labor is much narrower than appears from the above index figures; in fact it is hardly sufficient to compensate for the excess price of the other items of cost.

Another prominent feature of the German coal situation in 1922—in its financial aspect doubtless the most prominent one—is the growth of foreign imports. In pre-war times Germany imported coal, chiefly of British origin, but imports were largely exceeded by exports. In 1913, for instance exports of 34,500,000 tons stood against imports of 10,500,000 tons. But conditions now are entirely reversed. Exports from Upper Silesia to neighboring countries, carried out under Entente control, having stopped, there remain only the small quantities supplied to Holland under contract in return for a rotating credit to the German industry, and a similar arrangement with Switzerland on a smaller scale. Leaving out of consideration the coal tribute to the Entente, exports now average 120,000 tons per month, against which stand imports which in the second half of the year far exceeded 2,000 000 tons per month. The chief originating countries were Great Britain and since the division of Upper Silesia—Poland.

COAL IMPORTS BY MONTHS, 1922 AND COST IN PAPER MARKS

	Tons	Paper Marks
January	194,078	148,000,000
February	162,735	150,000,000
March	284,979	422,000,000
April	336,921	332,000,000
May	333,754	432,000,000
June	789,797	1,108,000,000
July	2,394,933	51,008,000,000
August	2,385,724	48,771,000,000
September	2,385,038	50,728,000,000
October	2,231,936	61,374,000,000
November	1,588,243	39,753,000,000
Totals	13,088,138	254,226,000,000

The coal situation at the end of the year may be summed up as follows: The present rate of production is insufficient for the needs of the country. After deducting from the output the coal tribute to the Entente, approximating 18,000,000 tons per year, a certain amount has to be imported, even under most favorable conditions for the supply of the shipping trade on the one

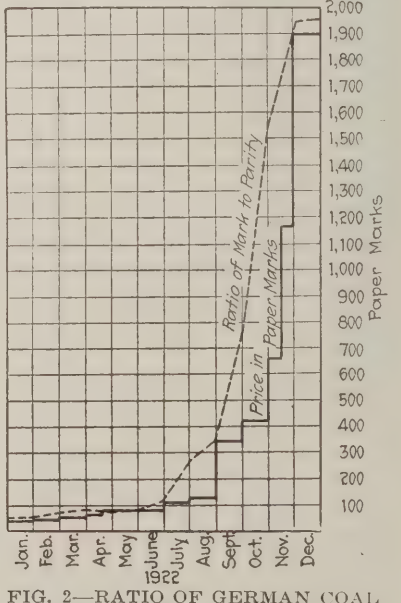


FIG. 2—RATIO OF GERMAN COAL PRICES TO PRE-WAR RATE OF EXCHANGE

Solid line shows ratio of coal prices to pre-war. Broken line shows ratio of gold mark to parity.

GERMAN COAL PRODUCTION IN 1922 COMPARED WITH PREVIOUS YEARS
(In 1,000 Tons)

	Bituminous Coal	Brown Coal	Coke	Patent Fuel—Bituminous Coal	Patent Fuel—Brown Coal
1913 (Within pre-war frontiers)	190,109	87,233	34,630	6,992	21,917
1913 (Within present frontiers)	173,096	87,233	32,653	6,811	21,977
1920	131,341	111,880	25,177	4,938	24,273
1921	176,210	123,011	27,921	5,688	28,243
1922*	128,301	124,776	29,248	5,435	27,277

*The production in November is inserted according to preliminary returns and the December production by estimates based upon intermediate reports.

hand and of the eastern part of Germany from Poland on the other. To balance the cost of these imports and to ease the market situation an increase in production of from fifteen to twenty million tons is needed. This also would help to meet further Entente demands.

Increase in production up to now has been a question of the number of miners employed. In view of the expensive housing problem and the state of the development of the mines, this number is limited, in fact, has arrived at this limit. Under present conditions, the only recourse is to the extension of the working time. An increase in the miners' efficiency is not taken into consideration for the present, as the required outlay for labor-saving equipment and the equally essential introduction of payment by results are out of the question now. Against the extension of the working time stands the miners' strong resistance. Their recent concession with regard to overtime shifts in the Ruhr district was made in a half-hearted way, only on the pressure of convincing circumstances.

With regard to the further development of mine capacity, no results on a large scale can be expected in the coming year. Of shafts now in process of sinking, five or six in the Ruhr district will be completed in the coming year, each estimated to have a capacity of about a million tons per year.

Fewer Coal-Mine Fatalities in 1922 Than in 1921, But Ratio to Output Is Higher

By W. W. Adams[1]

ACCIDENTS at coal mines in 1922 will show fewer men killed than in 1921, but the fatality rate based upon the output of coal will be higher. Reports from state inspectors covering the first eleven months, supplemented by an estimate for December, indicate that fatal accidents will number about 1,950, a reduction of 23 from the year before. Later reports may change this estimate.

The reduction in fatal accidents should have been much larger than the record will actually show, because during five months of the past year a large part of the coal-mining industry was shut down by the miners' strike, thus eliminating accidents that would have occurred had the mines been operating.

The reduction in fatalities during the five-month strike period was completely wiped out by the great loss of life in major disasters during the past year. The year's record shows 13 accidents in each of which five or more men were killed, with a total loss of 272 lives. In 1921 only five similar accidents occurred, in which 34 men were killed. To speculate is not always to waste time; had these major disasters during the past two years been prevented, the year 1922 would show 261 lives saved as compared with 1921.

Most of the larger disasters, of course, were mine explosions, and to their occurrence the increased fatality rate in 1922 is almost entirely attributable. There was a negligible increase in haulage accidents. Accidents from the use of powder and other explosives resulted in a fatality rate only two-thirds as large as the rate for 1921.

The following figures show the number of fatal accidents in each month during the past two years, the numbers in parentheses indicating the number of deaths from major disasters:

	1921	1922
January	197	158 (6)
February	160 (12)	228 (43)
March	137 (5)	196 (22)
April	164	78
May	173	84 (11)
June	170	103
July	162	84
August	155 (11)	102
September	167	163 (5)
October	180	199 (8)
November	158	349 (177)
December	150 (6)	203 Est.
Totals	1,973	1,947

[1]Statistician, U. S. Bureau of Mines.

It will be noted from the foregoing that only five months of the past year were free from major accidents, although half of the mines were on a non-producing basis from April 1 to Sept. 1. During 1921 the mines were operated eight months without the occurrence of a major disaster.

From the latest reports available it is estimated that the fatality rate from all causes for the past year will be 4.28 per million tons, as compared with 3.90 in 1921.

Falls of roof and coal always cause nearly half of all fatalities at coal mines, except in years of numerous deaths from gas and dust explosions. The actual number of deaths varies according to the quantity of coal mined, number of men employed, and period of active operation of the mines. The usual standard for comparing the increase or decrease in the frequency of accidents is the production of coal and the number of employees working any uniform period of time.

Choosing these usual standards, accidents from falls of roof and coal during the past year (excluding December) have shown a rate of 1.93 per million tons as compared with 2.01 in 1921. The lowest rate during the past eleven years was 1.72 in 1920 and the highest was 2.54 in 1911. On the basis of the number of men employed underground, the rate in 1921 was 2.58; for 1922 the rate cannot be stated, because the number of employees is not yet known. The highest rate since the bureau's organization was 2.83 in 1911; the lowest was 2.30 in 1916.

Falls of roof and coal constitute a class of accidents for which the miners themselves must shoulder most of the responsibility. The miners are constantly at the working places, they have the opportunity to continually observe the conditions of the roof, and they are best able to tell when rock or coal should be removed or additional props put up. Their safety is largely within their own keeping, and they have it within their power to eliminate perhaps half of all deaths from falls of roof and coal, and thus save more than 400 lives each year.

The responsibility for mine explosions cannot be charged entirely to the employees or to the company. Both must share the responsibility. While the immediate cause of an explosion of gas or dust may be the careless act of an employee, any failure to keep the mine in safe condition to prevent explosions must be charged against management. During the past year eleven explosions have resulted in 261 deaths, as compared with three explosions in 1921 resulting in 21 deaths. The death rate from these explosions in 1922 was 0.73 per million tons, more than three times the rate for the previous year, which was 0.23. In only two instances during the past eleven years has the 1922 rate been exceeded: in 1911 the rate was 0.74; in 1913 it was 0.90. The lowest rate was 0.19 for 1918. For each thousand employees the rate in 1921 was 0.29 (rate for 1922 not available). The rate for 1913 was the highest, 1.04 per thousand men, while the lowest rate was 0.25 for 1918.

Wetting or Dusting Needed

It has been demonstrated that explosions may to a great extent be prevented either by thoroughly wetting the coal dust or by diluting it with shale dust or limestone dust, thus rendering the mixture of rock and coal-dust non-explosive. The reduction in the number and severity of explosions in recent years has shown the effectiveness of precautions against explosions, and their recurrence in 1922 with heavy loss of life indicates the necessity of constant watchfulness against this class of mine accidents.

In recent years fatal accidents caused by underground haulage have constituted about 17 per cent of the deaths from all causes at coal mines. The fatality rate per million tons during the first eleven months of 1922 was 0.71, representing a loss of 290 lives, as against a rate of 0.67 for the full year 1921, during which 338 men were killed. A rate of 0.77 per million tons in 1911 was the highest during the past eleven years; the lowest rate was 0.62 in 1920. On the basis of the number of men working underground, the reports for 1921 show 0.86 deaths per thousand employees, as compared with 0.84 in the preceding year. The year 1918, with its record-breaking production of

MAJOR COAL-MINE DISASTERS OF 1922

Date	Name of Mine	Location	Nature of Accident	Killed
Jan. 30	Layman	Pineville, Ky.	Coal-dust explosion	6
Feb. 2	Belle Ellen No. 2	Belle Ellen, Ala.	Gas explosion	9
Feb. 2	Gates No. 2	Brownsville, Pa.	Coal-dust explosion	25
Feb. 7	Marietta	Pinson Fork, Ky	Coal-dust explosion	9
March 20	Dilltown No. 1	Dilltown, Pa	Gas explosion	5
March 24	Sopris	Sopris, Colo.	Coal-dust explosion	17
May 25	Acmar No. 3	Acmar, Ala.	Coal-dust explosion	11
Sept. 23	Raleigh-Wyoming No. 2	Glen Rogers, W. Va.	Falling cage	5
Oct. 20	No. 11	McCurtain, Okla.	Gas explosion	8
Nov. 3	Eddy Creek	Olyphant, Pa.	Premature shot	6
Nov. 6	Reilly No. 1	Spangler, Pa.	Gas explosion	77
Nov. 22	Dolomite No. 3	Dolomite, Ala.	Coal-dust explosion	87
Nov. 25	No. 4	Cerrillos, N. M.	Gas explosion	7

coal, had the highest rate from haulage accidents of any year since 1911; 0.99 deaths per thousand men employed. The lowest rate during the past eleven years was 0.81, in 1915. Considering haulage accidents over five-year periods beginning with the period 1911 to 1915 there has been a slight upward trend in the death rate per 1,000 employees.

Accidents from explosives normally are charged with about 6 per cent of all coal-mine fatalities. During the period January to November of the past year, 86 men were killed by explosives indicating a rate of 0.21 per million tons, as against 0.30 in 1921. The highest rate during the past eleven years was 0.37 per million tons, in 1919, due to the loss of 92 lives from a powder explosion in the Baltimore tunnel near Wilkes-Barre, Pa., on June 5. The lowest rate, 0.17 per million tons, was in 1917. For each thousand men employed the rate in 1921 was 0.39 (1922 rate not available). On this basis the year 1919 again had the highest rate, 0.48 per thousand employees, and the year 1917 the lowest, 0.22 per thousand.

The yearly increasing quantities of permissible explosives used in coal-mining operations in proportion to the output of coal is effecting a reduction in the loss of life in accidents due to explosives and in explosions of gas and dust. Figures covering the past eleven years show a downward trend in the death rate from explosives notwithstanding an occasional setback such as that indicated by the record of 1919.

Accidents due to electricity account for 2 to 4 per cent of the yearly total of coal-mine fatalities. In eleven months of 1922 the number of deaths was 69, representing a rate of 0.169 per million tons, as compared with 0.158 in 1921. The highest rate since the bureau's organization was 0.189, in 1911; the lowest was 0.115, in 1920. For each thousand men employed the rate in 1921 (latest available) was 0.203; the highest during the past eleven years being 0.211, in 1911, and the lowest 0.155, in 1917. With the increasing use of electricity in coal mines and the continual rise in the daily output of coal per man, a gradual decline in the fatality rate, however small, is an indication that mining companies are giving serious attention to the prevention of accidents from electricity.

The installation of undercutting machines in greater numbers each year and the improvement and enlargement of haulage equipment in coal mines are making possible a larger daily and yearly average production of coal per employee. The installation of any mechanical device naturally introduces new hazards into mining operations, although the net result of the installation may be a reduction in the total number of accidents from all causes combined. Such is the record regarding mining machines. The accident rate from this specific cause is higher in recent years than it was before machines came into such general use, but the accident rate in the coal-mining industry has declined and the individual employees daily production has increased. In 1922 the eleven-month fatality rate, based on 16 deaths, was 0.039 per million tons, as against 0.036 the year before. The highest rate in eleven years was 0.056, in 1920, and the lowest was 0.013, in 1912. The total number of deaths caused by mining machines usually is less than 1 per cent of the deaths from all causes. On the basis of the number of employees the rate in 1921 was 0.046 per thousand, the highest rate during the 11-year period being 0.077, in 1920, and the lowest being 0.016, in 1912.

Mine fires that have not resulted from gas or dust explosions or followed such explosions have not been the cause of many fatal accidents in coal mines, as compared with other causes of accidents. The annual loss of life in mine fires usually is much less than 1 per cent of the deaths from all causes. Yet it is imperative that this class of accidents be guarded against to prevent injury or death to employees and destruction to property either directly from the fire or through an explosion following a fire. No deaths from mine fires were reported in 1922, The highest rates were 0.151 per million tons and 0.169 per thousand employees, in 1911, while the lowest were those for 1915, which were 0.002 per million tons and per thousand employees.

Federal Coal Legislation Unlikely This Year

By Paul Wooton

WHILE the prospects are that coal will not be the subject of important legislation during 1923, the findings of the President's Coal Commission, the creation of which was the principal legislative act affecting the coal industry during 1922, may pave the way for far-reaching coal legislation in 1924.

Due to the fact that the Coal Commission's studies will last during the greater part of the year, it hardly is probable that any legislation will be considered this year, even if it be urgently recommended in the final report of the commission. Congress moves slowly in all matters. particularly in cases where the interests of large blocks of voters are concerned.

If a strike should materialize it is practically certain that an attempt will be made to meet the situation in a legislative way. The country would clamor for action before the strike would progress far. It may be assumed that the Coal Commission would give the operators and the miners time to get together, but if they should show signs of settling down in their trenches for another long drawn-out fight there is every reason to believe that the Coal Commission would come forward with a drastic recommendation which would require an act of Congress to put into effect. It is conceivable that the situation which a strike would precipitate might induce the President to call Congress in extra session for that purpose.

The year 1922 saw Washington again become, as in war days, the focal point of interest in the coal industry. Early in the year, attention centered in the capital because of the efforts being made to avert the strike. As the strike progressed the government stepped in—at first to prevent a runaway market. Then it began its control over distribution, and finally its hand was thrust in to force the termination of the strike. Out of it all grew the legislation which set up the fact-finding commission.

Important as were the precedents set in the matter of coal distribution, two events stand out with particular clearness even in a year fraught with spectacular developments in coal. Secretary of Commerce Hoover carried through a price-fixing program which probably was more effective than it would have been had he acted under an iron-clad statute. Without a semblance of law to strengthen his request, he sought and obtained the whole-hearted cooperation of the producers of 80 per cent of the country's coal tonnage in the fixing of maximum prices.

The other event was the passage of the Coal Commission Act. Since its creation the Coal Commission has been taken seriously by the industry. It is believed that as its work progresses it will come to be looked upon as of more and more importance by those who engage in businesses that touch coal. There are many who believe that from the findings of this commission will flow those revolutionary changes necessary to alter the coal industry from an overdeveloped, loosely-hung and blundering conglomeration of institutions and processes into a well coordinated, smoothly functioning activity which will make possible an accelerated industrial expansion.

Coke Industry Recovered in 1922 Despite Difficulties

Byproduct Output Was 28,319,000 Tons—8,007,000 Tons of Beehive Produced—Ovens Consumed 53,311,000 Tons of Coal—Several Plants Install New Ovens

By R. S. McBride

THE year 1922 in the coke industry can well be characterized as one of recovery despite difficuties. The industry has continued to demonstrate that it is a splendid barometer of industrial conditions—perhaps even better than the iron and steel industry, which is commonly so highly regarded as an index of industrial development.

The estimated production of coke during 1922, based upon official returns of the U. S. Geological Survey for eleven months and estimates for December, is 37,326,000 tons, of which 28 319,000 tons was byproduct coke and 8,007,000 tons was from beehive ovens.

Byproduct coke has again outstripped beehive coke and more or less dominates the situation. One should not conclude from these data for the year as a whole, however, that the byproduct branch of the business is really more than three times as large under normal circumstances as the beehive branch, for during the middle of the year the beehive industry suffered more severely through strike conditions, especially in the Connellsville district. This fact is brought out quite clearly by the monthly production figures for the year, which are given in Table I.

By-product Ovens End Year Well

The byproduct coke ovens of the country were operating at approximately 50 per cent of capacity at the beginning of 1922. For the first six months of the year the activity of this branch of the business increased steadily, so that in June about 70 per cent activity was estimated by the U. S. Geological Survey. The coal shortage during July and August, however, cut down activities again, production during July being 68 per cent and during August only 49 per cent of the installed-oven capacity. With the resumption of adequate fuel supply in September a prompt renewal of activity ensued, and production during November and December was approximately 80 per cent of the entire installed-oven capacity of the country.

During the year there were regularly from 10 to 15 plants idle. Altogether 16 plants were idle for a full month or more; but during no single month were more than 14 of the total number, 71 plants, entirely shut down. Seven plants were idle the entire year. No new plants began operation during 1922 but a few ovens were added to some of those already in operation.

At the beginning of 1922 three plants had new ovens under construction. These were the Woodward Iron Co., 30 ovens; Chicago By-product Coke Co., 5 ovens, and Milwaukee Coke and Gas Co., 50 ovens. All of these were completed during the year and some of them began operation.

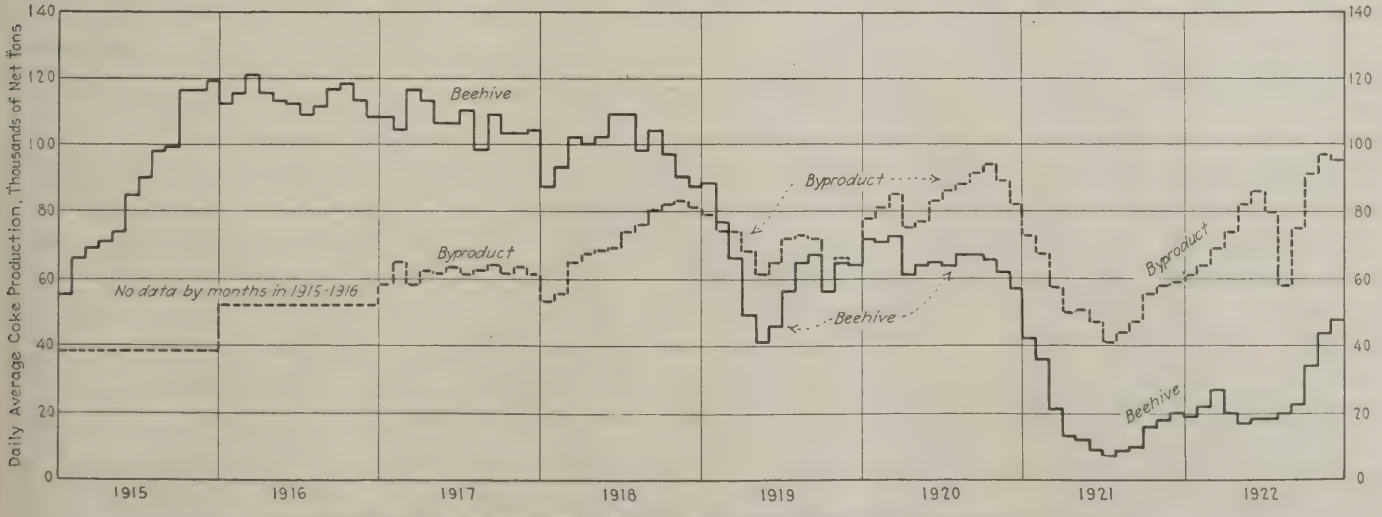
The coke industry normally takes about 15 per cent of the bituminous coal produced in the United States. However, in July of 1922 there were used in the coke ovens then active approximately 28 per cent of the entire coal production that month. Of course with normal coal production no such percentage of the coal would ever go into coke ovens, but the quantity so used will undoubtedly be large at all times.

In Table II are given figures for the coal consumption in both byproduct and beehive ovens and the total of the two, by months. These figures are those estimated by the U. S. Geological Survey on the assumed basis of 69.6 per cent yield of byproduct coke from coal and 63.4 per cent yield of beehive coke and coal, the average yields for the industry during the preceding calender year. The December figures are estimates.

At the beginning of 1922 there were in stock at many of the byproduct coke plants several hundred thousand tons of coke for which no market was available. Certainly at no previous time in the history of the industry was there ever on hand anything like this quantity of coke. However, as it became evident during the summer that anthracite would not be available in anything like the usual quantities, purchasers became increasingly interested in the use of coke as a substitute for anthra-

TABLE I—COKE PRODUCTION IN 1922
(In Net Tons)

	Byproduct Coke		Beehive Coke		
	Production	Daily Average	Production	Daily Average	Totals
January	1,879,000	61,000	496,000	19,000	2,375,000
February	1,795,000	64,000	549,000	22,000	2,344,000
March	2,137,000	69,000	732,000	27,000	2,869,000
April	2,208,000	74,000	528,000	20,000	2,736,000
May	2,537,000	82,000	432,000	17,000	2,969,000
June	2,580,000	86,000	458,000	18,000	3,038,000
July	2,486,000	80,000	450,000	18,000	2,936,000
August	1,794,000	58,000	539,000	20,000	2,333,000
September	2,244,000	75,000	606,000	23,000	2,850,000
October	2,806,000	91,000	878,000	34,000	3,684,000
November	2,908,000	97,000	1,139,000	44,000	4,047,000
December (est.)	2,945,000	95,000	1,200,000	48,000	4,145,000
Totals	28,319,000	78,000	8,007,000	26,000	36,326,000



PRODUCTION OF BEEHIVE AND BYPRODUCT COKE, BY MONTHS, 1915-1922
In the earlier years the older type of ovens produced the more coke, but in 1919 the output of byproduct ovens passed the beehive and is now well in advance

TABLE II—COAL CONSUMED IN COKE PRODUCTION, 1922
(In Net Tons)

	In Byproduct Ovens	In Beehive Ovens	Total
January	2,699,000	782,000	3,481,000
February	2,579,000	866,000	3,445,000
March	3,071,000	1,155,000	4,226,000
April	3,172,000	833,000	4,005,000
May	3,645,000	681,000	4,326,000
June	3,707,000	722,000	4,429,000
July	3,571,000	710,000	4,281,000
August	2,577,000	850,000	3,427,000
September	3,223,000	956,000	4,179,000
October	4,032,000	1,384,000	5,416,000
November	4,179,000	1,797,000	5,976,000
December (est.)	4,230,000	1,890,000	6,120,000
Total	40,685,000	12,626,000	53,311,000

cite. During midsummer the movement of this coke for gas making and for other industrial operations became active and with the early autumn it was an exception to find any unsold coke in stock.

The use of coke as a domestic fuel in place of anthracite has developed more slowly, but inability to get anthracite has compelled attention to this fuel and it is believed that thousands of households are served by coke which have never before used this fuel. This wide market, of course, promises to offer a balance-wheel for the industry which it has never before had. The exact tonnages so employed this year are not known, but it is certain that several times as much coke has been employed for domestic fuel as ever before.

Connellsville Beehive Coke Industry in Retrospect

By John L. Gans

The significant and outstanding feature of the beehive coke industry of the Connellsville region during 1922 was that it proved it had the vitality to withstand, and the recuperative power to gradually overcome, the effects of the handicaps imposed by the most skilfully planned and directed attack by organized labor, just as, during the year preceding, it had demonstrated its ability to "come back" after the most severe and most prolonged depression in the history of American industry.

These proofs of the industry's resistibility and resiliency are the more noteworthy in view of the changed relationship between the beehive and the byproduct methods of coke manufacture. Until three years ago the supremacy, in point of tonnage output, was indisputably held by the more primitive of the two methods. In 1880 the beehive oven had begun to win an important place for itself in the manufacture of pig iron, and for almost a score of years thereafter produced 100 per cent of the coke used in blast-furnace operations. It was not until 1900 that the byproduct oven became commercially successful; in that year it furnished 5.6 per cent of all the coke manufactured in the United States. Although the gain in byproduct grew steadily and increasingly from year to year, it was not until 1919 that its cruder and more wasteful competitor was surpassed for the first time. When this fact first became known in coke-trade circles prophecies were uttered which, had they been construed literally, would have meant that the beehive oven as a factor in metallurgical fuel production was doomed to early and complete eclipse.

In each of the three succeeding years the lead of the byproduct oven was increased; to 60 per cent in 1920, 78 per cent in 1921 and to a still larger proportion in 1922. To the surprise of some of the prophets and to the dismay of others, the beehive oven has persisted in its refusal to withdraw from the now seemingly unequal contest. That it still possesses certain inalienable rights as the original entrant, even if now encumbered in the race, has, by the events of the past two years, been clearly established. At least that must be one of the conclusions as to the result of the gruelling the industry has undergone during an unprecedented closing down of enterprises which are consumers of coke, followed in less than a twelve-month by the most determined effort to unionize the field.

Suffers a Permanent Loss

In all periods during which the operation of the Connellsville region has been interrupted by breaks in the continuity of industrial activity or otherwise, losses of trade have been sustained. These have been as regularly, but often very slowly, regained in large part, but a careful study of the records reveals the fact that whenever events or circumstances have lessened the opportunities of the coke producers to get their product to the consuming markets, subsequent operation has been restricted for more or less prolonged periods and, to a limited extent, permanently affected thereby.

When the sympathy strike was inaugurated in the Connellsville region on April 1, 1922, it virtually eliminated the merchant and independent furnace producers of beehive coke, and cut the United States Steel Corporation's coke subsidiary down to a 30-per cent basis during the first two months of the partial walkout. Meantime the byproduct plants with reserve stocks of coal on hand, and coal later procurable from the non-union mining districts, were able to continue making coke. The byproduct plants operated at a close approach to maximum in order to take care of customers who had previously been dependent upon the Connellsville region. It was not until early in the autumn months of 1922 that the merchant and independent furnace coke producers began their resumption movement, which gained headway from week to week until toward the end of the year both were back to better than the pre-strike basis; in fact better than at any time since the post-war depression began to issue its "run-slow" orders early in 1921.

What the immediate future, as embraced within the compass of the twelve months of 1923, may have in store is, as heretofore, largely dependent upon the iron and steel trades. If, as has been predicted by many sanguine forecasters, these trades are to prosper in an unexampled degree, the Connellsville region—still looked to as an important source of metallurgical fuel—probably will make 1920's weekly average production of 202,000 tons the minimum during the new year.

The strike of the coke workers having levied a tax, in the form of higher labor and other costs of production, which could not all be charged off when the books for 1922 were closed, no gift of prophecy is required to forecast with reasonable certainty of fulfillment that prices during 1923 will hold to a level which will be fairly representative of the enhanced value of the region's product.

That period having passed when coke operators are willing to sell their output merely in order to keep the smoke rising from their ovens, the policy of curtailing production when the price approaches uncomfortably to the limits of a remunerative profit, or unconsigned cars begin to accumulate for lack of destinations or orders, will be continued as a stabilizing measure, according to the practice of several years past.

Although the equipment of the region was reduced from 150 plants and 35,473 ovens to 143 plants and 35,042 ovens at the close of the year—a loss of 7 plants and 431 ovens—its practical productive capacity is about the same as at the beginning of 1922. The plants and ovens retired were for the most part out of operation for all of the year, hence contributed nothing to the year's gain of slightly more than 2,000,000 tons over 1921.

But all prognostications as to the prospects for larger production, maintenance of price level or other features of the trade during 1923 must be considered with due regard to eventualities and subject to contingencies which may arise.

If, for instance, the country next spring witnesses another bitter conflict over wage scales in the mining regions—toward which the present attitude and thoughts of both interested parties very plainly trend—all the skill of the union leaders and all the resources of their organization will be utilized for a desperate assault on this stronghold of the open-shop mine. In that case the coke operators will have before them the discouraging prospect of 1923 being the year in which "the worst is yet to come." And later they may have on their hands the stiffest fight of their existence.

In the happy, but admittedly uncertain, chance that the wage scales in the Central Competitive and other fields will be adjusted by application of the rule of reason, not resort to force, and without disturbing conditions in the coke region, the latter will be destined to enjoy during 1923 what, in such event, promises to be a year of more evenly distributed demand, fair prices and more stable conditions in the trade than have prevailed since the World War set business and industry topsy-turvy.

MARKET REVIEWS

Markets and Production in 1922 and Forecasts by Our Correspondents in Leading Cities and Coal Fields—Diagrams and Tables of Spot Prices of Coal and Operating Records of Producing Districts

New England Bituminous Conditions in 1922

Trend Toward Water Route Further Confirmed—Receipts of British Coal a Factor in Year's Trade—Future Railroad Supply and Opening for Pennsylvania Grades Hold Interest for 1923

By G. G. Wolkins

A NOTABLE increase in the volume of water-borne coal was an outstanding characteristic of bituminous in New England during the year just ended. Due in large part to a continuing disparity of rates that checks the flow of coal all-rail, another very considerable factor was non-union labor in the West Virginia smokeless fields. These features together have again indicated to Pennsylvania producers the handicaps under which they operate with special reference to Eastern territory and in seasons when conditions are reasonably near normal. As at the beginning of 1922 the Pocahontas and New River interests know that if Pennsylvania mine labor adheres to a war-time scale they need have little anxiety over competition from that quarter. So long as the through tariff remains so much to the disadvantage of Pennsylvania shippers the latter must content themselves with less representation in areas easily accessible from Tidewater.

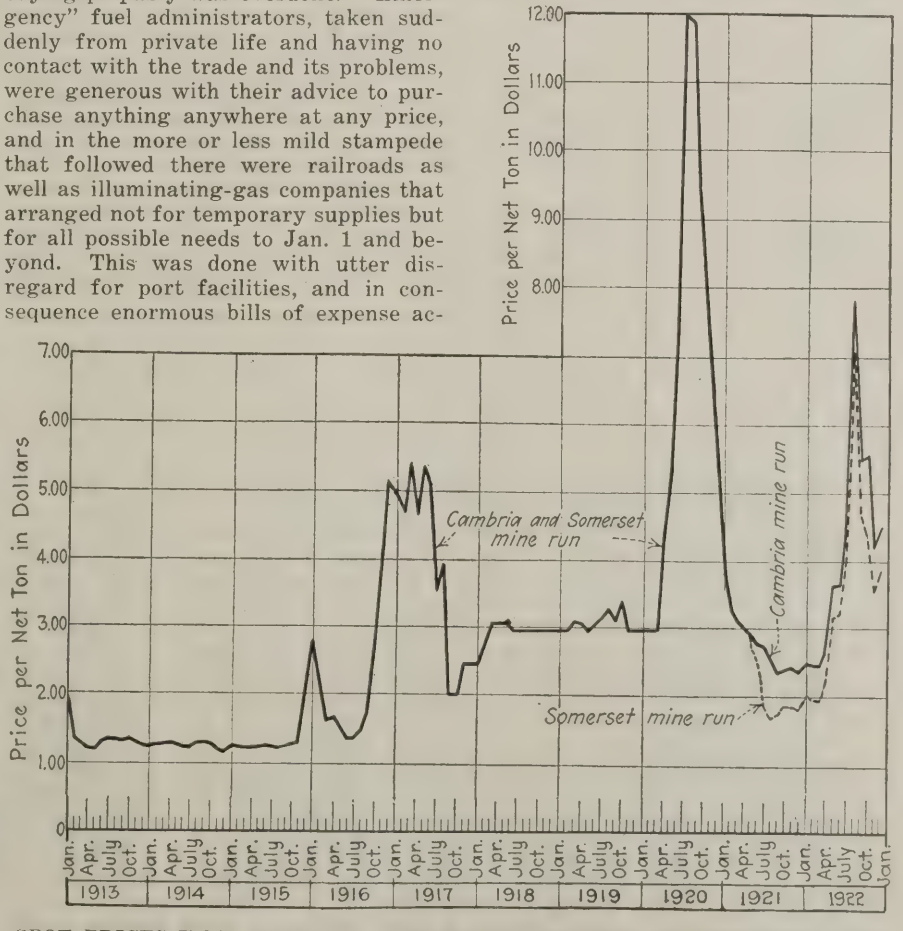
Throughout the year reserves were ample with most of the large consumers. Railroads, utilities and the industries pursued a generally conservative policy until July, when there developed within a very few days one of the worst scares New England buyers have experienced.

A protracted strike of cotton-mill operatives, effective from early in February, together with continued depression in most lines of manufacture, led steam users to agree that 80-90 per cent output in the Pocahontas field would yield enough coal easily to carry the situation. And so it turned out during the spring months, and doubtless would have continued through the summer but for the deplorable breakdown of equipment on the Norfolk & Western.

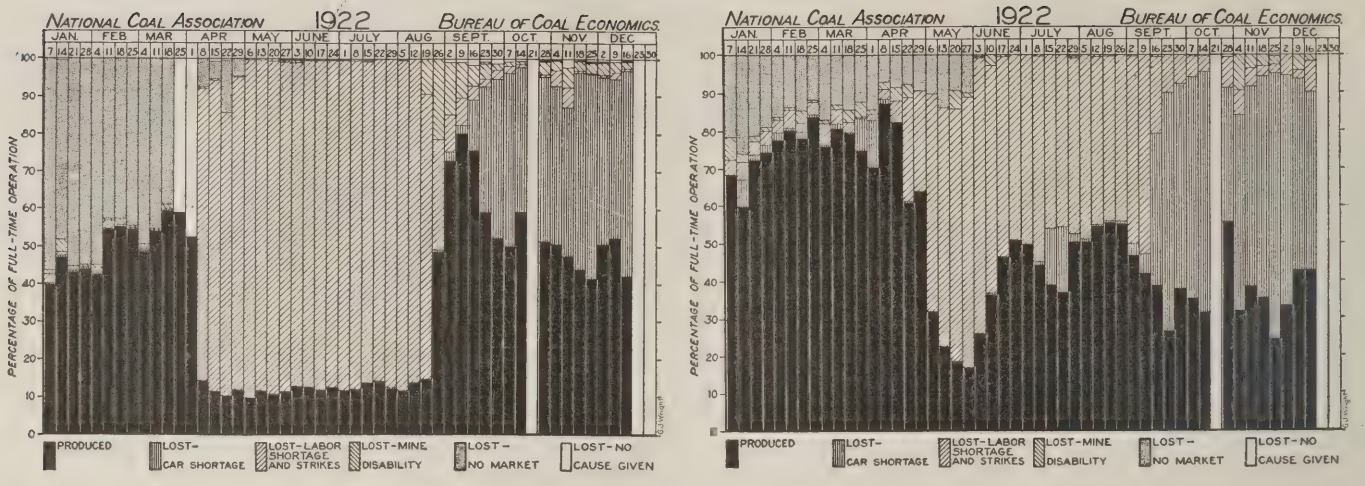
To meet pressing requirements that were at least threatening, the Pennsylvania districts had little to offer. There was an attempt, under government auspices, to put into effect some form of legalized discrimination in the distribution of cars among mines then in operation. The influence of the administration also was exerted to raise the non-union wage to the union peak scale, but while politicians were fanning the air the trade itself showed its usual resourcefulness under hard conditions. Very much as in 1903, when certain interests felt they could be the only possible avenues of supply, ships began loading at English and Welsh ports with such increasing frequency that between June and November the port of Boston alone received upward of a round million tons of British coal for steam purposes.

The scare was so great that foreign buying palpably was overdone. "Emergency" fuel administrators, taken suddenly from private life and having no contact with the trade and its problems, were generous with their advice to purchase anything anywhere at any price, and in the more or less mild stampede that followed there were railroads as well as illuminating-gas companies that arranged not for temporary supplies but for all possible needs to Jan. 1 and beyond. This was done with utter disregard for port facilities, and in consequence enormous bills of expense accrued through delays of five and six weeks in handling cargoes. It was a bubble that soon burst, and probably not for another cycle of years will certain buyers repeat their costly experience.

During most of the autumn reputable shippers, both all-rail and by water, in all districts, were obliged to mark time because this territory was almost buried under the avalanche of British coal. The let-down for a fortnight or so in July on some of the originating roads, because of the shopmen's strike, was enough to deprive mine owners of a market they had a right to count on when the strike issue was finally settled late in August. Political gestures at first had the effect of postponing buying, but as the July situation developed, so heavy a hand was laid upon available supply, chiefly in the interest of feverish railroad buyers, that New England steam users quite naturally got the im-



SPOT PRICES F.O.B. MINES ON THE BOSTON MARKET OF MINE-RUN COAL FROM CAMBRIA, CLEARFIELD AND SOMERSET COUNTIES, PENNSYLVANIA



Central Pennsylvania Somerset County, Pa.

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

pression they would have no standing whatever until the big carriers serving New York had had their wildest claims recognized.

Fuel oil of itself has now supplanted coal to an extent that makes the market for the latter rather less responsive, in general, than it was in years when oil was not such a factor. Unofficial figures point to oil importations at the port of Boston during the twelve months ended Dec. 21, 1922, that were the equivalent of 4,250,000 net tons of bituminous coal, or an equivalent increase of more than 500,000 net tons over figures for 1921. If to this be added the rising 1,000,000 gross tons received from British ports, it will be readily understood that suspension of mining in a large number of bituminous areas does not now have the significance it once had when this territory was regularly absorbing 18,000,000 to 20,000,000 gross tons annually.

An Unsatisfactory Year

Except for special situations in July and in December, the market tone was sluggish, and for three- and four-month periods shippers were obliged to lay siege to buyers in order to move any considerable tonnage. The dullness inherited from the previous year extended well through April, and was again recurrent during September, October and November. Not in several years has there been a season when relatively so little contract tonnage from the Pennsylvania districts was placed in this territory, and until the end of the year it took unremitting toil to obtain business enough to keep this or that mine in operation. Of the Hampton Roads coals a fair volume was placed on contract, but 75 to 90 per cent of it must have been through regular channels that have subsisted each year since the war.

The year opened with large reserves and low coastwise freights. The scarcity of orders forced both steam tonnage and large sailing vessels to take charters at 85c. and less, Norfolk to Boston, and for several weeks the agencies tried to capitalize what strike talk there was by naming delivered prices for February and March, hoping thereby to induce greater output in the smokeless districts. Quotations f.o.b. vessel at the Virginia terminals ranged $4.50@$4.80 per gross ton, and for delivery inland from Boston and Providence there were competitive bids $6.15@$6.35 on cars, also per gross ton. While moderate buying developed late in February, industries were really in no better shape and were taking coal only to be on the safe side.

In spite of numbers of New River operations closed by unions the market continued extremely quiet during April. There were non-union Pennsylvania mines unaffected by the strike, and it was not until May that any tightening at the sources of supply began in the least to affect prices at re-handling points, while advances f.o.b. were very gradual. Smokeless coals had been absorbed here to the point of saturation, sales being made at $5.75 on cars Boston at a time when $5.35 was being quoted f.o.b. Norfolk.

Long-term contracts were being made at retail in Boston for $7 flat per net ton as late as May 10, and one would never have supposed a big strike in effect at both anthracite and bituminous mines. It was not until the end of May that firmer prices at Hampton Roads began to be reflected here. As it was, quotations in June rose more rapidly than in two years; distress coal was soon cleaned up, and in a single day f.o.b. prices soared from $5.90 to $6.50, on-car figures having been pushed up to $8.50 at Boston.

"Fair-price" negotiations at Washington slackened demand for a time; stocks were heavy enough to justify delayed buying, and available coal at Norfolk and Newport News grew so much in volume that the market bore every appearance of suffering more from buyers' strike than idleness at the mines. Throughout June pier accumulations ruled more than 250,000 tons, buyers were influenced by news items from Washington and by the certainty of a 10 per cent reduction in railroad coals; prices had no stability, and while $7.50 @$8 was "asked," $6 would have been accepted.

The striking shopmen, however, upset the market. The slump in service on the Southern roads rapidly made itself felt in much reduced accumulations at the piers. On July 15 only 26,000 tons of Navy standard grade was available. The great bulk of contract coal was effectually cut off, and it was known that upward of 500,000 tons of British coal had already been arranged for. Prices here rose to $13 on cars, but there was so little free coal that buyers were not much interested. Contrary to government policy in 1917 and 1918, when contractors were deprived of their purchases in order that coal might go elsewhere on a lower price basis, they now saw their coal enticed in other directions by government order on a much higher figure. Coal properly belonging to New England was sent to the Middle Atlantic states for locomotive use at extremely high prices, and it was only natural that buyers here should seek to protect themselves by covering all the foreign coal that could readily be brought over seas.

The strike over, less tonnage from Hampton Roads to the railroads serving New York, a cessation of such glaring cross-hauls as sending N. & W. cars to New England, and a $1 a ton wage increase in the non-union smokeless mines combined to ease the situation materially. Hampton Roads prices dropped to $8.25, by late September the smokeless agencies were working hard to plug holes, and there was in prospect little improvement in a very inactive market. It was not until December, when car shortages were in excess of 50 per cent that values were again enhanced and an $8 level reached on Navy standard coals at Hampton Roads.

Several large cotton mills that had

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS MINE RUN COAL FROM CAMBRIA, CLEARFIELD AND SOMERSET COUNTIES, PA., BY MONTHS, 1922, QUOTED ON BOSTON, MASS., MARKET

	Cambria	Clearfield	Somerset
January	$2.47	$1.82	$2.01
February	2.45	1.90	1.95
March	2.45	1.90	1.95
April	2.64	2.24	2.21
May	3.63	3.38	3.18
June	3.64	3.25	3.20
July	4.40	4.08	4.00
August	7.75	7.37	7.09
September	5.44	4.99	4.71
October	5.52	4.22	4.32
November	4.20	3.82	3.57
December	4.49	4.05	3.87

been contending practically all the year with disaffected operatives finally resumed, and this together with a general industrial reaction brought back in a restricted sense the buying power the trade so greatly needed. The shortage of anthracite induced a continued active demand for prepared sizes, especially in the West, and at this writing the lack of motive power is serious enough to cause higher prices for weeks to come.

Railroad Fuel

In many directions the New England carriers renewed contract arrangements of other years, but suspended mining obliged them to seek relief in other quarters. Late in March the largest railroad user in this section made a considerable purchase of Kanawha at $5.39, alongside, for extended delivery, but until July the railroads, as others, bought only sparingly. They were among the first, however, to purchase British coal, and much of the high cost of receiving it here was due to their insistence upon prompt dispatch from the other side.

There is little question that certain of our own engine fuel has been permanently supplanted, at least so long as American coal can command in excess of $3 per net ton at mines and ocean freights are on anything like their present low level. There have been the usual discussions involving assigned cars for supply coal, but during November and December the railroads were in strong position to carry through their own program. Their reserves of British coal are quite sufficient to enable them to dicker with operators, and it is probable that another season will see new alignments with respect to railroad fuel in New England.

In general, much less coal has been received via the Hudson River gateways than in previous periods. There were three weeks in May when in the aggregate less than 100 cars of bituminous passed the transfer points for New England, and it will be of interest to the trade to see whether in 1923 the roads will make really serious efforts to cover as large a tonnage abroad as they saw fit to take last year.

Because of conditions already indicated, the output of even choice mines in central Pennsylvania figured much less than usual in the fuel problems of New England. Only when Hampton Roads coals failed in supply was there outlet here for more than the relatively small tonnage needed in the narrow strip of consuming territory west of the Connecticut River, and indeed for much of that section there was provision during most of 1922 for ample supplies of Pocahontas and New River via rehandling wharves at New Haven and Bridgeport. It was a year that enabled New England to do very little for overburdened operators who are obliged under existing circumstances to rely mainly upon Eastern markets and the all-rail route.

Early in the year the range of Clearfield quotations was barely in excess of $1.75 per net ton at the mines, with the most favorably known Cambrias at less than $1 more. There was simply no reaction to strike prospects, and attempts were unavailing to open central Pennsylvania operations that had been shut down for several months through lack of business.

Until rail facilities were so obviously crippled that certain shippers felt obliged to turn to the water route, there was little tonnage moving to New England over the Philadelphia and New York piers. The high cost of mining put many of them out of competition with Hampton Roads shipments except in special instances, and it was late December when certain high-volatile producers began to send coal here from Philadelphia terminals.

When mining was resumed in the union districts in August, prices on the output of mines not organized dropped rapidly from the $7@$8 level. During October and November inquiry was slow. The approaching cold weather had its influence none the less on householders who ordinarily rely upon anthracite, and from that direction there was soon in evidence a broadening demand through retail dealers for the desirable low volatiles.

Late in December erratic car supply made itself increasingly felt. As usual, many operators were so eager to sell when business offered that their obligations for spot shipment were much heavier than car service would warrant, and operators are renewing their customary unfavorable reputation for filling orders.

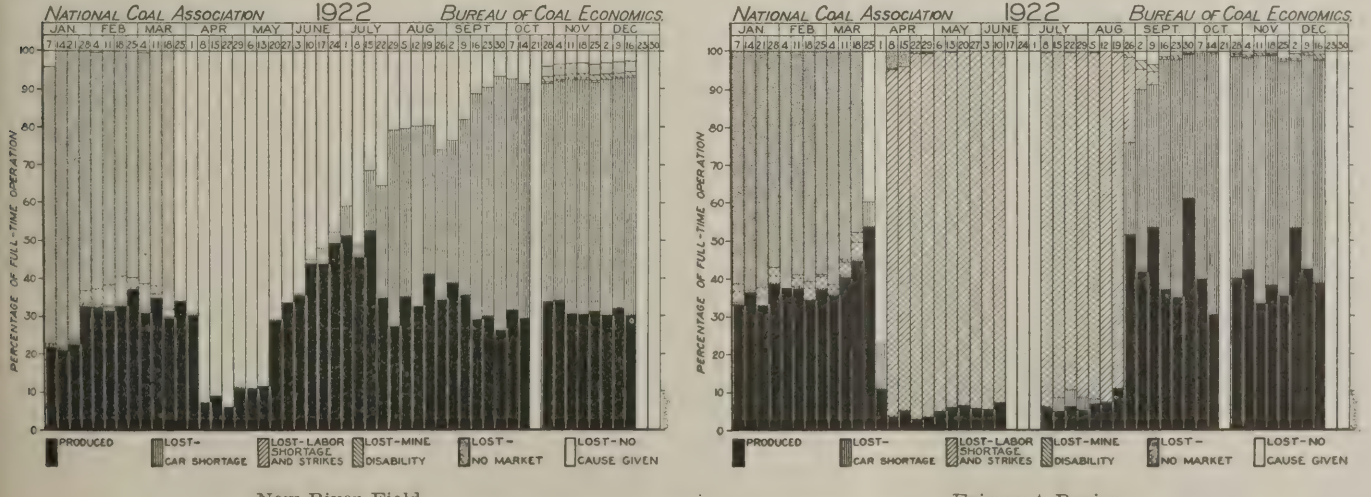
Hardening Prices as the Year Ends

Movement all-rail and by water slowed up materially in the holiday season. Not only were delays frequent in clearing coastwise transportation, together with much adverse weather in transit, but the hiatus in mining was enough to bunch cars on all the originating roads and to create further eccentricities in delivery throughout January. The natural consequence is a general leveling up in prices. Purchases that were withheld when the swing upward first began were now heard from, and there was more anxiety over covering coal for the first months of the new year than was apparent on the surface.

On the last business day of December a sale of Pool 1 Navy Standard was rumored at $9.25 per gross ton f.o.b. vessel at Norfolk, a figure that had not been reached since panic days in August. With the reduction in tolls July 1 from $2.80 to $2.52 this would leave the return to the operator $6.73 (commission included), a reasonably remunerative figure f.o.b. mines for a Pocahontas operator!

The New Year

A forecast at this writing is unusually difficult. The railroad-rate problem still presses for solution, and the inherent absurdities of the present tariff basis were never so blatant as during the heavy movement of British coal to the Atlantic seaboard during the summer and autumn of 1922, much of it arriving when American shippers were diligently seeking business. There are signs that both mine owners and workers will avoid the wasteful expedients resorted to last season, and possibly, with promise of expanding business in other lines, the bituminous trade will take to itself new courage and begin to outgrow the unpopularity of its calling. That would be an ambitious program!



New River Field Fairmont Region

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

Year of Ups and Downs in New York Market

Acute Domestic Situation Caused Formation of Fuel Administration—Quantities Restricted and Substitutes Prescribed—Suspend Smoke Ordinance to Permit Use of Bituminous

THE past year ended with conditions quite the reverse of what they were at the beginning. With more than sufficient coal on hand in January to meet all requirements, dealers closed the year 1922 with scarcely any anthracite in their yards, unless it was buckwheat and the smaller sizes.

The five months' suspension of operations in the hard-coal fields left the metropolitan area nearly 3,000,000 tons, or about 40 per cent, short of its usual tonnage to meet ordinary demands. This shortage would have caused untold suffering had not the use of substitutes —buckwheat, bituminous or coke—been made compulsory, if any of the domestic coals were to be obtained from retail dealers.

There was not much activity in January. With more than enough coal at the terminals to meet demands operators and shippers, in order to save car charges, dumped the coal into boats. Prices quoted for independent coals were slightly below company schedules. Toward the middle of the month, however, owing to changed weather conditions, the situation improved. Stove and chestnut, as well as the steam sizes, were hard to move.

There was a temporary spurt in buying following the warning of Secretary Hoover of possible labor trouble in the mines. The public paid little attention, however, and there was little difference in the situation during the next couple of months. The steam-coal situation, however, caused considerable concern to operators and shippers. Bids asked by the city for supplying a large tonnage of buckwheat No. 1 brought responses ranging $5.53@$6.53. In anticipation of the impending trouble many washeries which had been closed down because of the lack of demand reopened and their product was stored unless it could be disposed of otherwise.

From April until the resumption of mining in September the situation was in the hands of the consumers. Operators and wholesale dealers had nothing to sell, unless it might be pea coal and the steam sizes.

Governor Miller, realizing the seriousness of conditions, named a fuel commission to make a survey of the situation, of the amount of coal on hand and report to him. As a result of this report he appointed William H. Woodin, president of the American Car & Foundry Co., as State Fuel Administrator. Deputy administrators as well as an executive force were appointed and offices were opened in this city. An examination of supplies of coal on hand within the city limits showed a total of about 47,000 tons of all sizes of anthracite. This brought a warning to coal users to burn bituminous coal, which was coming to market in fairly good volume by this time.

When the mines resumed operations, Sept. 11, local yards were bare of domestic coals. Thirty-six hours after operations had been started thirty cars of coal arrived at Perth Amboy, and other shipments followed in quick succession. However, with other parts of the country in no better shape than New York this district was able to obtain only its proportionate share of the output, allotted to it by the Federal Fuel Administration.

The domestic coals were quickly taken, but, because of mild weather conditions, there was no demand for the steam coals and these soon piled up at the terminals. With demand becoming slower for these coals many washeries were forced to close down and the steam-coal problem became one of considerable moment to producers.

In October the domestic situation became so serious that the Fuel Administration officials issued orders restricting consumers to not more than a thirty-day supply and at the same time fixed the price for peddler coal at 85c. per 100 lb. at the cellar or peddlers' bin.

With winter closing in the demand for coal increased and several dealers suggested the forcing of the use of substitutes if the supply of anthracite domestic was to be conserved. This suggestion, however, was not made an order until early in December, when dealers were directed not to deliver domestic coals to consumers unless preceded or accompanied by 25 per cent of some substitute.

Soon after Dec. 15 shipments were increased because of the suspension of Lake navigation. Earlier in the month, because of the decision of the United States Supreme Court upholding the constitutionality of the Pennsylvania state tax law, several of the operating companies and larger independent operators advanced their price schedules 10c.@30c. on the various sizes, but this advance was not reflected in the retail prices, which showed considerable variation because of the range of quotations of the companies and independent operators.

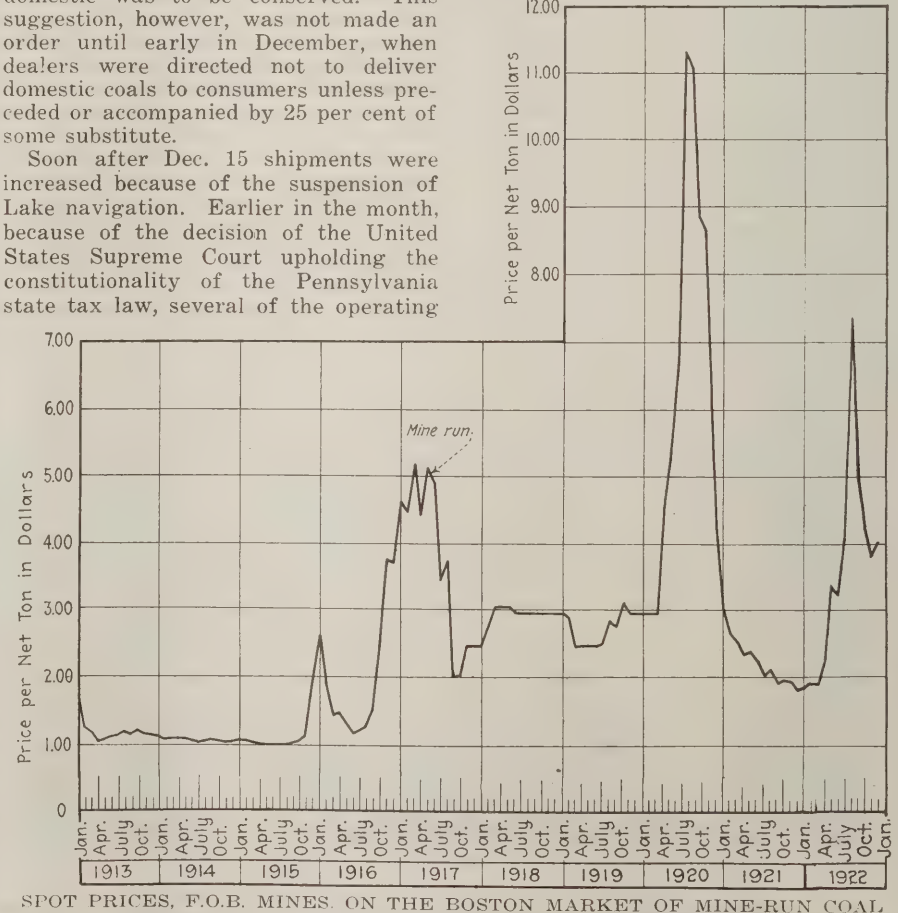
A comparison of retail prices in Manhattan before and after the so-called suspension in the anthracite fields is given on the next page.

There were many ups and downs in the bituminous situation during the year. Because of the strike stocks ran low and British coal was brought to these shores. Southern coals, which have nearly always been brought to this market in comparatively small quantities, were shipped here in much larger volume.

Because of the lack of anthracite in the last few months of 1922 bituminous was named by the State Fuel Admin-

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL, FROM FAIRMONT DISTRICT, BY MONTHS, 1922
AVERAGE OF QUOTATIONS ON THE PHILADELPHIA, NEW YORK AND BALTIMORE MARKETS

	Mine-Run
January	$1.53
February	1.50
March	1.47
April	1.73
May	2.82
June	...
July	6.27
August	7.05
September	4.64
October	3.85
November	3.50
December	3.42



SPOT PRICES, F.O.B. MINES, ON THE BOSTON MARKET OF MINE-RUN COAL FROM THE CLEARFIELD DISTRICT OF PENNSYLVANIA

COMPARISON OF RETAIL PRICES IN MANHATTAN BEFORE AND AFTER SUSPENSION IN ANTHRACITE FIELDS

	April, 1905	July, 1906	December, 1906	April, 1907	Oct., 1913	September, 1915	March, 1922	September, 1922	December, 1922*
Broken	$5.85	$6.05	$6.50	$6.00	$6.75	$7.00	$12.85	$13.25	$13.50–$14.75
Egg	5.85	6.05	6.50	6.00	6.75	7.00	12.85	13.25	13.50– 14.75
Stove	5.85	6.05	6.50	6.00	6.75	7.00	13.10	13.25	13.50– 14.75
Chestnut	5.85	6.05	6.50	6.00	7.00	7.25	13.10	13.25	13.50– 14.75
Pea	4.50	4.50	4.75	5.00	5.00	5.25	10.75	10.75	10.50– 11.25
Buckwheat	3.50	4.00	3.50	3.50	3.75	3.90	7.65	8.20	
Rice	3.00	3.00	3.00	3.00	3.15	3.15	6.75	7.20	
Barley							5.75	6.20	

*Quotations from two of the largest dealers in Manhattan. Smaller dealers may be asking higher prices, depending upon the tonnage obtained from independent operators

istrator as one of the substitutes to be used, and for the first time it began to figure as a household fuel in New York City. Bituminous screened coals of stove and chestnut sizes became so popular that they could not be furnished in sufficient quantities. Quotations ranged $6@$7 at point of loading, taking the Pittsburgh or Westmoreland freight rates.

There was a lack of supplies at this tidewater at the beginning of 1922, the average number of cars at the local terminals running close to 800 as compared with about 2,000 in normal times. However, there was little business and few inquiries regarding contracts. Harbor boatmen were on strike and there was already some talk of mine workers negotiating a new wage agreement. Quotations at this tidewater early in January ranged something like these: Pool 1, $2.75@$3.25; Pool 9, $2.15@$2.30; Pool 10, $1.80@$2.10.

The first arrival of British coal occurred during the first week in August. It was consigned to a public-utility corporation but its use was not entirely satisfactory. A survey of local stocks by the Board of Health Inspector showed about 14,339 tons of bituminous on hand within the city limits. The smoke ordinance was suspended. British coal was arriving at the rate of about 100,000 tons weekly.

A falling off in inquiries for British coal occurred early in September following the resumption of mining. Car supply was bad, but there was plenty of coal available to meet all demands. Foreign coals were being offered here at about $7.50, alongside. There was, however, no improvement in demand.

Similar conditions existed throughout October. November showed comparatively little change from the preceding month. Buyers did not appear to be greatly interested, car service continued poor and high-grade coals were quickly absorbed.

Rapid changes occurred in December. Quotations advanced rapidly and at the end of the month showed increases of from $1.50@$2 on nearly all grades. Most of this was attributed to poor car supply, resulting in greater demand. There was, however, a slight drop in quotations the first of the new year.

Screened coal grew rapidly in favor during the month and operators found themselves loaded with orders. The use of bituminous coal for heating purposes also became more general.

Baltimore Feels Few Regrets at Passing of 1922

Many Cases of Actual Loss for Operators, Agents and Distributors—Strike Caused Closing of Some Yards—Water-Borne Fuel an Interesting Feature of the Industry

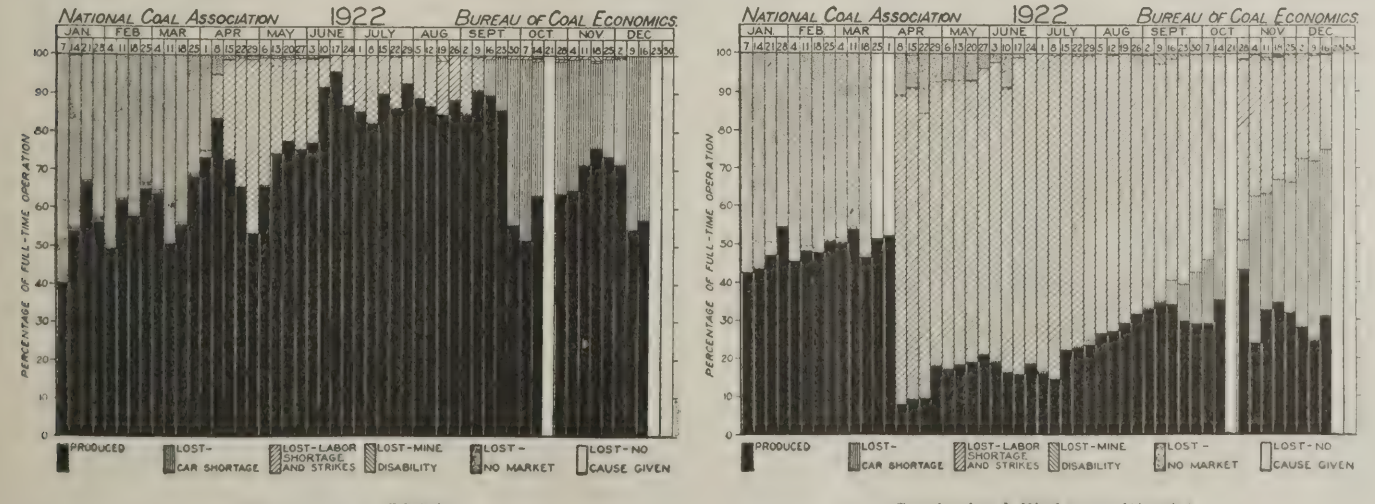
BY WALTER R. HOUGH

THERE will be little regret in the thoughts or feelings of coal men in the Baltimore district over the passing of the year 1922. It was a year of trials and tribulations, uncertainties and vexations and in many cases of actual loss for operators, agents and distributors.

Bituminous trading in January was of an encouraging nature with price of both line and bunker coals advancing, although the bunker trading was the better feature of the two. Best steam coals ranged $2.25@$2.40, with less desirable coals down to $2. Gas lump, Pennsylvania, was quoted at $2.40, with West Virginia selling down to $1.85. Hard-coal dealers were busy on small orders, with plenty of coal running, fair stocks in yards and little thought of the troubles to come.

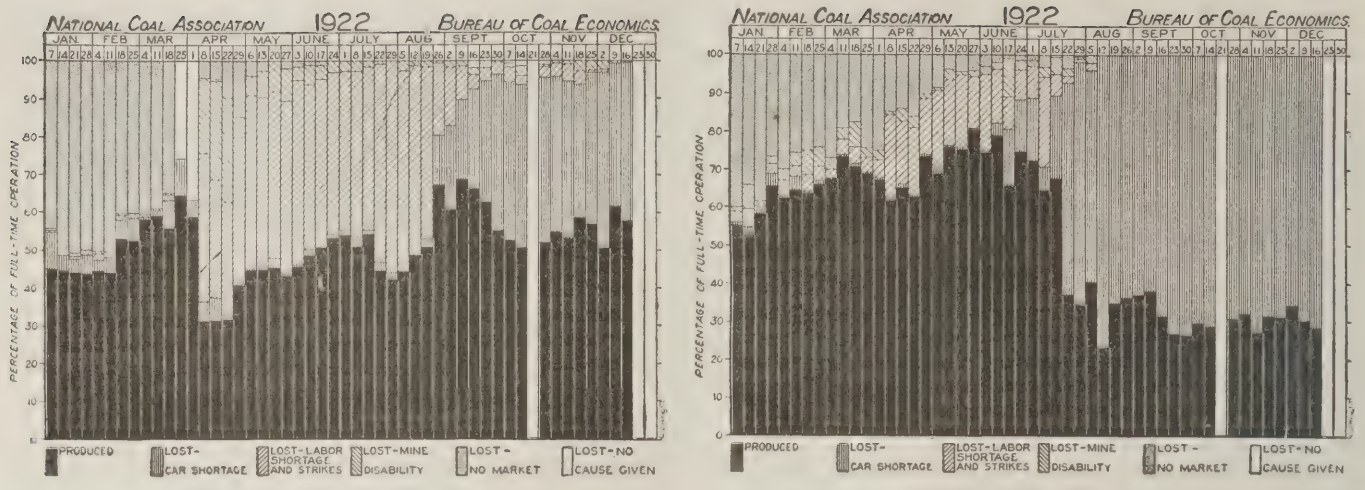
In March coal men began to study the coming strike situation and urge consumers to lay in stocks in order to make conditions better latter on, but the refusal of the public to buy soft coal in quantity made the price situation weaker for all lines of bituminous, and in this the waning export movement had a considerable weight. The hard-coal men at this time faced an odd situation. An extremely mild end to the winter with strike prospects for April left the dealers between the horns of two dilemmas. On the one hand some of the dealers had stocks left over, which, acquired at high prices, threatened serious losses if the strike failed to materialize. Others, who had kept close to actual needs, did not know whether to attempt to stock for the future or stand pat.

The strike went in with such little noise that the public failed to realize its import and many coal men thought that it would soon be over. By mid-April, however, reports of the closing of several non-union mines and the lessening run of soft coal began to send prices upward. Early in May steam coals of Pools 9 and 71 were quickly absorbed at $3.50@$4. Gas coals of better grades sold up to $4 and Fairmont lump was up to $4.50. The scarcity of bunker coals was such that shipping of coal to Baltimore on barges from Hamp-



Westmoreland District Cumberland-Piedmont District

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES



Panhandle District, W. Va. Winding Gulf, W. Va.

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

ton Roads began, and this was taken over at $5.50@$6 gross, alongside.

In June results were shown from the Hoover conference, and a number of shippers who had been expected to sell around $4@$5 let go of their holdings suddenly and prices even for better grades of steam coal dropped to around $3. This did not last, however, for before the end of the month practically all of the regions, with the exception of the Southern fields, were selling from good to best coals at $3.50@$4, while Hampton Roads was disposing of New River and Pocahontas coals at $3.25@$3.50, thus holding within the Hoover range. A number of yards were closed during the month because of a lack of anthracite supplies. Not more than ten or twelve in Baltimore had any substantial reserve.

August brought a state coal distribution commission and a questionnaire on supplies in industrial bins, a sharp advance in prices of soft coal and a tremendous drop in the amount of deliveries. Anthracite dealers took up the question of substitutes, and urged customers to lay in stocks of bituminous. Small lots of bunker coals continued to come from Hampton Roads and some English importations began.

The end of the bituminous strike sent an increased tonnage into the market. Prices did not slump at once, good grade steam coal holding firm at $6@$6.50 and less desirable fuels around $5. By the end of September, however, quotations for best steam grades were $5.25@$5.75; for intermediate coals, $4.75@$5, and poorer grades around $4.25.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM POCAHONTAS REGION, BY MONTHS, 1922

AVERAGE OF QUOTATIONS ON BOSTON, CHICAGO, CINCINNATI AND COLUMBUS MARKETS

	Mine-Run
January	$1.71
February	1.66
March	1.60
April	1.67
May	3.02
June	3.05
July	3.98
August	5.96
September	5.21
October	5.13
November	4.44
December	4.82

During the early days of the month a number of hard-coal dealers took considerable quantities of Welsh coals, which they sold at $13.50@$14.50 delivered to homes. The first receipts of anthracite came to hand from independent sources and while there was no set price arrangement through the Baltimore Exchange, No. 1 was generally sold around $15.75; Nos. 2, 3 and 4 at $16; Sunbury, $16.50, and Lykens Valley, $17.

Heavy arrivals of British coals during September and early October had their effect on the October market. Hard-coal dealers began to receive a more liberal run of anthracite, and there was general hope that November and December would bring liberal runs; a hope which was badly blasted later. Early November found a peculiar situation in the soft-coal trading here, there being a steady decline in price in view of the light call from large industries.

The last month of the year brought new strength to the soft-coal trading at Baltimore. Many large industries got actively into the buying and prices went up sharply. Hard-coal dealers were complaining bitterly that December had fallen back even of the light shipments of November. Really cold weather and snow had increased the urgent demand and householders began active buying of substitutes.

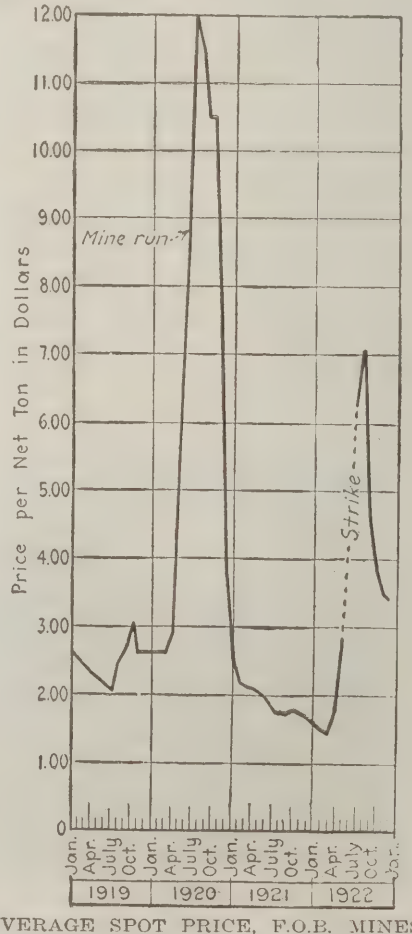
The subject of water-borne coal at Baltimore is interesting, especially when comparisons are made with former years. Possibly the most striking development was that the importation of coal from the British mines during three months of the year surpassed by 13,711 tons the total amount of the export cargoes tabulated to Dec. 18.

With Europe oversold on American coal, at least, 1922 opened with an extremely small demand for the fuel from this side. Just as the trade was beginning to show a tendency to return to normal, and March of 1922 had registered an increase in the business which made it the largest month since October, 1921, the miners of this country called a strike and exporting was discontinued after April 10.

While the period of the importation of British coal to Baltimore was of but short duration, dating from Aug. 25 to Oct. 28, it was extremely lively, particularly that portion of the trade covering the month of September.

The number of ships engaged in the trade and the amount brought here each month was: August, 1 ship, 6,694 tons; Setember, 14 ships, 79,895 tons; October, 4 ships, 26,595 tons.

With the beginning of the strike the New England coal trade from Baltimore began gradually to reduce until it was discontinued after a few weeks. It has been renewed, however, and a considerable volume of business is now being done in this line.



AVERAGE SPOT PRICE, F.O.B. MINES ON PHILADELPHIA, NEW YORK AND BALTIMORE MARKETS OF MINE-RUN COAL FROM FAIRMONT DISTRICT

Most Unsatisfactory Year in Philadelphia

Few Found Cause for Enthusiasm—After Watchfully Waiting for Lower Prices Consumer Paid More — Rate Cut Had Little Effect—Anthracite Tax Important Enactment

By W. D. Hammer

FROM beginning to end 1922 was a most unsatisfactory year to everyone in the trade. The operators, with over five months' idleness to contend with, had little chance to show a profit on their undertaking, including both bituminous and anthracite. In anthracite the retailer, being unable to do business for the lack of stock during most of the summer months, also put in an unprofitable twelve-month, and the consumer, always eager and watchful for lower prices, in the long run actually had to pay more than ever for fuel.

In the anthracite trade the year opened with plenty of all sizes of coal in the dealers' yards, and a winter which was close to mild at all times retarded buying, as even in the very beginning consumers were afraid to buy in volume lest they have something left over on April 1, when they felt certain there would be a general reduction in miners' wages, with a consequent decrease in retail prices.

It is worth while recording the mine prices at the beginning of the year, which were as follows:

Company—Egg, $7.75; stove and nut, $8@$8.10; and pea, $6@$6.25. Independent—Egg, $7.75; stove and nut, $8.10@$8.25; pea, $5@$5.50.

With very little coal coming in from April 1 onward, except from storage yards, the retail yards began gradually to show shrinkages in their stock, and when Aug. 1 was reached very little coal of any size was left but pea coal. It should be remembered that the companies had heavy stocks of pea on hand, but this did not begin to move until July 1, and they were anxious for business from anyone on this size.

During August Governor Sproul appointed a fuel commission to supervise the distribution and prices of coal, as with no production during the entire spring and summer it was easy to foresee difficulties when production did begin.

Coal began to arrive in the city soon after the resumption of work, although there was no particularly strong demand for it from consumers. For a while prices were an uncertain quantity, as the companies had not decided on their schedule and shipped upon the stipulation that price would be arranged later. Quite a number of the independents started with a price of $9.50 for egg, stove and nut and $7 for pea, shading down to one independent with a low price of $8.50 for the large sizes and $7 for pea. Later this was followed by company prices ranging $8.10@$8.35 for egg, stove and nut, and $6.15@$6.20 for pea. In October the fair-practice committee of the State Fuel Administration adjusted independent prices to $9.25 for the large sizes, and a few independents kept on with $9.50, and all with pea at the old figure of $7.

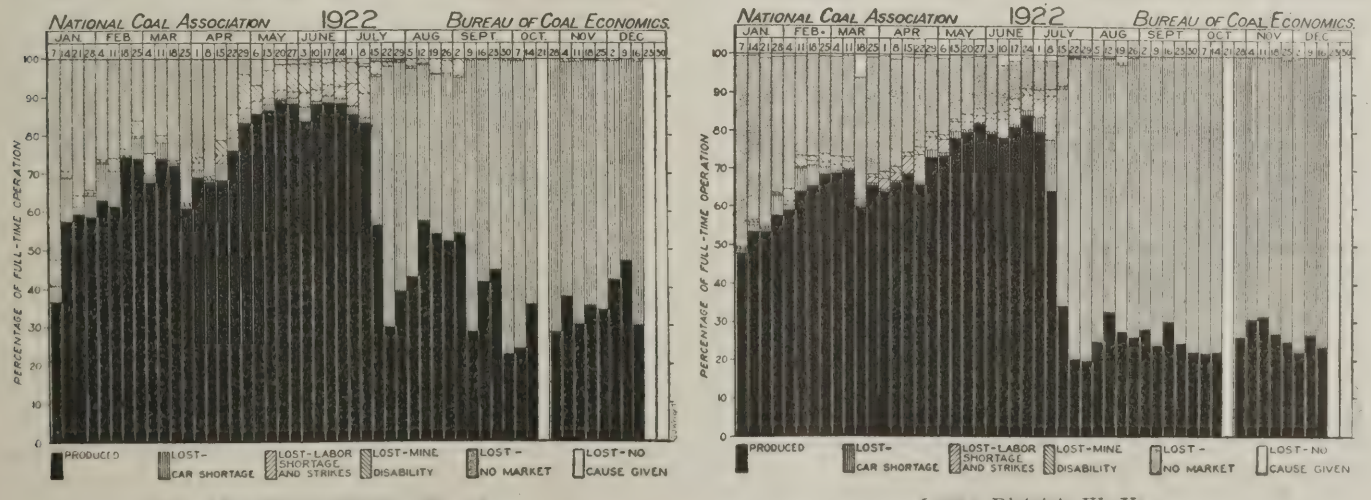
Within less than a month a number of independents claiming to be unable to do a profitable business at the above prices, began to make advances, and upon request of the fair practice committee were invited to present their cost sheets to them. As a result of this investigation advances in some instances of $1 a ton were allowed bringing certain independent prices to $10.50@$11 for the large sizes and $8 for pea. The lowest independent prices for the balance of the year were $9.25 for family coal and $7 for pea.

The steam-coal market started off strongly in the winter of 1921-22 and and was going well in January, with the companies selling practically all of their production at $3.50 for buckwheat, $2.50 for rice and $1.50 for barley, with the independents at times able to get a premium on these figures. However, it was another story later on. In February the independents were glad to get $3 for buckwheat, $2.25 for rice and $1.25 for barley, with the companies maintaining their schedule, but dumping much coal in the storage yards. With the approach of the strike, steam coals stiffened and independents obtained $3.50 for buckwheat. As the company storage piles began to melt away river barley came on the market in June at $1.60@$2.25, and fairly well maintained these prices until fresh-mined coal arrived again in September, when it faded out of sight. The new company prices on steam coals were: Buckwheat, $4; rice, $2.75; barley, $2, while the independents tried to get $1 above these prices, which they did for a short time, but prices weakened in October and much independent coal sold at 25c.@75c. less than company prices.

The state tax act was always a subject of great interest and even after its validity during the summer was affirmed by the state courts the dealers thought it would be finally quashed. Nevertheless in November the U. S. Supreme Court upheld the act, and while it was thought that the tax might be added to the coal price, no company made a specific charge for it.

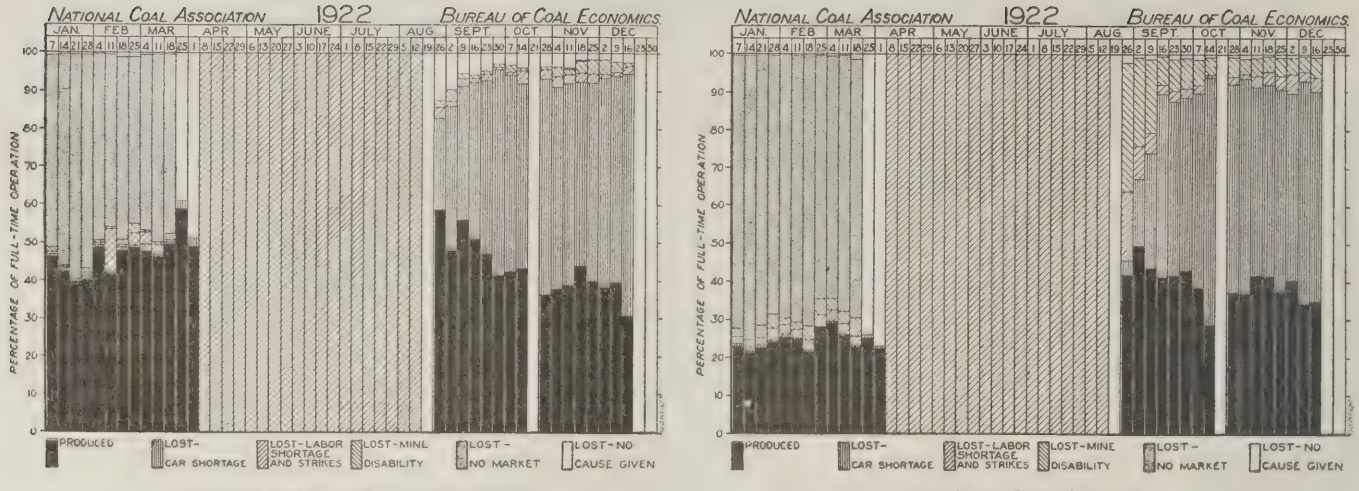
As the year came to a close the retail dealers in this vicinity found the greatest difficulty in getting enough coal to supply the needs of their customers, and they were compelled to resort to various substitute fuels to keep the people warm. Dealers generally stocked up with bituminous coal, coke and anthracite buckwheat, but it was only with the greatest difficulty that the people would take them, and only then under stress of much colder weather later in December.

In the bituminous trade the entire year seemed to have been spent by the consumer in jockeying for lower prices, despite many and serious issues such as rail and miners' strikes crowding to the front, which ordinarily would have spurred the consumer to take steps to accumulate reserves of coal. Despite low prices at the beginning of the year, such as $2.70@$3.10 for Pool 1; $2.30@$2.80 for Pool 9; $2@$2.25 for Pool 10, and $1.65@$1.80 for Pool 11, the consumer as a general thing simply re-



Tug River District, W. Va. Logan District, W. Va.

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES



PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

fused to buy for more than current needs.

One of the reasons for not buying was the expectation of a freight reduction, which was a live topic of conversation right up to the time the actual reduction was granted, to become effective on July 1. After the reduction was considered from all angles, however, it amounted to so little that it had no effect on the trade.

The first indication of better business in the coal business came in May, when the iron industry of the country began to take on a renewed lease of life and began to make better demands for fuel. For a time it seemed as if the steel people were bidding for every pound of coal produced and prices went mounting to $5@$5.75, irrespective of classification. It was at this time that Secretary Hoover stepped in and endeavored to prevent unseemly prices.

A plan of fixed prices for various districts was agreed upon, with $3.50 a popular figure, although the Pennsylvania low-volatile steam producers never actually came to an agreement, these interests endeavoring to get something around $4 for their output. The negotiations had the effect of holding prices in check, however, and in June there was little coal at $5, the price that had prevailed hitherto.

In July the going out of the railroad shop workers had a serious effect on the trade, as much of the non-union coal originated on lines in the South which were most troubled by the strike. As a result prices bounded forward to as much as $8.50. It was then that foreign shippers saw an opportunity to come into this market and prices of $8.50 @$10, laid down at piers in this city, were paid for foreign coal, which continued to be sold freely in this market right through August.

Following the Cleveland agreement prices naturally shaded downward, running from $5.50@$7.25, and at the same time sounding the knell of foreign coal buying. In November the downward movement continued. All of this softening was in the face of a poor car supply, as the roads had far from recovered from the effects of the strike.

The climax of the downward movement seems to have been reached the latter part of December, due to a combination of circumstances. First of all the car supply, instead of growing better, became worse, and in addition colder weather also induced greater consumption. The roads had an opportunity earlier in the season to stock up on fuel, but declined to take advantage of the situation until actually compelled to. With the lessening car supply prices began to move up gradually from December onward and by midmonth were running as follows: Pool 1, $5.20@$5.60; Pool 9-71, $5@$5.30; Pool 10, $4.30@$4.50; Pool 11, $3.40@$4.

Buffalo Has Influx of New Sales Agencies

Newcomers Appear Unobtrusively—No Notable Retirements and No Deaths During Year—City Is Getting Scarcely More Than Half of Tonnage of Year Ago

By John W. Chamberlin

PROBABLY the most noticeable new feature of the wholesale coal trade of Buffalo during 1922 is that mostly during the latter part of the year the number of sales offices have increased about 20 per cent over the previous year and have done so with an unusual degree of quietness and lack of display.

Scarcely a member of the older trade of the city has retired from it in any way during the year. If an outside concern withdrew its agency the manager commonly remained on his own account, sometimes doing much better than he had formerly done. No member of the city coal trade has died, and so far as the anthracite trade is concerned practically no changes whatever have taken place. Members of that trade are still wondering why, with mining considerably heavier than it was a year ago, the city is getting little more than half the coal it did then.

Buffalo is naturally a bear market. With only about a dozen mining companies of its own and being able to play the Pittsburgh, Ohio No. 8 and the Allegheny Valley bituminous markets against one another it often forces even Pittsburgh to sell coal to this market for less than its home quotations. Quite often, so far as steam coal is concerned, the Pittsburgh quotations are not paid here. Gas coal, being more restricted as to territory, is now holding above its usual average as compared with steam grades. All steam coal weakened as the year closed, but independent anthracite, with Scranton and Wilkes-Barre as headquarters, was strong and occasionally advanced from the former premium of $4@$5 over the schedule prices. If the heavy companies had gone into the market as the independents did a trade the like of which has not been seen yet would have resulted.

As, ordinarily speaking, little that is strictly personal is found in the coal trade of the year, mention may be made of the newcomers into the Buffalo market. They include the following, with manager's name if the company name does not indicate: Charles E. Graves Coal & Coke Co.; Grant B. McLaughlin & Co.; W. P. Smith Coal Sales Co.; Astel Coal Co., D. E. Ruckman; J. P. Burton Coal Co., A. R. Stubbs; Cheswick Coal Co., A. R. Carlson; Link-On Coal Co., William E. Schmidt; Theodore Krug Co., F. C. Eschelman; Maher Collieries Corporation, O. E. Southard; Manufacturers' Fuel Co., E. J. Delaney; Merrimac Anthracite Coal Corporation, Treasurer W. G. Russell; Penn-Empire Fuel Co., A. E. Yallowich; Valley Camp Coal Co., M. F. Murphy; Valley Coal Corp., A. D. Grasso.

The Lake trade closed on Dec. 15 with the loading of the steamer *A. B. Uhrig* for Milwaukee. A big effort was made to continue the movement later and 123,600 tons was loaded in December, which is the largest amount for a long time. The amount loaded during the season was 1,070,680 tons. The shipments for the season of 1921 were 3,810,315 tons.

Pittsburgh Coal Prices Pursue Devious Path

During the Strike Regular Pittsburgh District Coal Practically Disappeared from the Market—West Virginia and Kentucky Coal Passed Through Pittsburgh Market to Clairton

By B. E. V. Luty

THE YEAR 1922 opened with the Pittsburgh coal district at the same disadvantage, as compared with adjacent non-union districts, as had obtained during the major part of the preceding year, the non-union mines, with deflated wage scales, being able to undersell the Pittsburgh district operators. All that the district had for competitive purposes was its high-grade gas coal, but this did not mean much in point of tonnage because even in the case of gas coal some users were unwilling to pay the extra price. A little help was afforded by the fact that for delivery at many points the non-union fields were at a freight disadvantage. Coal freights were reduced July 1, 1922. Prior to that time, to illustrate, the Pittsburgh district had 14c. lower freight to Buffalo than the Connellsville region.

The year opened with Pittsburgh steam coal at $2.10 @ $2.20, some ordinary gas coal being available at about this range, while high-grade gas was held at higher figures. Pan Handle 1¼-in. domestic lump was $2.75 @ $2.90. There was no market for nut coal and slack was rarely bringing as much as $1.50, so that sellers of screened coal were averaging only about $2.35 for the run of the mine, little more than was obtainable for ordinary steam mine run.

During the first two months of the year the market held at substantially these figures. Consumers were stocking coal against the strike, which was universally expected. They could not remain in ignorance, for much advice was being given to stock coal and to avoid any "last minute rush." The advice must have been fully heeded, for without the strike prospect decreasing a particle a slump came in the market about March 1. Pittsburgh coal, having already been quiet and at prices the operators asserted did not cover the full cost of production, could not suffer much from this slump, which was seen better in Connellsville coal, which had been moving freely for stocking purposes and which declined, using round figures, from $1.75 to $1.50 for Pittsburgh seam and from $1.50 @ $1.60 to $1.25 @ $1.35 for Sewickley vein. Such market as there was for Pittsburgh coal at the end of March could be quoted at $1.80 @ $1.90 for steam mine run, and $2.60 @ $2.70 for high-grade ¾-in. gas. There was nothing like a fair-sized turnover.

When the strike came regular Pittsburgh district coal disappeared completely from the market, except for the relatively small output of a couple of stripping operations on the Pan Handle, this coal being offered at $2.75 for steam lump. Strikes promptly developed in the Connellsville region, from which consumers had been expecting to draw coal right along during the strike.

Except for strip-mined coal, trading in the Pittsburgh market throughout the strike was entirely in the product of near-by non-union fields, whose output was limited by what the trade considered "non-union" strikes but which had been produced by emissaries of the United Mine Workers, who enrolled the miners as regular members on payment of a nominal initiation fee of $1 or $2.

Throughout the second quarter of the year the market rose more or less continuously, until by June 30 Connellsville steam coal was bringing $3.75 and Westmoreland gas somewhat more. The extent of the rise was due largely to the bidding of steel companies which had not expected serious strikes in the Connellsville region. They bought West Virginia and Kentucky coal, and as such fuel commanded high freight rates the consumers were willing to pay high prices for Connellsville coal, which was nearer at hand. Both West Virginia and Kentucky coal came into Pittsburgh, and some went through Pittsburgh and up the Monongahela River as far as Clairton.

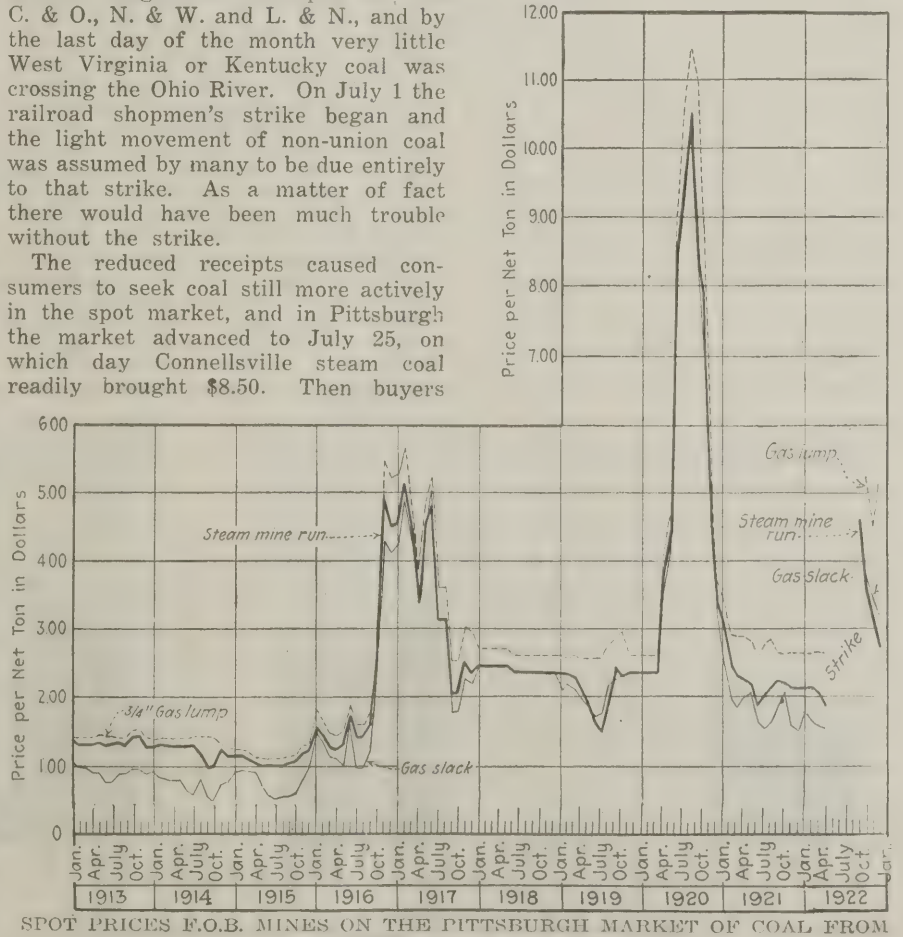
In the closing fortnight of June serious congestion developed on the C. & O., N. & W. and L. & N., and by the last day of the month very little West Virginia or Kentucky coal was crossing the Ohio River. On July 1 the railroad shopmen's strike began and the light movement of non-union coal was assumed by many to be due entirely to that strike. As a matter of fact there would have been much trouble without the strike.

The reduced receipts caused consumers to seek coal still more actively in the spot market, and in Pittsburgh the market advanced to July 25, on which day Connellsville steam coal readily brought $8.50. Then buyers became imbued with the notion that prices would be fixed by the government, and practically withdrew from the market, following which on the morning of Aug. 1 the price was quotable at $6. There was a minor rise afterward, and when the union mines opened the market was $5.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM PITTSBURGH DISTRICT, BY MONTHS, 1922
QUOTED ON PITTSBURGH, PA., MARKET

	Lump	Mine-Run	Screenings
January	$2.65	$2.15	$1.78
February	2.65	2.15	1.65
March	2.67	2.04	1.57
April	2.65	1.85	1.55
May			
June			
July			
August			
September		4.60	
October	5.22	3.59	3.81
November	4.50	3.16	3.47
December	5.15	2.72	3.19

The first Pittsburgh coal that appeared on the market after the settlement was Youghiogheny gas, which brought $6.50 on the first sales. There were constant declines, almost from day to day, afterward. The market was not closely quotable for a time on account of the wide range in quality, as various coals not ordinarily mined were being produced on account of the emergency. Just before the close of the Lake season Pittsburgh steam was $3.25 @$3.50, with Youghiogheny gas at $4.50 for mine run. At the close of the Lake season the market took another drop, and then ruled to the end of the year at about $2.50@$2.75 for steam and $3@$3.25 for Youghiogheny gas, mine run.



SPOT PRICES F.O.B. MINES ON THE PITTSBURGH MARKET OF COAL FROM THE PITTSBURGH DISTRICT

Connellsville Market Rebounds from Low Ebb

Demand Resulting from Strike Proves Stimulus—Steady Falling Off Follows Settlement—Operators Doggedly Resist Further Drop—Finding Destination Now a Burning Question

By L. U. Leslie

THE past year saw the coal market in Connellsville at the lowest ebb in history, then witnessed its sudden rise because of the demand resulting from the strike, and only to drop step by step after the strike was settled elsewhere. On Jan. 1 coal was quoted at $1.35 and when the strike went into effect it was at the same figure. Then by leaps and bounds it advanced to an $8 peak, reached on Aug. 15. From that point the price receded slowly day by day until it reached its present figure of $2.25, where it has clung for a month or more, and operators are strongly resisting any further downward moves.

The coke market reached its high point about the middle of August, when furnace coke was quotable at $14@$15 and foundry coke at $15@$16. The Cleveland settlement and the advance in wages in the Connellsville region caused a sharp drop and at the end of August furnace coke sold down to $10, for shipment over September. Idle furnaces were so anxious to get into blast that they bid the market up again to a secondary maximum of $12 late in September. Then the market declined at intervals to $6.50 at the middle of December, when a new influence developed, this being demand for coke for domestic use in the East as a substitute for anthracite, and the market took a sudden jump. As production of anthracite is over 2,000,000 tons a week and merchant production of Connellsville coke averaged about 75,000 tons a week in December, nearly all of this being under contract to furnaces, the domestic demand could easily swing the market. Whether it will be an influence throughout the winter depends chiefly upon the attitude of householders toward a fuel new to them and requiring somewhat different handling.

While the operators were dreaming of the biggest summer's run since the war ended they failed to see the spirit of unrest among their employees. Taking advantage of operators' confidence that their miners would not participate in any strike, organizers for the mine workers were sent into the region, got jobs at many of the mines and started planting the seed of unrest. One by one the great mines in the lower Connellsville region were silenced and in two weeks the strike spread to practically all parts of the field in Fayette County, but the union signally failed in making any inroads into the Westmoreland field.

The strikers are no longer interfering with plant operations and the market demand again is measuring the extent of production. But there is no disputing the fact that the Connellsville coal trade has suffered a permanent loss by reason of the fact that it now must take its place among other districts subject to labor disturbances.

Strike Was Shock of Years at Connellsville

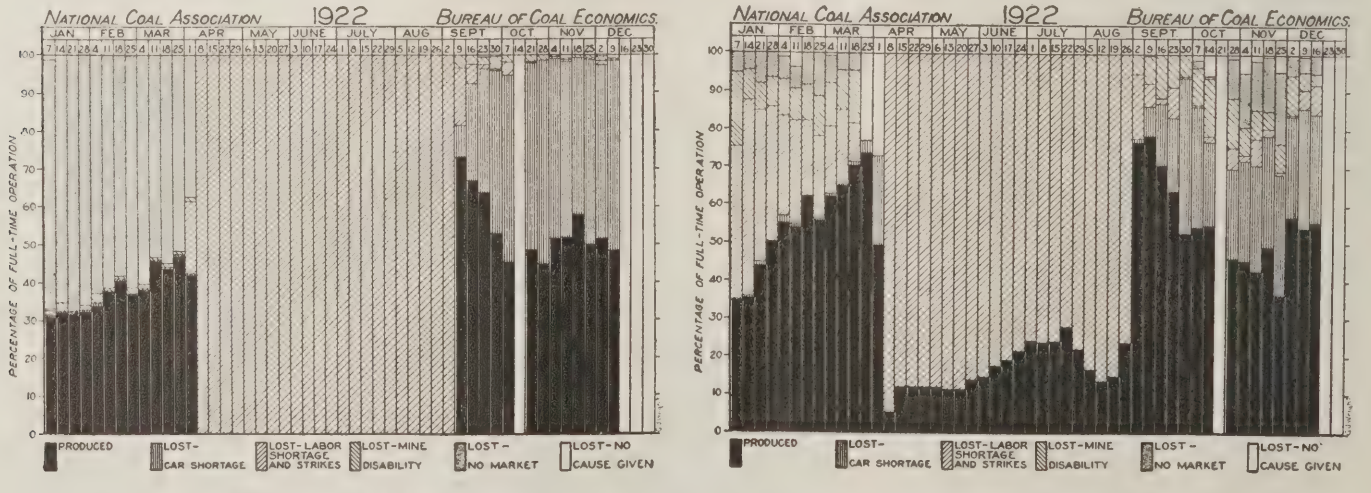
Within Fortnight Coke Production Fell to One-Third Rate at Close of March—Coal Output Dropped Further—Wage Advance Following Cleveland Settlement Failed to End Trouble

By B. E. V. Luty

THE event of the year in the Connellsville region, of course was the strike. It was, indeed, the most startling event for many years. The 1922 strike at the union coal mines may have been a great event in its way, but that trade is accustomed to strikes. There have been various strikes in the Connellsville region, the last important one being in 1891. For several years thereafter the "mountain of coke" at the Edgar Thomson blast furnaces served to prevent a recurrence. Wages were advanced from time to time, and at rare intervals they were reduced for short periods. In general the rates were kept in harmony with those paid in the Pittsburgh district, with allowance for the much greater ease of mining. Even in the great iron and steel strike of Sept. 22, 1919, when the agitators sought to close iron-ore mines, coal mines and coke works, there was much less striking in the Connellsville region than at the mills and furnaces.

The Connellsville region scale of Sept. 1, 1920, was in harmony with the existing scale at the union bituminous mines, but wage reductions were made in 1921, resulting in a condition wherein at the beginning of 1922 the cost of producing coal was vastly less in the Connellsville region than at the union mines under the scale which the United Mine Workers sought to continue for the two years from April 1, 1922.

Within a fortnight after April 1 production of coke in the Connellsville and lower Connellsville region was down to one-third the rate at the end of March, and the production of coal for shipment had decreased still further. The strike was strongest along the Monongahela River, where most of the coal for shipment is produced, much of it moving by water. It was confessed by large operators that they had not expected the strike. There was evidence of careful planning on the part of the representatives of the United Mine Workers, who produced the strike, and there also was evidence that if some of the men responsible for the iron and steel strike of 1919 were not



Pittsburgh (Pa.) District — Kansas District

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

actively at work their precise methods at any rate were carefully followed.

Predictions were common that this "non-union strike" would not last nearly as long as the union strike. Like most predictions made about the strike, this proved erroneous. When the Cleveland settlement of the union strike was made the Connellsville operators advanced wages to the scale of Sept. 1, 1920, the highest ever paid in the region, except that outside day labor was set at a lower rate than in that scale. It was expected that the strike would completely crumble, but it did not. There had been gradually increasing production since the first month or two of the strike, and early in September, with the heavy demands upon the railroads to move union coal, the car supply in the region became such that additional workers were not particularly needed. From that time to the end of the year operations were controlled by car supply and market demand, but the "strike" continued in the sense that there were strikers, supported in part by the United Mine Workers. Obviously the object is to retain a nucleus if there is to be another union strike in 1923. This is a fact that should be considered in all discussion of the probability of there being a coal strike April 1, 1923.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM SOUTHEASTERN KENTUCKY, BY MONTHS, 1922
AVERAGE OF QUOTATIONS ON LOUISVILLE, CINCINNATI AND CHICAGO MARKETS

	Lump	Mine-Run	Screenings
January	$2.85	$1.58	$1.25
February	2.70	1.55	1.21
March	2.25	1.55	1.34
April	2.29	1.85	1.54
May	3.16	3.01	2.97
June	3.49	3.25	3.02
July	5.81	5.67	5.62
August	5.71	5.59	5.40
September	6.20	5.49	5.29
October	6.80	4.46	4.30
November	6.59	4.06	3.96
December	6.49	3.40	3.21

Cincinnati Coal Trade Had Most Remarkable Year in More Than Decade

Many New Firms, Branches and Sales Offices Cause Notable Expansion in Tonnage and Territory Represented—Failures Were Not of Much Importance

By Harold W. Coates

LEAVING aside all the questions inextricably bound up in the disputes that have arisen through the labor question, this has been the most remarkable year of more than a decade so far as the Cincinnati coal trade is concerned. Through the addition of a score or more new firms and the adding of branches and sales offices there are now doing business here over 100 coal firms whose shipments might well be traced from "dear old Lun'on to far off Cathay." The expansion of business through these new offices has increased in tonnage as well as to territory into which the coal has been poured.

It might also be said that each period of feverish activity has brought its flock of new concerns—each seemingly finding it necessary to have representation on the Cincinnati market or else finding this a fertile field in which to sow. Nor have the new firms been more largely of the jobber order, for quite a number of them are offshoots of mines that have opened in Kentucky and West Virginia who see advantage in having a medium for sale between the producer and the consumer.

On the other side of the ledger there are but few entries. One or two weak brothers have dropped out of the running, but they were either puny in character or weaklings to begin with.

The beginning of the year saw the trade in the doldrums with an after-holiday state of affairs that had put most of the takers of coal in a position of doubt. Even the menacing clouds of a labor dispute of magnitude failed to act as a bracer and January saw the domestic market the steam market and even the usual ready sale for smokeless slipping in quite alarming fashion.

On several occasions the price of slack sank below the dollar mark and there was a general effort on the part of most of the producers to hold lump firm and sacrifice on slack to prevent any great accumulation. It was in this period that one or two of the direct sales agents for mines here took the lead in slashing prices in order to keep their mines going. These to a degree set the pace, for their price lists were flooding the mails and were a counter argument to others who tried to hold the helm a bit steady.

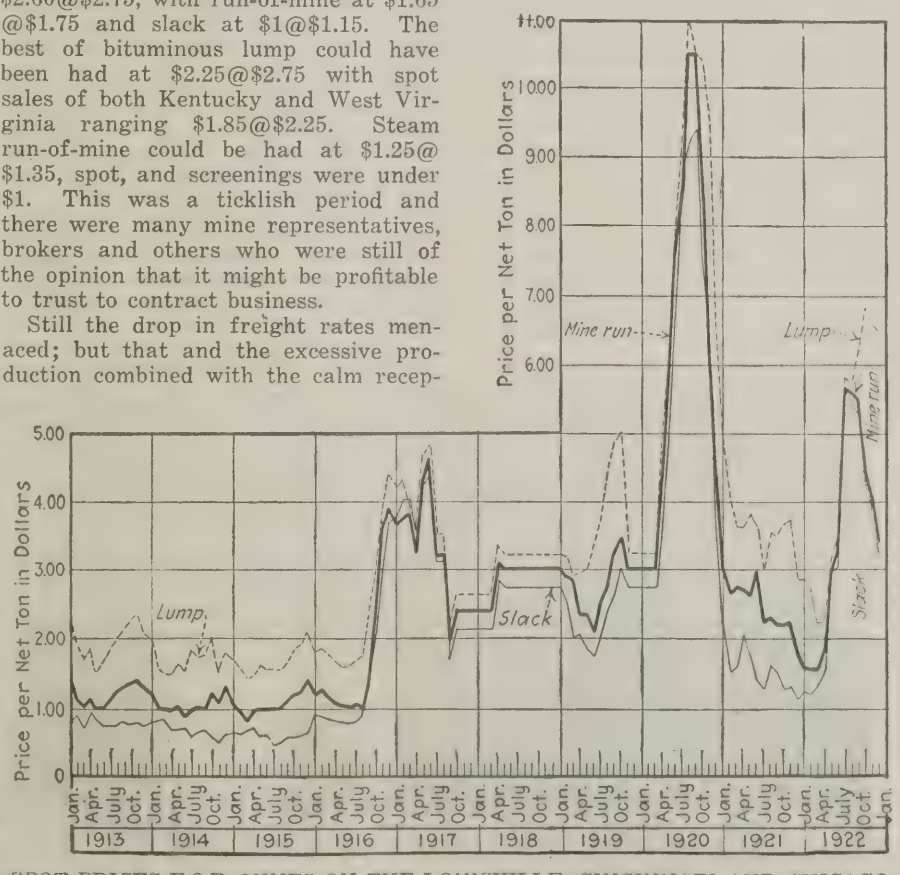
During March the banner coals had dropped greatly in price. Smokeless lump and egg were being sold freely at $2.60@$2.75, with run-of-mine at $1.65 @$1.75 and slack at $1@$1.15. The best of bituminous lump could have been had at $2.25@$2.75 with spot sales of both Kentucky and West Virginia ranging $1.85@$2.25. Steam run-of-mine could be had at $1.25@ $1.35, spot, and screenings were under $1. This was a ticklish period and there were many mine representatives, brokers and others who were still of the opinion that it might be profitable to trust to contract business.

Still the drop in freight rates menaced; but that and the excessive production combined with the calm reception of the actual strike situation failed to arouse any great price stimulus for weeks. The beginning of May, however, saw a change in tone. Reserves were beginning to melt away.

From a position of waiting hat in hand in the outer office, the small producer down in the hills began to take on a new significance. His production was being solicited. War times and the after-armistice period made this figure in the trade business-wise. He was canny. He began flirting with the middleman and by June the most of them were packing their buyers off to producing points to deal for the coal as it came from the mouth of the mines. Wagon mines that had been hit by the inertia came to life with a bang.

From the last of May until the middle of June jumps in price of 50c. to $1 within a week were not uncommon and then Secretary Hoover stepped in with the stern order to desist.

Perhaps it is a bit harsh to recall that period—that is as it applies to Cincinnati—for there are still men who



SPOT PRICES F.O.B. MINES ON THE LOUISVILLE, CINCINNATI AND CHICAGO MARKETS OF COAL FROM SOUTHEASTERN KENTUCKY

found one week with apparently the sky the limit, with buyers in the field who were paying around $4@$4.50 for coal only to have Mr. Hoover put his foot down on the skyrocketing of prices. They found that the Secretary of Commerce was speaking to the buyer.

Meetings of the operators with Mr. Hoover resulted in the smokeless coals being placed upon a basis of $3.25 for slack, $3.50 for run-of-mine and $3.75 for lump. And it might be said here that this part of the trade kept faith with Secretary Hoover and the prices on that level.

The middle of July found Mr. Hoover's attention directed to the Cincinnati market by reports that the price had mounted to $4@$5 once more. This was the crucial period in which the government was forced to action, and with the open season for priorities, district managers and distribution agencies coming on there was the usual hurly-burly attendant upon the government's attempt to regulate trade without the machinery of the law to enforce the demands.

Then came the establishment of the new Hoover prices in the smokeless field, which took into account the fact that producers with selling agencies should be allowed brokerage fees. This brought the price up to $4.56 for nut and slack, $4.86 for run-of-mine and $5.13 for lump and egg. The Ohio Fuel Administration came into being soon after the government regulation of affairs; but through the fact that the larger amount of Cincinnati's coal was interstate this did not cut much of a figure until Governor Davis called a special meeting of the Legislature and passed an act legalizing this wing of the government. Even then it was pointed out to the Governor's agent, Mr. Neal, the Fuel Administrator, that the Cincinnati trade could not be held accountable, and about the only thing done here was to make a few of the retailers uncomfortable.

September and the closing of the labor trouble showed a general scramble for coal. Railways, which had been the chief cause of the upturn in price through their bidding for what coal was available, despite the system of priorities, were still heavy takers. The steel mills were in the market. Henry Ford made his famous declaration—even with his deal with certain groups of Cincinnati brokers in progress—and the price of coal steadily advanced.

It was in this period that the Lake shippers became heavy customers, though it is to be said that some of the tactics that were employed still have a strange twist to them.

Even after the close of the Lakes there was a fine line of distinction made between coals that were for steam purposes and those that were used in the steel and byproduct plants with the latter taking anywhere up to $1 premium. The middle of November, however, saw the high values starting to wane. Several times the market settled with the prices easing off, only to recover an equilibrium that held out hope that bottom was being reached.

The railway situation to the south of the river has been muddled. The N. & W. and the L. & N. acknowledge that it will be months before there will be a complete recovery from the shopmen's strike. The C. & O. at one time was forced to embargo westbound coal in order to clean up accumulations.

The closing of the year saw a price range of ups and downs wholly out of line with any set precedent. The weather during the fore part of December was mild, and this with the usual accumulation at the Lake ports and a drop in the interest of buying for steel mills dulled the market. Then came a cold snap with an attendant tie-up of transportation, and with the country taking coal from hand to mouth this had an immediate effect. For the first time in months $2.50 coal was on record and then the price immediately swung upward again until Christmas saw it hovering around the $4 mark.

In Southern Ohio 1922 Was Not a Good Year

Operators' Profits After Strike Not Sufficient to Counterbalance Previous Losses—Many Jobbers Made Handsome Profits—Retailer's Path Beset with Difficulties—Output Lowest Since 1915

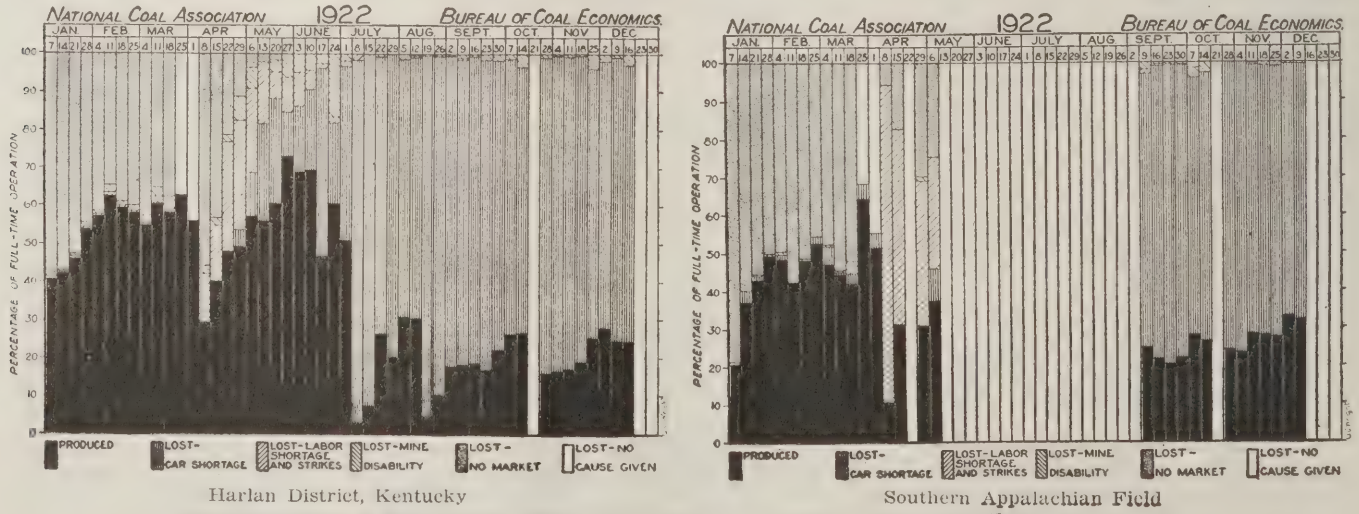
By J. W. Lehman

THE year 1922 was not a good one for the coal industry in the Buckeye State. Many things mitigated against a better and more profitable year, principally the strike. For the operator it was a bad year and while some huge profits were made following the settlement of the strike, still these have not been sufficient, in most cases, to counterbalance the losses previous thereto.

From the jobber's standpoint the year was a good one in many respects. During the first three months wholesalers were able to handle a fair tonnage at small margins, but with the declaration of the strike they began to take an active part in the business. Coal from the non-union fields of West Virginia and Kentucky came into the state and jobbers in many cases made handsome profits.

The retailer had a fair year as a rule, although it was beset with many difficulties. One of these was the Ohio Fuel Administration. This administration fixed retail profits at a time when profits would naturally have been larger. But on the whole the retailer has little complaint to offer.

Statistics of the Southern Ohio Coal Exchange show an opproximate output in Ohio during the year of 25,650,000 tons. This estimate is based on the production up to Dec. 1 and an estimate of the last month, which is placed at 3,000,000 tons or more. The output in 1912 was 34,444,000 tons; in 1913, 36,285,000 tons; in 1914, 18,736,000 tons; in 1915, 22,627,000 tons; in 1916, 34,526,000 tons; in 1917, 41,678,000 tons; in 1918, 47,919,000 tons; in 1919, 35,226,000 tons in 1920, 45,227,000 tons and in 1921, 29,065,000 tons.



PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

While the strike was predicted for some time the usual stocking up on the part of steam users was not as heavy as in some former years when strikes were called. This is due to the fact that stocks were already large and also to the business uncertainty of the future.

The year opened with low prices and there was nothing outside of the threatened strike to stimulate the market. As a result lump was sold around $2.20@$2.50 during the entire time. Mine run was rather weak, selling at $1.60@$1.85 and screenings, $1.50@$1.85. Just previous to April 1 there was a slight increase, but this was almost negligible.

Little effect on quotations was noticed for the first 45 days of the strike. But by May 15 there came a bull movement and prices advanced materially. This state of affairs continued right up to the settlement and immediately afterward, when the extreme high prices of the year prevailed. The Ohio Fuel Administration came into being and fixed prices to be paid at the mines in all of the producing fields of the state. This was not brought about until fully five weeks after the strike and operators shared in the big quotations as a rule up to that time.

Ohio prices were originally fixed at from $3.56@$4.86 for mine-run. The provision of the administration was that prepared sizes would be 25c. higher while screenings were 25c. lower than those levels. In all there were nine mining districts in the state according to the plan of the Ohio Administration.

These prices were considerably lower than current quotations and consequently the larger part of the production was shipped out of the state. To supply the deficit West Virginia and Kentucky varieties were shipped into Ohio at fancy prices and the consuming public was not benefited materially by the fixation of prices. Many complaints were received from the public when the administration permitted operators producing lumps "Especially prepared for domestic use" to charge 50c. more than the former schedule. This had the effect of retaining a larger proportion of the Ohio output for Ohio users.

At the close of the year stocks in the hands of retailers were only fair and in some cases shorter than usual at the time of the season. This was because householders were not buying actively, preferring to place small orders in the belief that lower prices would prevail after the first of the year. Retailers were loath to stock up on high-priced coal and consequently the policy was to conduct that business from hand to mouth. Stocks in the hands of steam users were somewhat larger, variously estimated at from 30 to 60 days. In some instances even shorter stocks were carried, as steam users also had the idea of cheaper coal until the final break just before the end of the year.

With colder weather producers, distributors and dealers believe there will be a steady demand for domestic sizes during the early part of the year. But the steam market is not looked upon in the same way and it is believed that prices for mine run and slack will continue at a rather low level for some time to come.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM HOCKING DISTRICT, BY MONTHS, 1922
QUOTED ON COLUMBUS, OHIO, MARKET.

	Lump	Mine-Run	Screenings
January	$2.76	$1 86	$1 36
February	2.65	1 86	1 37
March	2.60	1 82	1.49
April	2.60	1 88	1.60
May	3.37	3.18	2.86
June	3.44	3 24	3.15
July	5.00	4 95	4.59
August	6.16	5 84	5.51
September	6.12	5 19	5.04
October	5.34	3 80	3.52
November	5.27	3.46	3.01
December	5.05	2.76	2.62

Eastern Ohio Had Many Tribulations in 1922

Potential Loss of 12,000,000 Tons Production Due to "No Market," Miners' Strike and Car Shortage—Bargain Counter Coal Prices of January and February Failed to Stimulate Buying

BY K. M. PINAIRE

OPERATIONS in eastern Ohio perhaps experienced during 1922 a greater variety of tribulations than ever before. The year began with coal prices lower than had prevailed in many months, but this price range which proved to be the bargain counter of the year failed to stimulate much buying on the part of a convalescent industry. Large users, such as public utilities, railroads and steel mills, had not made appreciable inroads on their reserve stocks and considerable optimism prevailed that impending labor troubles at the mines would in some way be settled so as to result in lower production costs.

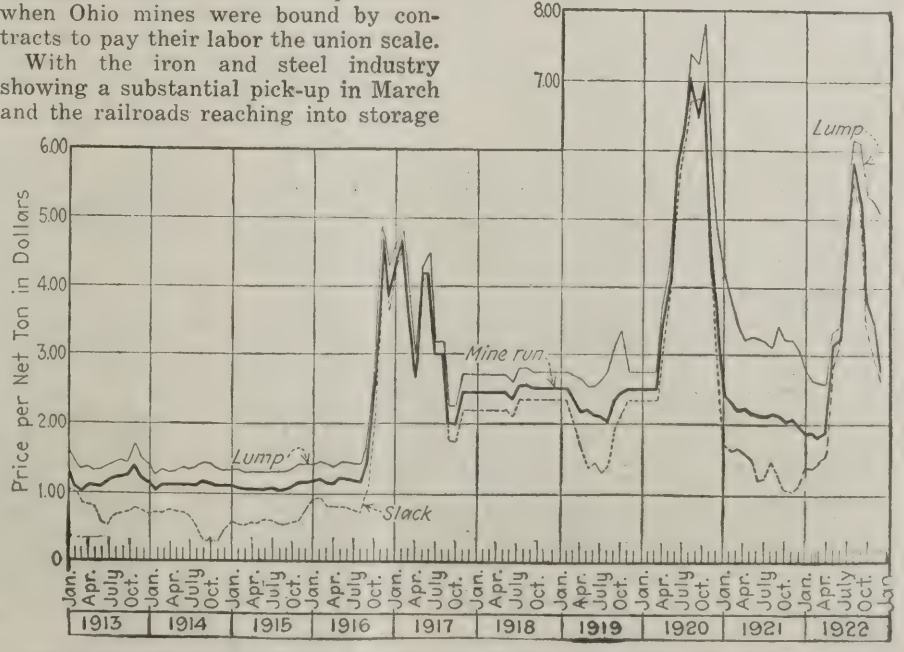
During the first quarter of the year mines worked less than 50 per cent of full time, the only factor of any significance hindering production being "no market."

In an effort to create more work for Ohio miners the Governor of the state in early February appealed to consumers throughout the state to confine their purchases to Ohio coal, and particularly urged municipalities and public utilities to heed his suggestion. However, lower production costs at nonunion mines to the south made this program difficult of accomplishment when Ohio mines were bound by contracts to pay their labor the union scale.

With the iron and steel industry showing a substantial pick-up in March and the railroads reaching into storage tracks pulling empties to take care of increased traffic all-round, coupled with increased fuel demand for storage purposes, mining operations were stimulated to the highest point of the year, and by the end of the month consumers in this section had enough coal on hand to last anywhere from forty to ninety days.

During the strike period, the majority of stripping mines in the district continued to operate and produced between 30,000 and 60,000 tons per week. While the stripping coal was able to supply fuel in many emergency cases, quite a few large consumers located contiguous to the lower ports protected their situation by acquiring cargoes from steamers which had already been loaded and were awaiting the opening of Lake navigation.

Likewise, others moved to nearby cross-Lake ports to replenish weak spots in coal reserves. Not until early July did there appear any real anxiety, as by that time stripping and nonunion coal began to prove inadequate. The effect of this scant fuel supply brought reports of hampered operations of steel mills and banking of furnaces in the Youngstown and Mahoning



SPOT PRICES F.O.B. MINES ON THE COLUMBUS MARKET OF BITUMINOUS COAL FROM THE HOCKING DISTRICT

PRODUCTION OF COAL IN EASTERN OHIO, 1922
(In Net Tons)

Railroads	B & O	Penna.	W. & L.E.	N. Y. C.	Totals
No. of mines	(75)	(45)	(45)	(12)	(177)
January	595,000	365,000	315,000	106,000	1,381,000
February	627,000	376,000	332,000	98,000	1,433,000
March	826,000	470,000	378,000	35,000	1,709,000
April*	15,000	30,000	60,000	50,000	155,000
May*	15,000	20,000	60,000	50,000	145,000
June*	10,000	15,000	60,000	40,000	125,000
July*	10,000	10,000	50,000	40,000	110,000
August*	193,000	186,000	77,000	57,000	513,000
September	486,000	444,000	259,000	170,000	1,359,000
October	474,000	439,000	261,000	154,000	1,328,000
November	528,000	337,000	316,000	120,000	1,301,000
December	491,000	364,000	275,000	145,000	1,275,000
Totals	4,270,000	3,056,000	2,443,000	1,065,000	10,834,000
Per Cent by Railroads	39.4	28.3	22.5	9.8	100

* Stripping mine output April 1 to Aug. 17 estimated.

Valley districts and the Detroit & Cleveland Navigation Co. sought relief by enlisting the aid of Secretary Hoover. With a shortage becoming imminent, prices hit the high level of the year.

By the middle of July Cleveland's coal supply became such a matter of concern that the Chamber of Commerce appointed a committee to cope with the situation. During the same month several injunctions were granted through the Federal District Court restraining union miners from interfering with stripping-mine operations and the arrival of National Guard caused an immediate increase in stripping output.

Coal had become so scarce by early August that vessel operators were reported to have paid in some cases as much as $10 per ton for bunker coal. On Aug. 16, as result of the Cleveland joint conference, telegraphic instructions were sent out to local unions and machine men began cutting coal in easten Ohio on the 17th.

Spot prices then dropped $1@$2. Despite the prolonged strike, no widespread demand appeared and the procrastinating attitude of buyers was again bolstered up by the appointment of an Ohio Fuel Administrator and the fixing of maximum prices on coal from the various fields. Price regulation became effective Oct. 10, maximum figures f.o.b. eastern Ohio mines being as follows: Slack, nut and slack, $3.31; mine-run, $3.56; lump, $3.81.

Effective Nov. 15, increases were allowed on lump sizes, resulting in the following range: Lump, 1¼ in., $3.81; lump, 2 in., 4 in., 6 in., $4.31.

Before all price restrictions were removed Dec. 1, demand had subsided and spot prices had receded to figures below the state maxima. A review of spot prices prevailing throughout the year reveals that the lowest figures prevailed during the first quarter, when the range was about as follows: Slack, $1.50@$1.90; nut and slack, $1.65@$1.90; mine-run, $1.75@$1.95; lump, $1.85@$3.

PERCENTAGE OF TIME LOST BY MONTHS DURING 1922

	Per Cent	Cause
January	57	No market
February	51	No market
March	46	No market
April	100	Miners' strike
May	100	Miners' strike
June	100	Miners' strike
July	100	Miners' strike
August	81	Strike 53%, car shortage 15
September	47	Car shortage
October	60	Car shortage
November	52	Car shortage
December	60	Car shortage

While no figures are yet available as to 1922 production in the State of Ohio, an estimate is made that it will not exceed 25,000,000 tons, and the following table, made comparative with the four preceding years, will indicate the prominence of the eastern Ohio field in the annual production of coal in the state:

Year	Eastern Ohio	State of Ohio	Per Cent
1918	21,043,010	47,919,202	43.8
1919*	16,416,319	35,225,908	46.6
1920	19,584,806	45,227,077	43.3
1921	18,031,000	32,000,000	56.0
1922*	11,000,000	25,000,000	44.0

* General strike six weeks.
† General strike four and one-half months.

Bituminous coal receipts at Cleveland for industries and retail yards during the year 1922 are shown by the following table:

	Net Tons
January	419,047
February	455,760
March	462,653
April	231,756
May	341,108
June	358,184
July	234,486
August	372,451
September	752,427
October	410,307
November	634,882
December	641,141
Total	5,314,202
Year	
1918	7,300,000
1919	6,394,000
1920	4,194,000
1921	4,042,001

Detroit Had Year of Disappointment in 1922

Market at No Time in Healthy, Normal Condition—Influences Outside the Industry Had Depressing Effect—Hopes of Jobbers and Wholesalers Unfulfilled

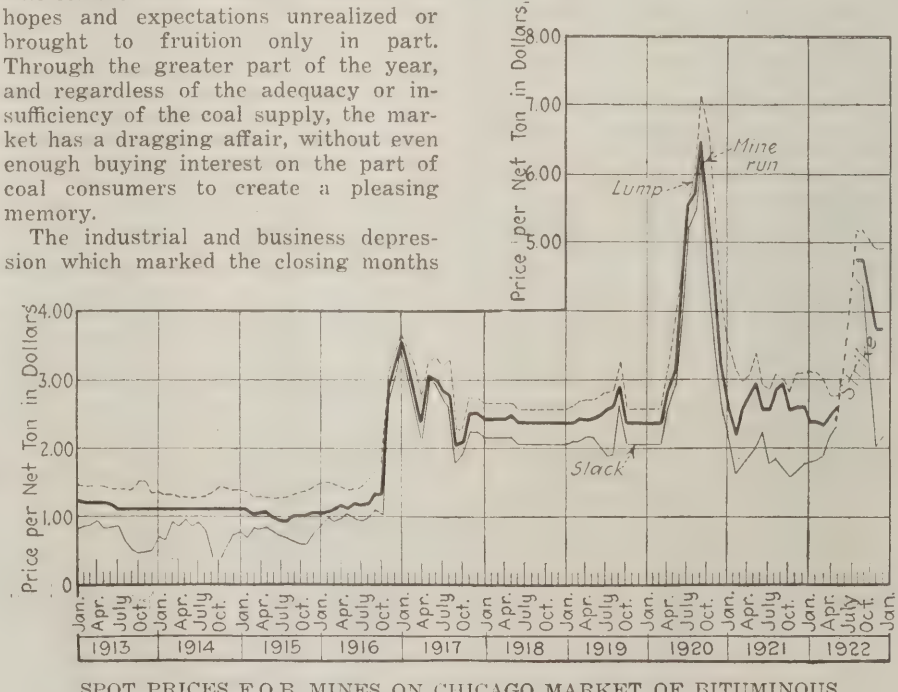
By E. E. Dunbar

As a whole, the twelve-month just ended was a period of disappointment for representatives of the coal trade in Detroit. From the opening to the close of the year there was perhaps no time when the local market could be considered as in a healthy, normal condition. At various times throughout the year the coal business suffered from the restrictive influence of depressing events, some of which were a development outside of and apart from the industry.

To most of the Detroit jobbers and wholesalers 1922 was an interval of hopes and expectations unrealized or brought to fruition only in part. Through the greater part of the year, and regardless of the adequacy or insufficiency of the coal supply, the market has a dragging affair, without even enough buying interest on the part of coal consumers to create a pleasing memory.

The industrial and business depression which marked the closing months of the previous year was carried over into the early part of 1922. Many industrial consumers were carrying reserves of considerable magnitude, so also were many of the retail dealers. This condition was not altogether a result of overliberal buying in the preceding months but was rather the natural outcome of a reduction in consumption.

The sluggish state of the market continued well into March, with the railroads and public-utility companies supplying the chief buying power, though



SPOT PRICES F.O.B. MINES ON CHICAGO MARKET OF BITUMINOUS COAL FROM FOURTH AND FIFTH VEINS, INDIANA

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM INDIANA 4th AND 5th VEIN DISTRICTS, BY MONTHS, 1922 QUOTED ON CHICAGO, ILL., MARKET

	Lump	Mine-Run	Screenings
January	$3 13	$2 37	$1 79
February	3 10	2 37	1 81
March	3 00	2 34	1 88
April	2 77	2 47	2 17
May	2 77	2 55	2 32
June			
July			
August	5 17	4 75	4 47
September	5 17	4 75	4 35
October	5 04	4 24	3 06
November	4 92	3 72	2 01
December	4 92	3 72	2 17

even these purchasers indicated a curtailment of requirements.

Not even the strike news possessed sufficient galvanic power to rouse the coal buyers from the apathy into which they had fallen. Only a few of the steam buyers exerted any active effort to add to their stocks and in the case of some of these the attempt was made too late to be productive.

Another factor in the situation which was an influence in preventing any rush of buyers preceding the miners' strike was the fact that a considerable number of steam plants during the early months of the year had been obtaining most of their supply from the non-union mining districts of West Virginia and Kentucky. Because of its generally high quality and the lower cost of production, this coal had almost driven out of the market the product of the union mines. Among buyers the expectation was generally encouraged that these non-union mines would be able to continue adequate production during the strike.

The unforeseen complications injected into the situation by the closing of a number of these mines in districts where the union organizers had been busy, and by the strike of railway workers, brought to the local market in the late summer a brief period when buying demand was perhaps the most active of the year, with supply at the lowest level.

With the resumption of union production, the volume of buying demand eased off. The reversion to a sluggish market was attributed to unwillingness of either users of steam coal or retail dealers to pay the prices imposed by the operators of the reopened union mines.

The attitude of the buyers doubtless was encouraged to some extent by a statement issued by Henry Ford, who urged coal buyers to limit their purchases to the quantities actually necessary to supply current needs.

This attitude apparently has been maintained through the last three months of the year. Its efficacy as a means of lowering mine prices is still somewhat in question.

In the intervening weeks, however, there has been some reduction of mine prices. Hocking lump, quoted around $6 early in October, is now about $5.50 and mine-run is down from $4 to $3.50, while nut, pea and slack have eased off from about $3.50 to $2.75. West Virginia and Kentucky lump has declined from $7 to $5.75; mine-run from $4 to $3.50 and slack from $4 to about $3. Smokeless, with supply limited, is still holding around $8 for lump and egg and $6 for mine-run.

These prices show a considerable advance from the lowest of the year, in late March, when West Virginia 4-in. lump was obtainable at $2.50; egg at $2; mine-run at $1.50 and slack at $1.30. Three-inch Ohio lump was then quoted $2.75; egg, $2.25; mine-run, $1.85; slack, $1.50. Smokeless lump was $3.25; mine-run, $2, and slack, $1.50. A month after the opening of the strike, or about May 1, smokeless lump and egg was obtainable at $3.75 and mine-run at $2.40. West Virginia and Kentucky lump was held at about $3; mine-run at $2.50@$2.60 and slack at $2.40.

Alabama Market Had Good Year, But Progress Was Not as Great as Expected

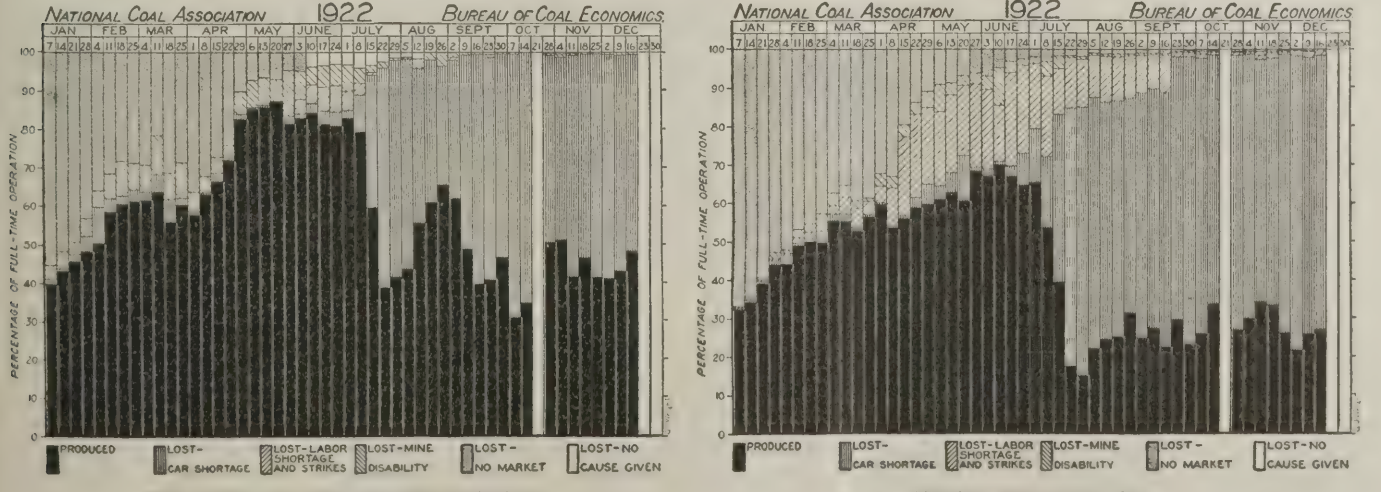
As This Region Operates on Open-Shop Basis, Strike in Central Competitive Field Proved a Boon—Production Reached Peak of 400,000 Tons per Week.

By H. B. McLaurine

ALTHOUGH trade conditions in Alabama did not show the degree of progress toward normalcy which was expected following the previous year of extreme dullness and lack of demand for fuel, the market might be rated as having been fairly good, considering the adverse circumstances affecting production and consumption. Some improvement in the industrial situation was noted; railroads and other utilities required an increased tonnage, and as a result of constantly increasing activity in furnace operations and better demand for foundry products as the year wore on, the need for furnace and foundry coke was greater and the consumption of coal in coke manufacture was much heavier than during 1921.

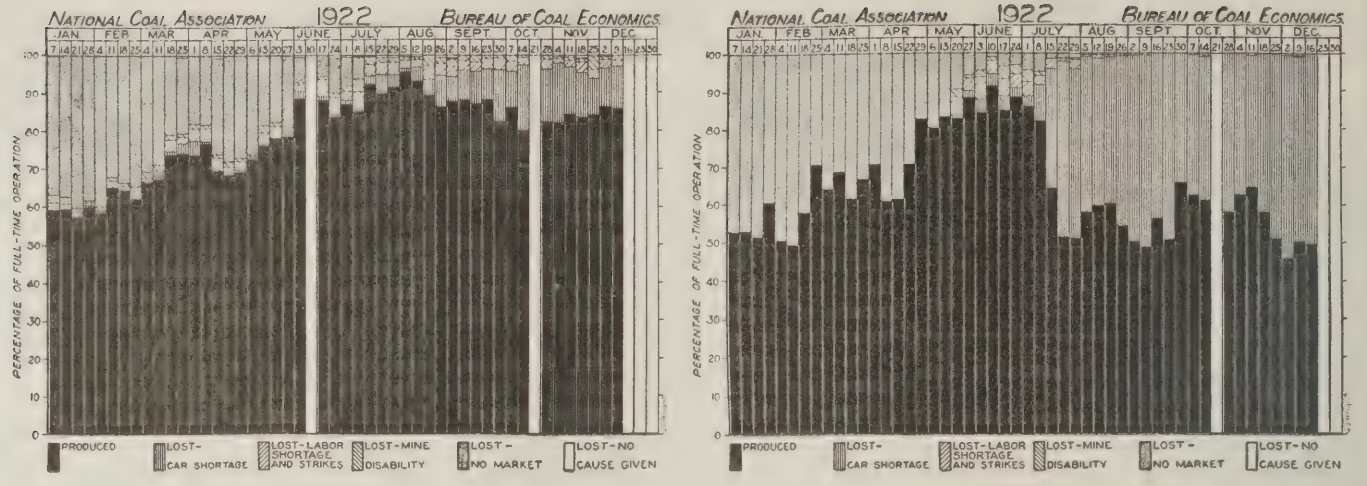
Bunker and export trade did not show material improvement and the amount of coal moving to the Gulf ports was perhaps no greater than during the previous year. Slow recovery of shipping and the increased use of oil as motive power contracted the need for bunker fuel, and the further utilization of hydro-electric power reduced coal requirements at inland points to some extent.

During the first two and a half months of the year there was little demand for commercial coal. The latter part of March the railroads and some industrial interests bought considerable coal for stocking in anticipation of the strike, which temporarily stimulated the trade, and the negotiation of contracts for railroad, industrial and domestic coal through April, May and June tended to stabilize operations. Inquiry for spot coal in the meantime was fairly active, the requirements being about equal to the supply of free coal available. Consumers not covered by contract maintained throughout the



Kenova-Thacker District, West Virginia — Northeastern Kentucky

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

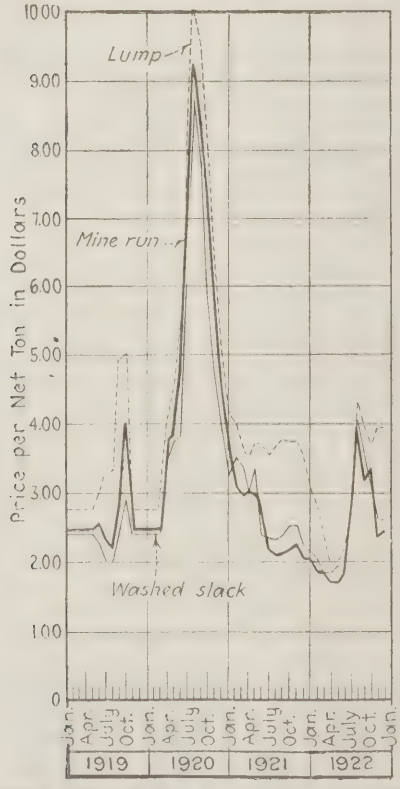


Alabama Virginia

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

year a policy of providing only for needs of the immediate future.

During the latter part of June railroads in the North and West, which had practically exhausted the large surplus stocks accumulated prior to the strike in the union fields, turned to this market for coal and bought heavily over a period of about two months, a good demand also developing from industrial sources in the same territory. This movement continued until the strike settlement was effected in the Central Competitive field and proved a decided boon to the industry in this district, which experienced no labor troubles, operating as it did on the open-shop basis. Production reached a peak record of 400,000 tons per week, consumers in normal Alabama territory in the meantime being amply supplied and suffering no ill effects from the foreign movement. The commercial market during the remainder of the year was easy, but requirements were ample to take care of the restricted production caused by a drastic car shortage which immediately followed the cancellation of foreign business and the withdrawal of equipment which had been furnished the mines in unlimited quantity to move the emergency tonnage.



SPOT PRICES F.O.B. MINES ON THE BIRMINGHAM MARKET OF COAL FROM ALABAMA FIELDS

Demand for domestic coal was good practically throughout the year, there being strong pressure the greater part of the time, with only a few brief periods of lessened activity. Suspension of operations in union fields created a market for considerable tonnage in portions of Georgia and Mississippi formerly supplied from Tennessee and Kentucky mines, thus expanding dependent territory. The activity of the market was occasioned by a shortage in supply and wider distribution.

Periods of dullness in the steam trade materially reduced the normal output at commercial mines from which practically 75 per cent of domestic sizes come, car shortage and crippled transportation conditions incident to the strike curtailed production at all operations, and there was little chance for dealers to acquire reserve supply.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM BIG SEAM DISTRICT, BY MONTHS, 1922

QUOTED ON BIRMINGHAM, ALA., MARKET

	Lump	Mine-Run	Washed Slack
January	$3.02	$2.05	$2.14
February	2.82	1.85	2.04
March	2.47	1.85	1.85
April	2.00	1.70	1.85
May	2.00	1.70	1.95
June	2.20	1.84	1.85
July	2.79	2.67	2.79
August	4.31	3.95	4.06
September	3.97	3.17	3.59
October	3.67	3.32	3.04
November	3.95	2.35	2.60
December	3.95	2.41	2.60

Quotations on steam grades began to ease in January and suffered a slight gradual reduction until June, when they began to stiffen again with the coming of inquiry from outside territory and the eventual placing of orders for heavy tonnage for foreign shipment. The demand from the North and West became so strong that quotations for spot mine run and washed coal rose rapidly, ranging $5@$7 at the peak of the movement, and spot domestic brought similar figures in nearby territory.

In an effort to stabilize market conditions producers representing the majority of the tonnage in the field agreed to abide by prices fixed by Secretary Hoover, which were based on a 25c. reduction on the old government schedule, but as most of the coal available for the spot trade came from small operations, many of which began to function with the development of the emergency demand, coal moving to foreign territory continued to bring a large premium over the fixed schedule

RANGE OF QUOTATIONS ON STEAM COAL DURING 1922

	January		April		July (27) (Gov.)		September (State)		December	
	Mine-Run	Washed	Mine-Run	Washed	Mine-Run	Washed	Mine-Run	Washed	Mine-Run	Washed
Big Seam	$1.75@$2.00	$1.75@$2.00	$1.50@$1.90	$1.75@$2.00	$2.20	$2.50	$2.60	$3.10	$2.25@$2.75	$2.50@$3.00
Carbon Hill	1.75@ 2.00	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.60	2.80	3.00	3.50	2.50@ 2.75	2.75@ 3.25
Cahaba	2.25@ 2.50	2.25@ 2.50	1.85@ 2.25	2.00@ 2.25	3.20	3.50	3.60	4.10	3.00@ 3.25	3.00@ 3.75
Black Creek	2.25@ 2.50	2.25@ 3.00	2.00@ 2.40	2.25@ 2.50	3.20	3.50	3.60	4.10	3.00@ 3.25	3.00@ 3.75
Pratt	1.75@ 2.00	.....	1.75@ 2.00	1.90@ 2.25	2.60	2.80	3.00	3.50	2.75@ 3.00	.....
DOMESTIC QUOTATIONS — LUMP AND EGG										
Big Seam	$2.75@$3.00	.....	$2.00	.....	$2.50	.....	$3.45@$4.45	.....	$3.45@$4.45	.....
Carbon Hill	3.00@ 3.25	.....	2.00	.....	2.80	.....	4.45	.....	4.45	.....
Cahaba	3.75@ 4.50	.....	2.75@ 3.00	.....	3.50	.....	5.20	.....	5.20	.....
Black Creek	3.75@ 4.50	.....	2.75@ 3.00	.....	3.50	.....	5.20	.....	5.20	.....
Montevallo	6.00	.....	3.50@ 3.75	.....	4.60	.....	6.00	.....	6.00	.....

Note:—July schedule fixed by Mr. Hoover, effective July 27; September schedule fixed by state, effective Sept. 1.

until the pressure was relieved by the resumption of operations in the union fields and quotations gradually receded to government figures. Due to an increase in wages granted mine labor as of Sept. 1 the State Fuel Administration fixed a new schedule of maximum prices for steam and domestic coal to absorb the additional cost of production, which ruled for the balance of the year, the easy commercial market bringing about some decrease from the maximum prices for that grade of coal.

New development work and improvement of producing facilities during the year included the new Overton mine of the Alabama Fuel & Iron Co., in the Cahaba basin; Dixie mine of the Moffatt Coal Co., in Bibb County; the Black Creek & Valley Coal Co., and the incorporation of the Etowah Coal & Iron Co., for the development of properties in Marshall and DeKalb counties, and an extensive stripping operation in Tuscaloosa County.

Completion of the $400,000 coal terminals of the federal government at Mobile added greatly to the facilities for storing bunker and export coal and the speedy bunkering of vessels coaling at that point. Coal-carrying equipment on the Warrior River was supplemented and indications point to a more extensive utilization of water transportation during the coming year.

At this time no accurate figures on production are available but it is estimated that the output for the year will run between 16,500,000 and 17,000,000 tons, or a gain of 3,500,000 to 4,000,000 tons over 1921. Coke production is a difficult matter on which to venture an estimate, but it probably will be around 4,500,000 tons, or an increase over last year of approximately 1,500,000 to 2,000,000 tons.

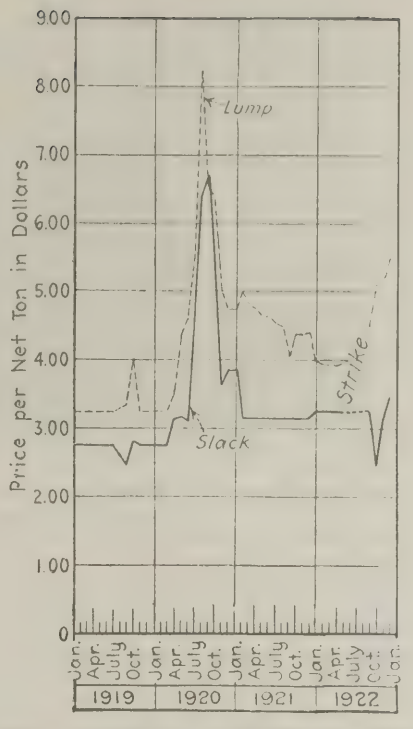
Chicago Has Feast-and-Famine Twelvemonth

Enters Strike Period Quietly Enough but "West Kentucky Riot" Upsets Everybody and Everything—Post-Strike Market Calm and Buyers' Hold-out Run to End of Poor Rail-Service Year

NO MORE perfect demonstration of the "feast-and-famine" character of the coal industry has been given the coal trade of Chicago than that offered by the year 1922. Opening on a quiet market that persistently refused to get excited about the approach of the general strike of April 1, the year progressed through a slight market agitation just before the strike, moved on into a summer that started stagnantly but wound up in a hectic late July bartering for western Kentucky and non-union coal whose prices bounded skyward when the country's immense coal reserve began to show bottom, entered next into an autumn that deflated whatever boom tendencies followed the close of the strike in August, and reached a grand finale in December which disappointed almost everybody who sold coal.

Most Indiana and Illinois producers, more than 100 of whom have headquarters in Chicago, finished the year fairly well out of the red, but none was rolling in wealth and it must be said truthfully that a few had not been able to recoup the losses incident to the strike. A number turned their sales organizations into jobbing agencies during the shutdown. There was more of this sort of thing than the city has seen in a long time. It was the only means of keeping a few heads above water. Regular wholesalers went through the usual experience of a strike year. They speculated at every opportunity and for a few weeks just after the middle of the strike period their plunging was rewarded with gold. But the uncertainty of the market caused enough of them to get their fingers scorched so that no 1920 "gold rush" was experienced. The slack autumn and early winter market was hard on jobbers, even though 75 per cent of the Chicago trading was on the open market.

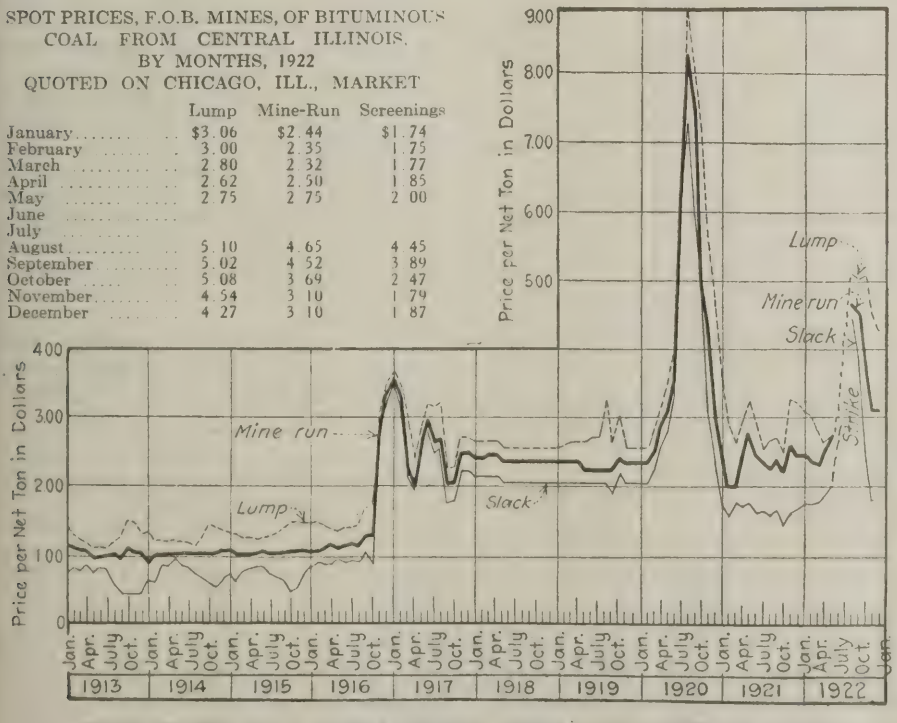
Price restraint exercised through the latter half of the strike period by Secretary Hoover over practically all non-union coal except that to be had in western Kentucky and the general effort of railroads and big consumers to combine against bloated markets had their effect in Chicago as well as elsewhere. The organization of a "buying pool" of railroads, under advice of union operators here whose mines were down, worked fairly well for awhile. It prevented a good deal of bidding in the fields; but it did not last. The "pool"



SPOT PRICES F.O.B. MINES ON THE CHICAGO MARKET OF COAL FROM NORTHERN ILLINOIS

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM CENTRAL ILLINOIS, BY MONTHS, 1922 QUOTED ON CHICAGO, ILL., MARKET

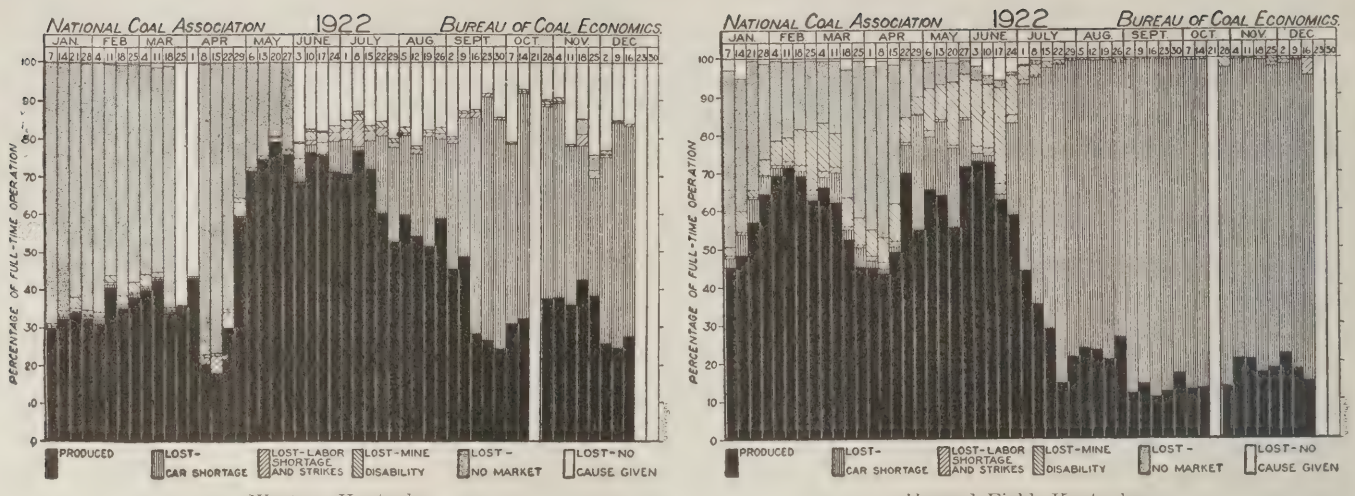
	Lump	Mine-Run	Screenings
January	$3.06	$2.44	$1.74
February	3.00	2.35	1.75
March	2.80	2.32	1.77
April	2.62	2.50	1.85
May	2.75	2.75	2.00
June			
July			
August	5.10	4.65	4.45
September	5.02	4.52	3.89
October	5.08	3.69	2.47
November	4.54	3.10	1.79
December	4.27	3.10	1.87



SPOT PRICES F.O.B. MINES ON THE CHICAGO MARKET OF COAL FROM CENTRAL ILLINOIS

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL, FROM NORTHERN ILLINOIS, BY MONTHS, 1922 QUOTED ON CHICAGO, ILL., MARKET

	Lump	Mine-Run	Screening
January	$3.99		$3.25
February	3.96		3.25
March	3.93		3.25
April	3.92		3.25
May	3.93		3.25
June			
July			
August			
September	4.50		3.25
October	5.10		2.49
November	5.22		3.16
December	5.50		3.47



Western Kentucky Hazard Field, Kentucky

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

sundered by internal dissention and many of its members finally joined in the short but exciting rush for coal in western Kentucky which hoisted that fuel from $4.50, mine run basis, to as high as $10@$12 on the Chicago market in the last weeks of July.

By the time the strike ended, Aug. 15, western Kentucky had slumped badly, and a few Chicago men with high-priced contracts were in hot water. Then violations of contract had their turn and the market was upset generally.

At the outset of new production in Illinois and Indiana following the strike the usual sparring for position was engaged in. The companies set a high but not exorbitant circular and started in. Southern Illinois lump opened at $4.90@$5.15 when the first coal came out of the ground. Screenings were assigned a price of $4.15@$4.35. Central Illinois companies followed suit and Fourth and Fifth Vein Indiana operators began at levels 25c. above this. Standard district Illinois coal began at $1 less. These circular prices were all at least $1 above the pre-strike market of March; in the case of steam coals the increase was $2 or more.

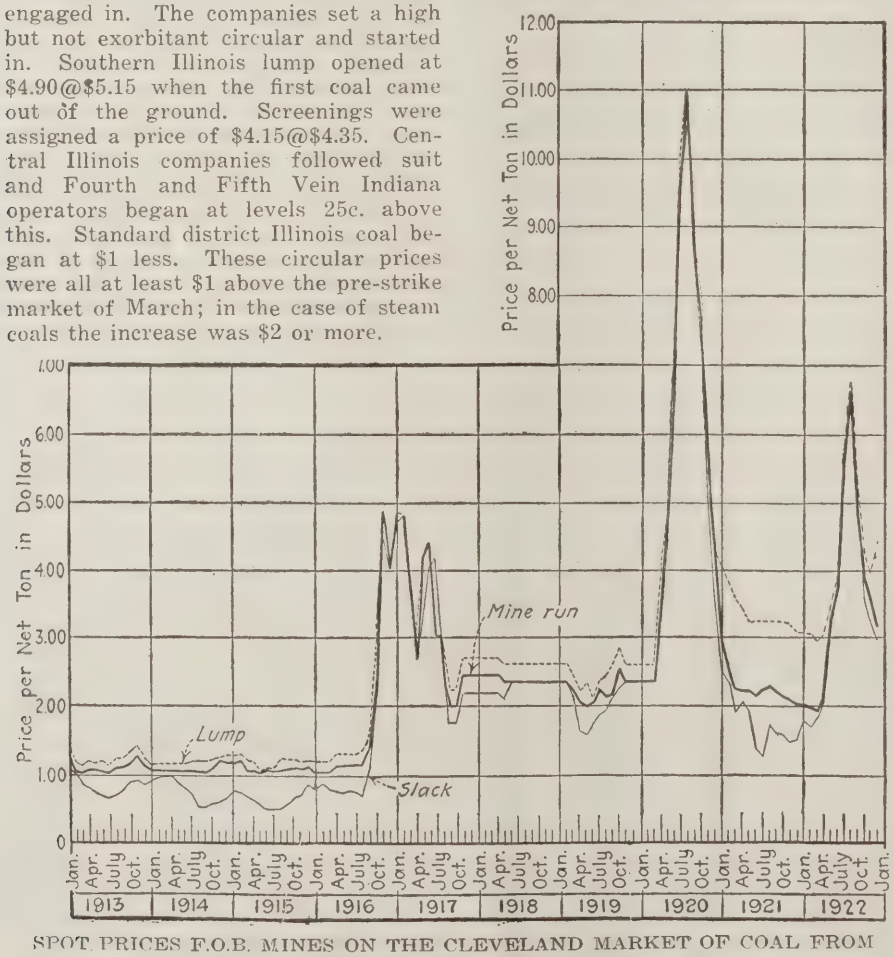
Of course by this time western Kentucky's flight was over. Coal from there at once resumed its normal practice of undercutting the market, and before autumn had advanced far western Kentucky lump was passing $4 on the way down, and remained that low to the end of the year, while its screenings dropped to $1.50. On the other hand Illinois and Indiana domestic coals went into October at a 50c. advance, though the steam market remained slow and screenings descended.

Continued warm weather and the presence of cheap western Kentucky coal which big buyers were ever ready to use as a club on the better fields of the Middle States, kept the market at low ebb after the first few weeks of operation. The advice of the government and the United States Chamber of Commerce against stocking of steam coal had a double effect in the Midwest region as generally.

When dealers' yards began to overflow and household buyers throughout this region quit purchasing in the hope that the price would drop, there settled down over the market in November another lull which shot prices to pieces except in the cases of exceptionally good domestic coals. These continued to maintain the $5.50 circular with some degree of stability. Central Illinois and Standard district domestic sizes dropped $1, however, and demand at times was so light that the fields choked with "no-bills" and large shipments were dumped out at the mercy of spot buyers who knew not the meaning of the word.

The steam market during early November softened noticeably. The best screenings Illinois produced sank to $2.15@$2.25 and those from various fields to $1.25. The volume of screenings which went on the ground at mines was considerable. But even this device to free cars for domestic coal did not keep all mines working. Because of general slackness, the domestic market did not, for awhile, absorb all the output at the reduced prices, a condition which continued in lesser degree through a cold snap or two right up to the end of the year.

This unsatisfactory condition held through a period of car shortage which cannot be regarded in any other light



SPOT PRICES F.O.B. MINES ON THE CLEVELAND MARKET OF COAL FROM THE PITTSBURGH NO. 8 DISTRICT OF OHIO

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM PITTSBURGH NO. 8 DISTRICT, BY MONTHS, 1922, QUOTED ON CLEVELAND, OHIO, MARKET.

	Lump	Mine-Run	Screenings
January	$3.09	$2.00	$1.80
February	3.07	1.97	1.70
March	2.96	1.91	1.84
April	3.04	2.12	2.06
May	3.41	3.26	3.26
June	3.98	3.76	3.76
July	5.80	5.63	5.63
August	6.74	6.61	6.61
September	5.27	4.89	4.82
October	4.23	3.90	3.60
November	3.97	3.60	3.28
December	4.42	3.19	2.96

SPOT PRICES F.O.B. MINES, OF BITUMINOUS COAL FROM SOUTHERN ILLINOIS, BY MONTHS, 1922 QUOTED ON CHICAGO, ILL., MARKET

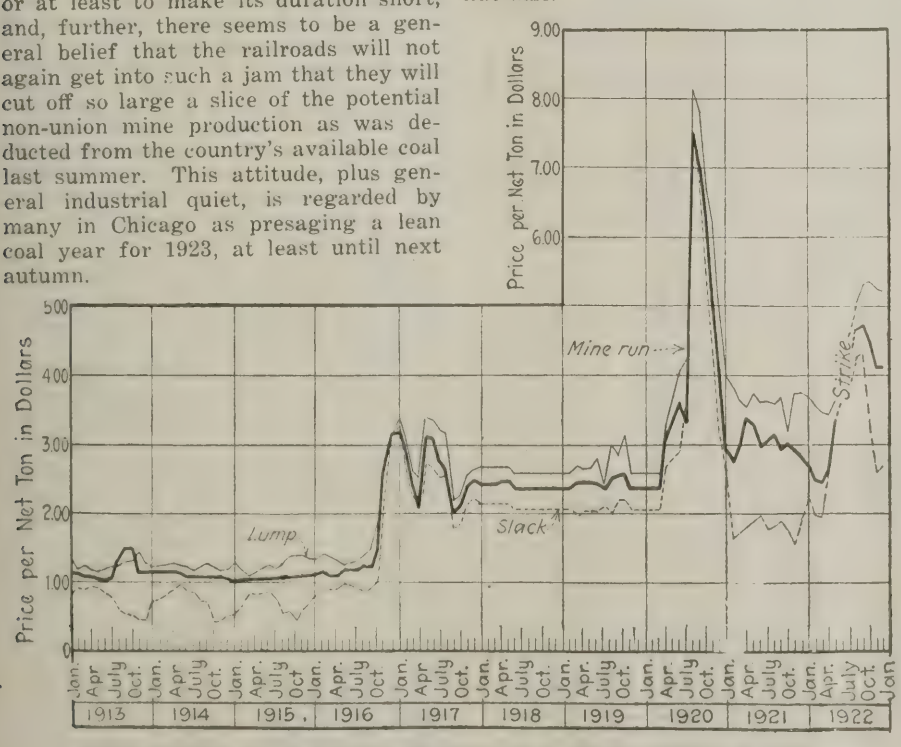
	Lump	Mine-Run	Screening
January	$3.68	$2.66	$2.21
February	3.56	2.46	1.99
March	3.44	2.44	1.95
April	3.42	2.61	2.55
May	3.62	3.32	3.38
June	....	....	....
July	....	....	....
August	5.05	4.65	4.25
September	5.31	4.72	4.30
October	5.36	4.47	3.24
November	5.24	4.10	2.57
December	5.21	4.10	2.66

than as a godsend to the operators. At the resumption of mining there were, of course, large numbers of coal cars in the mining fields ready for business. As soon as this supply was scattered to the four winds a shortage settled down immediately, not so much because of lack of cars as for general disability of railroads as they came out of their shopmen's strike.

The general and surprising autumn dullness drove the more ambitious producers and wholesalers to extend the territory dominated or affected by Chicago as no other one influence ever had done before. This extension was mainly into the Northwest, where competition with the docks became keener than usual.

These factors contributed to reduce materially the volume of coal normally handled into and through the Chicago switching district. In view of this and the fact that Cincinnati during the strike period became the coal center of the country, thanks to its proximity to heavily producing non-union fields, Chicago can hardly claim for 1922 its undisputed title as "the world's greatest coal market."

It is observed by Chicago traders that many a buyer is counting on the government to prevent a strike next spring, or at least to make its duration short, and, further, there seems to be a general belief that the railroads will not again get into such a jam that they will cut off so large a slice of the potential non-union mine production as was deducted from the country's available coal last summer. This attitude, plus general industrial quiet, is regarded by many in Chicago as presaging a lean coal year for 1923, at least until next autumn.



SPOT PRICES F.O.B. MINES ON THE CHICAGO MARKET OF COAL FROM SOUTHERN ILLINOIS

St. Louis Observes Need for a "Coal Moses"

Year's Wilderness of Uncertainty Kept Everybody Wandering —Retailers and Operators Make Little Money but Some Jobbers Get Rich—Year Effects Many Distribution Changes

BY E. J. WALLACE

THE experiences of 1922 in the St. Louis market prove only one thing: The Moses of the coal industry is yet to appear.—And he is badly needed. All tried and trusted signs and omens fail in the battle of the workers and the "worriers" as the coal industry stands now. They failed so often during 1922 that the luck of the year was oddly spread around. The year has not been a good one for retailers. The jobbers had the time of their somewhat checkered careers and made money. Among the operators, some fattened and some didn't in playing the St. Louis market.

Illinois coal lost out in Missouri. In the southeastern part of the state western Kentucky and Alabama got a good foothold along the Frisco lines. This same applies to eastern Arkansas and eastern and northern Louisiana. No more Illinois coal moves to Texas, with an exceptional car here and there. Kansas coal is getting in solid in southwestern Missouri, with Alabama a close second. All over Missouri little "gopher" hole mines have opened up and some pretty good strip mines. This tonnage has put Illinois coal out of some cities entirely.

Arkansas coal failed to reach St. Louis in 1922, and diminished in tonnage to other Missouri points, outside of Kansas City and St. Joseph. Less than 50 per cent of the normal volume of hard coal came through from Pennsylvania. Alabama byproduct coke moved in to replace anthracite in chestnut size.

As usual, the new year opened in St. Louis and surrounding country under trying conditions. The market had been soft as the year closed and warm weather almost put the finishing touches on what market remained. The only coal moving was the cheapest kind, although there was an abundance of everything in fuel available.

The local retail prices were: Carterville, $7.50@$7.75; Mt. Olive, $6.50; Standard, $4.75@$5; smokeless, $12.25; anthracite stove, $15.75; anthracite chestnut, $16; anthracite grate and egg, $15.50.

Coal at the mines was: Carterville lump, $3.25@$4.05; Carterville egg, $3.25@$4.05; Carterville No. 1 and 2 nut, $2.75; Carterville mine-run, $2.75 @$3; Carterville screenings, $1.90@ $2.25; Mt. Olive lump, $2.75@$3.50; Mt. Olive mine run, $2.25@$2.75; Mt. Olive screenings, $1.85@$2.10; Standard lump, $2.75@$3; Standard mine-run, $1.90; Standard screenings, $1.25@ $1.50.

The rate on Standard and Mt. Olive to St. Louis was $1.27½; Carterville, $1.48½, and Duquoin, $1.35. East St. Louis and Granite City were 29c. less than this.

Country call was quiet. Dealers everywhere had full yards and steam plants were pretty well stocked. The railroads had started storage piles and there was no scarcity of fuel anywhere.

Up to Jan. 1 the temperature at no time had been under 26° and it was not real winter weather for St. Louis and domestic users bought only as they needed, in small quantities. With February colder weather prevailed, and this helped a little, but nothing like a seasonable winter prevailed.

Storage coal went in slowly and with no alarm. For once the coal buyer had the situation completely in his hands. He played the game as he cared to and the coal trade was helpless. On April 1 the strike came on. Almost everyone figured a 60 to 90 day suspension They stored accordingly except a few railroads, whose blindness to take a 90-day chance was costly later.

About May 1 the railroads began to buy freely of western Kentucky coal at from $2.10 to $2.40 for mine-run. By May 15 the price had advanced $1. This was followed by a slight slump, but July 1 saw western Kentucky mine-run at $4.25, lump at $4.50 and screenings at from $4.25 to $4.50. In July Alabama coal began to move in at from $2.25 for mine-run up to $3.50 on screened coal, with a rate of $3.67. The Kentucky coal had a rate of about $1.87. The last of over 100,000 tons of coal stored on the ground at East St. Louis and other places was cleaned up. This last lot sold at over $6 mine basis.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM STANDARD FIELD OF ILLINOIS, BY MONTHS, 1919-1922
QUOTED ON ST. LOUIS, MO., MARKET

	Lump	Mine-Run	Screenings
January	$2.72	$1.91	$1.36
February	2.79	1.92	1.09
March	2.55	1.86	1.19
April	2.65	1.85	1.57
May	3.15	2.75	2.75
June	...	...	...
July	...	...	...
August	3.90	3.40	2.90
September	4.74	3.64	3.11
October	4.37	3.16	2.13
November	4.00	2.55	1.35
December	4.21	2.26	1.39

In July the railroads began to get jammed up on account of the shopmen's strike and a serious several weeks followed. A little Missouri coal from Moniteau County came in as a lifesaver from then on until the end of the strike, but in small lots.

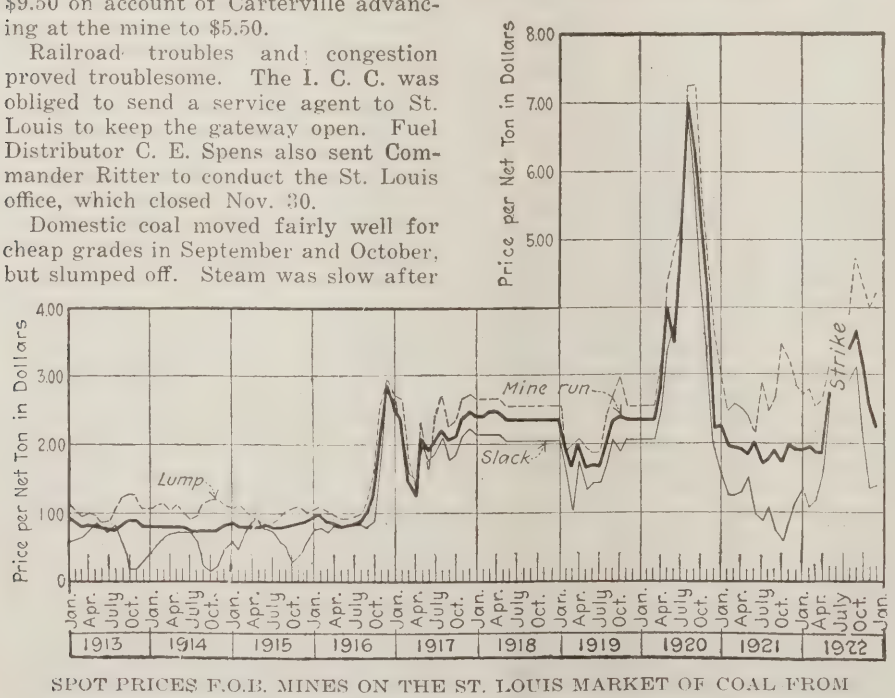
In August the question of coal for hotels and other domestic users became a problem, resulting in a fuel distributing commission for Missouri with city and county committees. The situation became serious and resulted in some plants suspending though public utilities kept going. Coal was brought up from western Kentucky on barges for the first time in years.

With mines resuming on Aug. 23 the situation eased up rapidly. Buying in St. Louis was only for actual needs, for there was a good tonnage of Alabama in transit at $5@$8 at the mine for mine-run and between 1,500 and 2,000 cars of western Kentucky at $7@$8, and some as high as $11. Standard 2-in. lump opened up at $3.50@$4, with all other sizes about the same. Mt. Olive for St. Louis was $4 for domestic sizes. Outside shipments ranged to $5. Carterville averaged $5 for domestic and steam sizes. Retail prices averaged: Standard, $6.75; Mt. Olive, $7.50, and Carterville, $9. These prices remained for the year excepting Carterville, which advanced in September to $9.50 on account of Carterville advancing at the mine to $5.50.

Railroad troubles and congestion proved troublesome. The I. C. C. was obliged to send a service agent to St. Louis to keep the gateway open. Fuel Distributor C. E. Spens also sent Commander Ritter to conduct the St. Louis office, which closed Nov. 30.

Domestic coal moved fairly well for cheap grades in September and October, but slumped off. Steam was slow after the first few weeks of operation following the strike. Storage at the close of the year was well under way in a most intelligent, well-planned movement by the big buyers. They kept the market down by slow buying.

From Nov. 1 the market was in bad shape and prices weakened. Standard 2-in. lump went down to $2.50, 6-in. lump to $3.25, steam nut and egg $2.25, mine-run $2.25, screenings $1 to $1.25. Mt. Olive held its price. Carterville slipped only by the independent operators. The association shippers held to the $5.50 domestic size price. Screenings in that field got down to $2 at times. In December there was a comeback on Standard, with the colder weather. The first cold weather came on Dec. 11, with a temperature of 20 deg. above, and no snow. The winter looked as if it would be an open one. Dealers' bins were loaded by Dec. 1 and no one buying. The railroads began to store up and public utilities were in good shape.



SPOT PRICES F.O.B. MINES ON THE ST. LOUIS MARKET OF COAL FROM STANDARD FIELD OF ILLINOIS

At Head-of-Lakes 1922 Exactly Reverses 1921

Season Opens with Docks Full—Public Counts So Heavily Upon Stocks That It Refuses to Buy Until Fall Famine Fright Spreads Trouble—Real Shortage Threatens Before Opening of Navigation

BY S. M. CHAMBERS

A GOOD idea of 1922 at the Head-of-the-Lakes can be gained by merely reversing the reports of everything that happened in 1921. The two years are as diametrically opposite as could possibly be. The Northwest faces almost surely a coal shortage before the opening of navigation in the spring. Anthracite is already gone, and users are turning to substitutes. Bituminous coal seems to be plentiful at present, but there is little doubt that the coal administrator at St. Paul will enlarge the territory served by Duluth, and that stocks will be depleted before the summer comes.

Until the opening of navigation this year there was little to feature the coal market at the Head-of-the-Lakes. The only noticeable signs of the general trend were sags in the market. Prices of both bituminous and anthracite fell off steadily from the first of the year to the opening of navigation. This was caused in the main by the well-stocked docks at Duluth and Superior.

The oversupply was due to the failure of the usual demand to materialize rather than a poor estimate of supply. The dock men expected the mines of the Mesaba Iron Range to operate full blast and consume much fuel; and the mines were idle the greater part of the summer.

Even when the strike became a reality the gravity of the situation was not appreciated. The docks were still well filled and buyers refused to be worried. Prices, however, did not fall further, and the market showed signs of strengthening.

Because of the coal on hand, Duluth became the supply center of territory as far away as Lake Michigan and even shipped coal to lower Lake ports. This was unprecedented and there began to be talk of a shortage at the Head-of-the-Lakes. A vast amount of coal also was shipped by rail to out-of-territory points.

By this time summer had come and the demand for anthracite had fallen away entirely. Bituminous, however, was moving fast enough to mystify and alarm even the most phlegmatic buyer. Prices rose with a jump. Local and territory buyers tried to make up their minds to get in on the market, and before they were ready to buy it, coal was being meted out to "steady customers" only. The only thing that staved off an industrial panic in the Northwest was that industry had been quiescent for some time.

Things continued in this strain until September, when the strike was settled and the first cargo of coal arrived. The demand for bituminous was satisfied quickly. At first there was regulation in the shipping, but the carriers brought coal to Duluth at a rate never before seen, and the docks soon filled up. It was hardly a month and a half before industries were urged to buy their coal at once to prevent a dock tie-up. This they did, with the result that dispatch of both boats and cars was excellent.

The first cargo of anthracite did not reach Duluth until more than a month after bituminous started coming. At first it was thought that enough would

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM MT. OLIVE DISTRICT, BY MONTHS, 1922 QUOTED ON ST. LOUIS, MO., MARKET

	Lump	Mine-Run	Screenings
January	$3 21	$2 50	$1 66
February	3 22	2 50	1 42
March	2 87	2 43	1 66
April	2 87	2 50	1 75
May	3 00	2 50	1 75
June	....	....	....
July	....	....	....
August	5 00	4 63	4 40
September	4 66	3 89	3 62
October	4 45	3 18	2 50
November	4 00	3 44	1 97
December	4 06	3 50	2 09

arrive to satisfy the needs of the Northwest. It soon became evident, however, that this was impossible.

The real pinch in anthracite did not come until the latter part of November, with the first cold. Householders failed to buy until the last moment, expecting a drop in prices, which were fixed the same as last year. A large portion of available stocks of anthracite was held, however, for Duluth consumption, and not until the latter part of December was it utterly impossible to get hard coal.

One of the features of the shortage of anthracite is the development of the hard- and soft-coal briquet industry at Duluth. There are now two plants each producing 600 tons of briquets daily.

Approximately 3,250,000 fewer tons of bituminous coal were unloaded here than in 1921 and about 1,250,000 tons less of anthracite. Normally receipts run about 2,000,000 tons of hard coal and 8,500,000 tons of bituminous.

From all appearances the Northwest will come to the opening of navigation in 1923 with **not a free ton** of anthracite or bituminous on the docks, as in 1921.

Many Difficulties Beset Minneapolis Trade

Dock Interests Forced to Buy Coal They Do Not Want and Then Take Losses When Demand Slumps—All-Rail Competitors Cut In Deeply—Substitutes for Anthracite Flood Market

By G. A. Welch

IN THE Minneapolis region the year just closed opened with a depressed and inactive sale for all grades of coal. Even when the approach of April 1 made it certain that there would be a strike and a suspension of all coal production, very little interest was aroused. Buying showed now and then a little spurt in some sections, but the tonnage placed was small. During the season of navigation, the docks on Lake Superior had been stocked to a considerably greater extent than was necessary.

The strike in both anthracite and bituminous fields seemed to be but a joke to the Northwest. Very little coal would be needed between April 1 and Sept. 1, and that was ample time for operators and miners to fight out their differences and to get back to production with costs to consumers down considerably. There seemed to be no doubt in the mind of any buyer about the reduction. The owners of the coal carried over on the docks made futile efforts to sell it during the spring. No one wanted it. It hardly could have been sold at a discount, let alone the ruling price. And the weeks slipped by with the coal completely neglected.

Finally some of the railroads operating from Chicago awoke to the fact that the coal on the docks on Lake Superior was a "good buy" and a number of sales of considerable tonnage were made. This waked some of the Northwestern roads and they came into the market. The latter had been offered the same coal earlier. A little quiet buying on behalf of public utilities also ensued. And when autumn came, with still no coal being produced, the surplus on the docks was found to be pretty well absorbed.

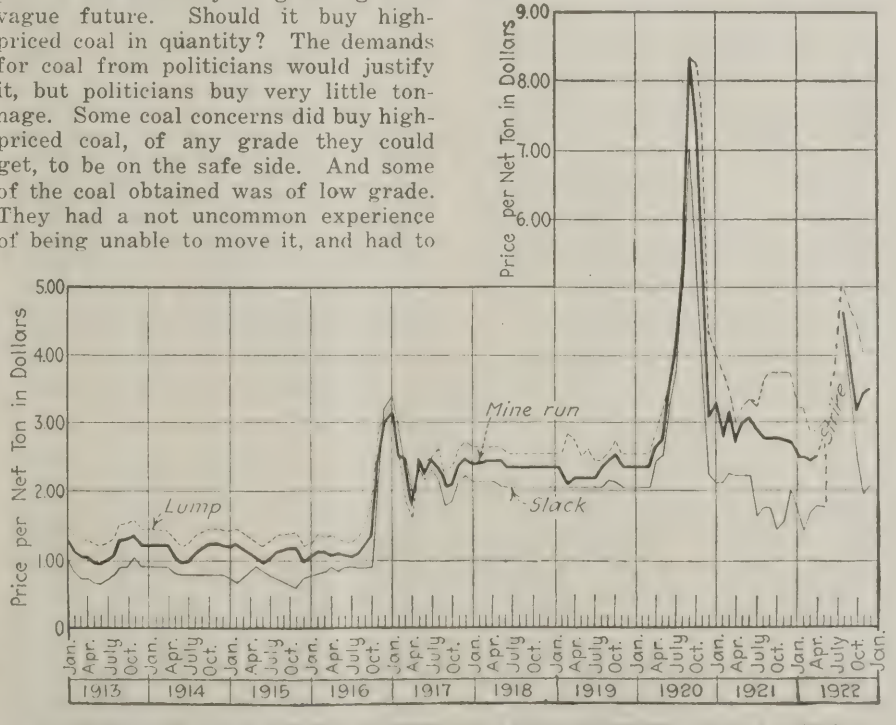
Then came the annual hullaballoo about the urgent need of fuel for the Northwest. The politicians worked the subject threadbare. There were consultations, conferences, surveys, demands and entreaties, commissioners, allotments, priorities and incantations. But they produced no coal. The non-union miners were doing all that they could do, but it was hardly to be expected that all other sections would subside in their demands and let the Northwest get a new supply under a fair-priced arrangement, when several million tons of coal had been ignored for months.

The coal trade of the Northwest was put to the necessity of guessing on a vague future. Should it buy high-priced coal in quantity? The demands for coal from politicians would justify it, but politicians buy very little tonnage. Some coal concerns did buy high-priced coal, of any grade they could get, to be on the safe side. And some of the coal obtained was of low grade. They had a not uncommon experience of being unable to move it, and had to take a loss. Other coal of satisfactory grade but high price had to take some loss as well.

The dock trade learned a lesson from previous years, and confined its tonnage to narrow totals, so that at the end of the season the soft coal on the docks was perhaps two-thirds of that of a year previous. Dock interests encountered a sharper competition this season than ever before. The all-rail shippers bombarded the market with surplus coal. Many producers have regular officers in this district, and so their transit coal is watched carefully enough to guard against much flooding of market. But there are other concerns which sent coal into this district and dispatched a salesman to dispose of it, without the slightest established trade to depend upon. Some heavy losses were taken as a result.

Competition by rail shippers with the dock trade has been more than keen; it has been militantly aggressive. Aided by favorable freight costs rail traders have pushed into a wider trade area than ever before, and claim that they will go farther yet.

As to hard coal, it nearly resembles the story of snakes in Ireland. The receipts have been possibly one-third of last year. There was some hard coal carried over from last spring, mainly of undesirable sizes. People have been resorting to substitutes and the need for hard coal has been cut down sharply, but the receipts are far below the allotment, which was to be about 700,000 tons. If the docks receive 400,000 tons they will do well. This will be increased by some all-rail shipments, but the tonnage will not be so great as had been expected. There is talk of shipping 300,000 tons of hard coal all-rail. This probably would leave a surplus, from the way the demand has been running.



SPOT PRICES F.O.B. MINES ON THE ST. LOUIS MARKET OF COAL FROM THE MT. OLIVE DISTRICT OF ILLINOIS

Milwaukee Docks Troubled Month by Month

Glutted Market from January to June is Followed by Wildest Speculation and Upset Trading Conditions—Quality of Pool Coal Harassing and Rail Competition Keen—Hard Coal Short

By H. Bleyer

THE year 1922 was evidently unsatisfactory to the Milwaukee coal trade. The coal business normally has a full measure of troubles, both major and minor, but when these are supplemented by strikes which seriously interfere with supply and distribution, the situation becomes nerve-racking. Car supply was poor and undependable at all times. And to cap it all, the coal man, after frenzied efforts to obtain supplies at any reasonable price, was confronted by a disinterested and dissatisfied public which stubbornly held back in the hope of obtaining lower prices.

The market was glutted with coal from January until the end of June. During the two following months coal was practically unobtainable. When mining was resumed, wild speculation at the mines made business uncertain and hazardous, especially to jobbers, because of a tendency on the part of consignees to refuse coal billed to them under a fluctuating market and to insist on lower prices.

Quality Falls Off

The Eastern bituminous coal received during and after the strike was not up to its normal standard of quality, and as a result, dock men who contracted to deliver the coal with a specified volume of thermal units, were compelled to seek releases from such obligations. The government pooling system, which was put in operation when coal began to move, made quality discrimination impossible.

Because of these complications incident to marketing Eastern coal, increased quantities of Illinois and Indiana coal have found their way to Western markets heretofore dominated by Eastern coal. Continuation of the trying experiences which Western consumers have been forced to struggle against in procuring Eastern coal eventually will result in the loss to Eastern operators of a large portion of their present Western trade.

There is seemingly an ample amount of soft coal on the docks to last until another season with reasonable receipts by rail. The stock of hard coal, however, is far from sufficient, and the railroads will have to be depended upon to keep up the supply during the remaining winter months.

Anthracite has not varied in price throughout the year. Soft coal, including Pocahontas, however, has been advanced from time to time, and is now averaging $2@$2.50, higher than at this time last year.

Following are the current prices of coal in the Milwaukee market, compared with those of last year at this time:

BITUMINOUS COAL PRICES

	Jan. 1923	Jan. 1922
Pitts. Hock. & Yough.	$10.25	$7.75
Pile-run	9.50	7.25
Screenings	9.00	6.75
West Virginia screened	10.25	8.00
Pile-run	9.75	7.50
Screenings	9.75	7.00
Pocahontas screened	13.75	11.50
Mine run	10.25	7.75
Screenings	9.75	7.25
Smithing	11.75	8.00
Kanawha gas mine-run	.....	7.50
Ill. and Ind. screened	10.25	8.00
Pile-run	9.75	7.50
Screenings	9.75	7.00
Coke, large sizes	16.00	15.00
Pea and nut	13.00	12.00

Carrying charge 75c. per ton on coal. Nothing on coke.

ANTHRACITE

Egg	$15.75	$15.70
Stove	16.00	16.10
Nut	15.95	15.95
Pea	14.00	14.10
Buckwheat	11.50	11.50

Carrying charge 75c. per ton.

Kentucky Has Labor Peace but Market Hubbub

Western Field's Fortunate Two-Year Contract Enabled It to Produce Tremendously—Wild Buyers Run Prices Up to $11.50—Non-Union Field Suffers for Cars—Transport Improves for 1923

By A. W. Williams

THE season of 1922 in Louisville and the Kentucky fields proved unusual in many ways; in fact it probably will be remembered by the coal trade for years to come. The year's problem was to get coal transported rather than to find a market. The great coal strike stimulated Kentucky to tremendous effort, causing less labor disturbance there than in any other state in the Union.

First—western Kentucky, in April, 1921, figuring that there would be a nationwide strike about April, 1922, used brains and made a new union contract running two years and with a no-strike clause. When the rest of the country walked out in the spring of 1922, the union in western Kentucky stuck to its agreement. Demand resulted in capacity production and it was merely a question of getting enough cars. The railroads came to bat in great shape, and tonnage records were established in western Kentucky which may hold for years. The L. & N. handled 66,415 cars in May alone as against 52,717 for the best previous month it had ever had. Little hillside mines with groups of small trucks co-operated in rapid loading of cars, and coal moved out in great quantities, some of it at high prices.

Second—Most of the eastern Kentucky field is non-union, and during the strike period proceeded to mine and ship just as much coal as the ability to obtain cars made possible. Eastern Kentucky trackage facilities always have been inadequate for heavy movement in rush times, but during the strike period a large tonnage was moved.

The strike had a marked effect on Kentucky. Tonnage increased and prices climbed slowly, due to the fact that big consumers were well stocked, domestic demand was at its lowest ebb, and buyers did not figure the strike would last. On March 29, 1922, Kentucky prices, f.o.b., mines were:

Western Kentucky

Lump	Mine-Run	Screenings
$2@$2.25	$1.75@$2	$1.60@$1.75

Eastern Kentucky

Harlan

Lump	Mine-Run	Screenings
$2.25@$2.40	$1.65@$1.70	$1.35@$1.60

Hazard

Lump	Mine-Run	Screenings
$2@$2.25	$1.50@$1.60	$1.25@$1.35

In late April prices started climbing, as Lake movement commenced and steel mills and big industries placed buyers in the field. In late April all coals were selling $2.50@$3, mine run, in all sections of the state. On May 10 the price was $3@$3.25. Operators began quoting all grades at the same price, and made very little prepared coal. Prices slowly advanced in June when news came of the threatened rail strike and in July ran at the start at around $3.50 @$4.50. They advanced rapidly in mid-July, ranging $4@$5.50 on July 12,

RECEIPTS OF COAL AT MILWAUKEE BY MONTHS IN 1922

(In Net Tons)

Month	By Vessel Hard	By Vessel Soft	By Car Ferry Hard	By Car Ferry Soft	By Rail Hard	By Rail Soft	Grand Total
January			7,113	15,394	496	47,424	70,427
February			13,599	35,216	....	36,335	85,150
March			30,769	47,146	....	36,853	114,768
April	700	107,609	9,546	27,858	....	26,594	172,307
May	..	195,251	1,965	5,340	....	24,250	226,806
June	..	303,401	2,455	5,668	129	23,868	335,392
July	..	167,499	1,809	7,619	....	26,342	203,269
August	..	78,852	2,878	19,232	34	22,886	123,848
September	....	438,343	1,560	11,816	50	38,806	490,575
October	141,414	654,945	12,634	34,546	120	56,842	900,501
November	128,139	331,765	12,162	31,463	....	40,840	544,369
December	89,817	53,242	12,130	31,366	50	48,985	235,590
Total	360,070	2,331,407	108,620	272,664	879	428,805	3,502,445
Total 1921	1,023,645	2,574,374	141,736	253,778	3,244	794,934	4,791,711
Decrease	663,575	242,967	33,116	..	2,365	428,805	1,289,266
Increase	..	..	..	18,886	..	..	..

*Estimated

$6.50@$7.25 July 18, and on July 22, the high-water level, western Kentucky was quoting $11@$11.50 and selling it freely in Chicago, Indianapolis, St. Louis and other big consuming points. On the same date eastern Kentucky was asking $9@$10.50. That was a wild week, with prices jumping so fast that jobbers were caught short on accepted business before they could fill. Everyone was playing for quick advances and tonnage was sold day to day at time of shipment only. Buyers were buying bills of lading and nothing else.

With the blowing up of the trainmen's strike prices began to fall, but threatened rationing of cars by the Hoover conference was the chief forcer of lower prices. Between July 22 and July 26 prices dropped from $9@$11.50 a ton to $6@$7.50. Since then prices have slumped some, especially in western Kentucky, which got down to $3.50 for lump, but the market generally was much higher than in the early spring.

Kentucky operators were never able to agree with the Hoover plan of price control or any other plan, objecting principally because car supply grew so poor. Operators say their expenses have been so great that they have not made much money this year. Eastern Kentucky has had a fair year in spite of the railroad tie-ups such as paralyzed traffic through the important rail junction at Corbin.

River transportation was at the lowest ebb in history, mainly because of low water. For the first five months a total of 20,861 tons reached Louisville by water, as against 23,106 tons for the corresponding months of 1921. The 1921 total was 57,311 tons. This year the total tonnage probably will fall short of 30,000. A few small shipments of coal from the Beattyville district on the Kentucky River have come in, but the big West Virginia shipments were cut off. By use of artificial waves West Virginia tonnage got as far as Cincinnati.

The retail trade has had a mean year. In 1921 the retailers stocked their yards. A mild winter and dull industrial conditions resulted in generally poor demand and when mine prices broke badly in the winter the "snowbirds" forced retailers to lower prices and yards were unloaded at a loss in many instances. The retailers refused to stock coal at high prices, as a result of the bitter experiences of 1921.

The outlook is generally better for the coal trade than it was at this time last year. Stocks in industrial as well as domestic hands are smaller, in spite of heavy production. Buying is on a hand-to-mouth basis and consumption is larger, with the result that prospects are for a fairly steady market to spring, with the possibility of a rapid advance if the threatened strike develops. River transportation outlook is better, as there is more interest shown and facilities are improved.

Railroad conditions are improving. Big car and motive-power orders have been placed by the L. & N., C. & O., Illinois Central, Monon, N. C. & St. L., and other roads. The L. & N. is spending $52,000,000 in improvements, nearly $30,000,000 having been contracted for this year, including enlarged sidings, terminals, double tracking, etc., with a considerable amount of work done in the Harlan and Hazard fields, which regions for years have suffered for want of cars.

Production capacity has been enlarged far more rapidly than railroad capacity. The Hazard field ten years ago was just getting started, and the same thing was true of the Harlan, Elkhorn and other eastern Kentucky fields.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL, FROM WESTERN KENTUCKY, BY MONTHS, 1922
AVERAGE OF QUOTATIONS ON THE LOUISVILLE AND CHICAGO MARKETS

	Lump	Mine-Run	Screenings
January	$2.72	$1.85	$1.23
February	2.57	1.86	1.40
March	2.40	1.80	1.62
April	2.34	1.94	1.94
May	3.02	2.97	2.97
June	3.75	3.74	3.74
July	6.56	6.59	6.59
August	5.92	5.87	5.80
September	4.66	4.25	4.06
October	5.16	3.14	2.75
November	4.42	2.45	1.65
December	3.92	2.52	1.82

Indiana Ends Year with Sigh of Relief

Coal Men Worried, However, with Check-Off Dispute Auguring Ill—Not Much Money Made by Hoosiers in 1922—Weakening Market Runs Well into Midwinter

By Earl Bullock

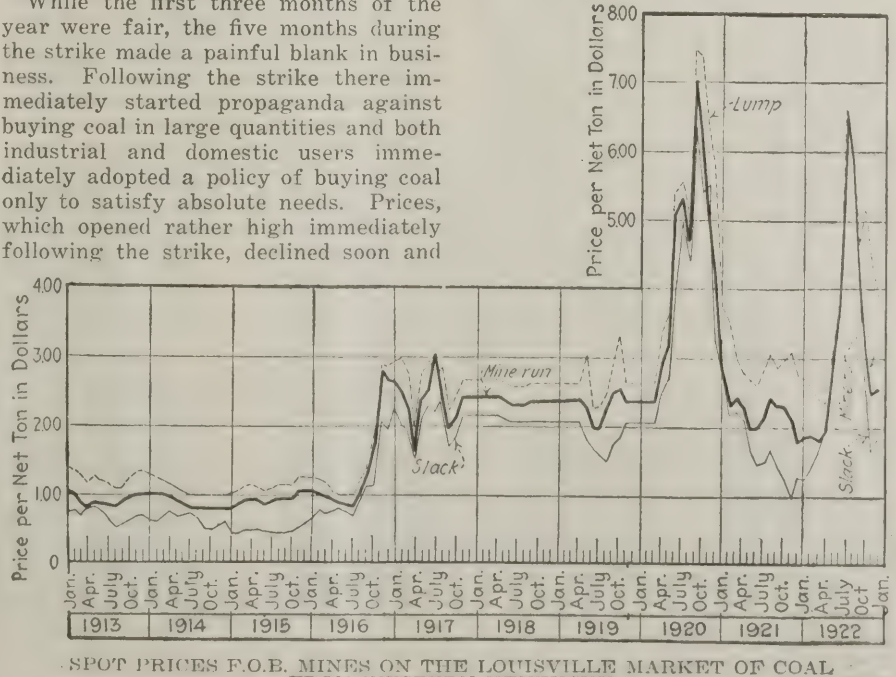
IT IS with a sigh of relief that the coal producers of Indiana see the hectic period of the last twelve months fade into a new year. The majority of the trade in Indiana, however, can't see anything particularly bright for at least the first six months of 1923. At any rate, it can be no worse than the first six months of the year just closed. The end of 1922 augured ill for the future with the union heckling the operators of Indiana with threats of a strike because of their first refusal to permit the check-off of the strike assessment of $4 per capita to reimburse the strike fund of the international organization so that another strike can be staged next April.

What with declining prices, decreased consumption, a strike lasting for months, a car shortage when business picked up and no orders when cars got plentiful, little individual strikes and what not, the last ten months have been anything but a good time for the local trade.

While the first three months of the year were fair, the five months during the strike made a painful blank in business. Following the strike there immediately started propaganda against buying coal in large quantities and both industrial and domestic users immediately adopted a policy of buying coal only to satisfy absolute needs. Prices, which opened rather high immediately following the strike, declined soon and continued on a general downward trend. There have been slight periods of strength and once or twice some trifling rises in quotations, but on the whole the price level has declined so far as Indiana coal is concerned.

Some operators say the rapid spread of the central-power-plant idea is having a great deal to do with the situation. They all admit there is something wrong, especially so far as the steam-coal market is concerned, and they cannot entirely explain the slow market. Since the end of the strike the railroads have taken more steam coal than ever before, showing conclusively that goods are being moved and the manufacturer is using power of some sort. It is a well-known fact that the manufacturer has no large reserve and it also is known that between now and April, when local operators expect another strike, the manufacturers and utilities cannot build up tremendous reserves.

The local trade apparently has a large portion of praise for President Hard-



SPOT PRICES F.O.B. MINES ON THE LOUISVILLE MARKET OF COAL FROM WESTERN KENTUCKY

ing's price policy. They say that this is one development due to the strike that has worked out. There is not so much praise, however, for the fact-finding part of the presidential program. Many of the most prominent operators in the state declare the operators do not need a fact-finding commission—they know the facts, as do the miners. The need as they see it is for something that will unravel the facts into some program which will eliminate the annual recurrence in April.

In case of a strike next April the trade in Indiana looks for an immediate advance in non-union coal. It was two months last year before coal from these mines took any jump, but there were reserves at that time and there may be little or none if another strike is called.

SPOT PRICES, F.O.B. MINES, OF BITUMINOUS COAL FROM KANAWHA DISTRICT, BY MONTHS, 1922
AVERAGE OF QUOTATIONS ON COLUMBUS AND CINCINNATI MARKETS

	Lump	Mine-Run	Screenings
January	$2.73	$1.74	$1.20
February	2.62	1.64	1.34
March	2.40	1.55	1.37
April	2.36	1.69	1.50
May	3.25	2.96	2.72
June	3.45	3.22	3.09
July	5.06	4.82	4.67
August	5.97	5.71	5.50
September	6.10	5.71	5.5
October	6.40	4.85	4.37
November	5.90	3.92	3.57
December	5.40	3.17	2.92

Early Market Dullness and Later Rail Trouble Hampered High-Volatile Output

Increased Production in Logan Partly Offset by Losses in Kanawha and Coal River—Kenova-Thacker Fared Better Than Other Fields—Kentucky Mines on C. & O. Double 1921 Yield

By J. W. Weir

THE history of conditions during 1922 in the southern high-volatile area of West Virginia and in northeast Kentucky and southwest Virginia is to be divided into two periods, the first lasting from Jan. 1 until about July 1 and the second covering the remainder of the year. The first period was one of market inactivity and the second one of transportation disabilities so serious as to materially cripple the mines. As a result it is doubtful if actual production in the three high-volatile fields of southern West Virginia was much above 23,500,000 tons. That did represent, however, a marked increase in the output of the Logan district, offset in part by losses in Kanawha and Coal River.

The most serious factor at any time during the year was car shortage, not so much in evidence, however, during the first few months, owing to the poor demand existing in that period. From July until the end of the year mines at no time were afforded sufficient transportation facilities to produce more than half of capacity and during the last quarter of 1922 car supply most of the time was not equal to more than 30 per cent of allotment, particularly on the C. & O.

When the year began market conditions were worse than at any other time in recent years. There was no sale either for domestic or for fuel for steam purposes and mine-run was not bringing much in excess of $1.25 a ton. The coal strike had been in effect for several weeks before mines felt the stimulus and even then buying was confined to utilities, railroads and the steel mills, many consumers appearing to feel that they could obtain all the coal they wanted whenever it was needed.

It was not indeed until after the rail strike began to curtail production seriously, after the middle of July, that buyers began to be at all apprehensive. During the Lake season mines had a ready market for their output in the West but with the closing of navigation there was a slump in Western markets and for several weeks prices steadily dropped, only to be stiffened by a sudden resumption of buying in Eastern markets early in December, as a result of which mine-run reached about $3.50 a ton, with prepared grades quoted $5@$6. During the latter part of 1922 in fact $3.50 a ton seemed to be the average price for mine-run.

After producing at the rate of over 16,000,000 tons per year, the railroad shopmen's strike brought an acute car shortage, the worst ever experienced in the Logan district, and production dropped below 800,000 tons per month, as shown in the following table:

MONTHLY PRODUCTION, LOGAN DISTRICT
(In Net Tons)

January	1,065,830
February	1,178,940
March	1,330,550
April	1,277,420
May	1,603,630
June	1,641,060
July	785,430
August	764,450
September	685,140
October	697,720
November	761,320

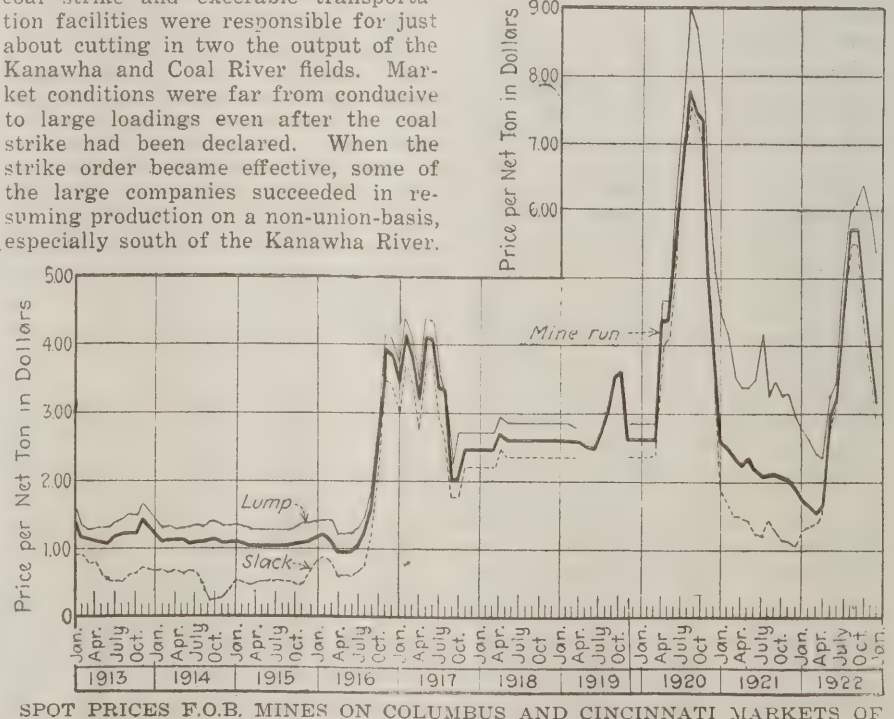
Exceedingly poor demand during the early months of 1922, partial suspension of operations at mines during the coal strike and execrable transportation facilities were responsible for just about cutting in two the output of the Kanawha and Coal River fields. Market conditions were far from conducive to large loadings even after the coal strike had been declared. When the strike order became effective, some of the large companies succeeded in resuming production on a non-union-basis, especially south of the Kanawha River. Such companies as had operated during the strike declined to make any agreement with the union when a settlement was effected.

The Kenova-Thacker district fared somewhat better than other high-volatile regions. Most of the time production was above 100,000 tons a week, so that for the year as a whole the volume of coal mined and shipped was not far from 6,000,000 tons. For a time early in 1922 it was not possible to make heavy shipments owing to a poor market. But with a shortage in some of the Western markets after the coal and rail strikes had become effective, production was speeded up.

PRODUCTION IN SOUTHWEST VIRGINIA
(In Net Tons)

January	613,328
February	630,821
March	754,588
April	726,796
May	991,745
June	1,068,501
July	792,185
August	838,604
September	725,937
October	853,830
November	800,000
	8,796,345

There was a depressed market during the first four months of 1922, which tended to curtail production in southwest Virginia. Effective with the strike of miners and for a period of 60 days



SPOT PRICES F.O.B. MINES ON COLUMBUS AND CINCINNATI MARKETS OF COAL FROM THE KANAWHA FIELD

thereafter, production increased at a rapid rate. Beginning July 1, however, output underwent a decline, due to serious car shortage.

It is somewhat difficult to forecast what may be expected during 1923 because so many factors enter into the situation, the first of which is overdevelopment of the industry. Production is going to be restricted to the ability of the railroads to furnish cars, but it is natural to assume that there will be considerable improvement in that respect. Unless there is a marked increase in consumption, market conditions, as viewed by some Virginia operators, do not at this time look encouraging, unless there should be another miners' strike on April 1.

Approximately twice as much coal was produced by the mines on the C. & O. in Kentucky during 1922 as during the preceding year, 1922 production being between 3,500,000 and 3,700,000 tons as against 1,850,000 tons for 1921. Market conditions were much better than in 1921, except during the early months of the year. The most serious period during the whole year was the last six months, when it was not possible to produce more than 100,000 tons a week, or about 30 per cent of capacity, owing to a scarcity of cars and poor motive power. Even when the demand in other sections waned late in the year and when prices in other fields dropped northeast Kentucky producers had no difficulty in finding buyers for mine-run at $3.50 @$4, with lump and block stable at $6@$7. Lake shipments, were unusually large.

Conditions in Northern West Virginia in 1922 Underwent Slight Change

Good Feeling Between Miners and Operators Evident During Strike—3,500,000 Tons Production Loss from Car Shortage —Failures Are Few — Future Shrouded in Uncertainty

H. A. WILLIAMSON
Fairmont, W. Va.

IN A general way conditions in 1922 have not been greatly different from those of 1921. In 1921 we shipped, roughly, 14,500,000 tons; in 1922 we will ship probably 12,500,000 tons. Naturally the feature most affecting tonnage was the strike.

During the strike of 1922 the outstanding feature in northern West Virginia was the evident good feeling existing between the operators and the miners. It is almost universally conceded that there would have been either no strike at all or one of short duration had those concerned been allowed to negotiate without the interference of outside parties. There were a few disturbances but they were small in comparison to the area involved and what happened in other regions.

In the long run what affects the tonnage most is the car supply or lack of it. There can be no satisfactory solution of this situation until the basic feature is corrected. That feature is simply that the railroads do not have sufficient cars. Various figures have been given as to what loss lack of cars caused in 1922, but it is conservative to say that it was at least 3,500,000 tons.

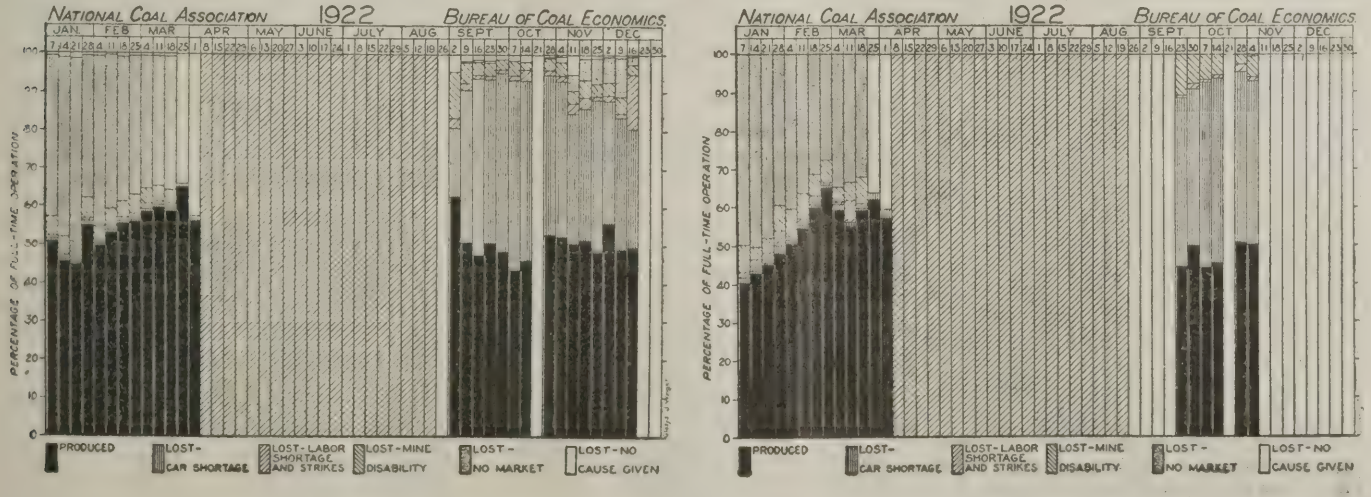
Up to a few years ago the B. & O. was the only road serving the region. Then the Monongahela, having connections with the Pennsylvania and New York Central systems, opened, and also the Western Maryland obtained certain short branches and connections and commenced to send its cars into the region. In 1920 the Monongahela handled something over 5,000,000 tons, in 1921 about 3,600,000 and in 1922 (ten months) slightly over 3,000,000 tons. It is to be noted from this that tonnage on the Monongahela dropped in spite of the fact that all the mines on its lines are practically new and just developing and their tonnage should be increasing largely each year. Of course some of this has been due to lack of business and a large part in 1922 due to strike, but it is also largely due to lack of railroad cars. Further, the car supply has been generally better on the Monongahela than on the B. & O.

Another feature severely affecting tonnage to the West and Lakes is the freight differential which went into operation some years ago. During the period of severe shortage of coal—when "coal was coal and price made little difference"—the affect of this differential was not noticed. Including the Lake coal, in 1914 5,500,000 tons of coal went westward; in 1916 3,000,000 tons. In 1921 our Western shipments, including Lake coal, were 1,330,000 tons and for the ten months of 1922 919,000 —a differential of 40c. per ton went into effect in 1920. The figures are more impressive than any comment we can make. Had the region been able to compete in the Western markets it would have shipped more coal in that direction and their present shortage would not now be as acute as it is.

In spite of the disadvantages of the year there have been but few failures of mining firms. This storm of adversity all in a bunch has been weathered very well. There have been some new companies organized and some development work has been done, but not a great deal.

Prices have varied widely during the year. Accurate average prices, in spite of the many such reported, are difficult if not impossible. In a general way probably $1.60 per ton, f.o.b. mines, represents the low price of the first one or two months of the year. Later in the year spot prices at $6.50 and higher have been rumored. Authentically reported maximum prices are in the neighborhood of $4. The average price for the first ten months of the year appears to be approximately $3.50.

What will happen in the coal business in 1923 is a question probably more in doubt than ever before in the history of the industry. From the fact that there



Illinois Indiana

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

apparently is a coal shortage and other business is picking up, the demand for coal should be strong. On the other hand there is no probability of betterment of the railroad situation and there is the possibility of a strike. Northern West Virginia operators seem to be preparing for a good year but they also seem to have no particular reason for it other than a general spirit of optimism.

West Virginia Smokeless Output Hits High

Last Year One of the Best Since 1916—Estimated That 33,000,000 Tons Was Produced, Which Could Have Been Surpassed with Adequate Transportation

By J. W. Weir
Elkins, W. Va.

THE year 1922 ranks as one of the largest in smokeless production in West Virginia since 1916. It is conservatively estimated that when all statistics are compiled it will be found that not less than 33,000,000 tons was produced. The smokeless mines could have exceeded the record of 1916 if transportation facilities had been adequate. Only at the outset of 1922 and then for but a short time was production retarded by lack of demand.

During the first part of the year there was a recovery from the market slump witnessed at the end of 1921. This was followed by another period during which production reached a larger scale at times than had ever before been recorded in the history of the regions, continuing until July, when the effects of the shopmen's strike began to be felt. From then until the end of the year most mines labored under great difficulties owing to transportation disabilities.

An analysis of conditions prevailing in the smokeless area throughout the yearly period shows that the most serious factor in curtailing production was not the coal strike, not the level of prices or the state of demand but a general breakdown in transportation facilities following the termination of the railroad strike. Of course during the early part of the year, when there was a comparatively light demand for smokeless, car service was ample for all requirements. And even during the height of the coal strike transportation facilities were conducive to a large production and a large movement of coal. Though of course the shopmen's strike began to make itself felt in retarding the movement of coal after it had been in effect for a few weeks, as had been expected by the officials of the United Mine Workers, it has been in the months since then that the smokeless mines of southern West Virginia have suffered the most.

Much of the time during the last five months of the year car supply was not much better than 30 per cent, the N. & O. toward the close of the year making it possible, however, to load as much as 40 per cent of capacity. On other lines the car supply was restricted to about 30 per cent of allotments; some of the mines on the C. & O. were unable to secure more than a 20 per cent supply. It was not only a paucity of cars which tended to so materially curtail production but deficient motive power.

TABLE OF PRODUCTION ON THE N. & W. BY DISTRICTS, FOR THE YEAR 1922

Pocahontas	16,000,000
Tug River	4,500,000
Williamson	6,500,000
Clinch Valley	2,200,000
	29,200,000

The difficulty during the latter part of 1922 was in hauling coal to Western markets. Western outlets were constantly congested, necessitating frequent embargoes. Still another factor in retarding Western movement was failure of connecting roads to return cars which had been used to transport coal to the Lakes and Inland West markets.

There appeared to be less fluctuation in prices during the year than is usually witnessed. At the outset the demand was extremely dormant and that of course exerted a depressing effect on prices, mine run reaching as low a level as $2 a ton during the early months of the year. The prospects of a strike in organized fields on April 1 stiffened the demand for smokeless to some extent and resulted in heavier orders being placed for quick delivery yet there was not as sharp an advance as might have been expected in view of a prospective shortage of fuel in the markets. Prices were far from being as high, however, as had been the case during the 1919 strike, not only because of an agreement with Secretary Hoover but also because producers were averse to seeing a runaway market and in so far as it was possible checked the upward tendency as much as possible. As a matter of fact during the period of the coal strike smokeless prices were not on as high a level as they were during the final months of the year, when they took a decided brace as a result of heavier Eastern buying.

PRODUCTION ON THE VIRGINIAN, FIRST ELEVEN MONTHS IN 1922 AND 1921

	1922	1921
January	506,291	603,950
February	572,237	368,123
March	706,983	386,977
April	528,471	510,237
May	690,033	732,102
June	719,702	696,428
July	512,362	512,806
August	503,222	477,909
September	494,445	412,391
October	617,533	558,863
November (*a*)	581,593	483,855
	6,432,872	5,743,641

(*a*) Estimated.

Just about the time Lake shipments ceased, when it was thought there might be a surplus of low-volatile coal available, Tidewater markets revived and then there was during the last six months of the year a period of heavier buying in Inland East markets as smokeless supplanted anthracite to some extent.

The strike of bituminous-coal miners was felt in none of the smokeless fields of West Virginia except one—the New River region—though for a time it looked as if the United Mine Workers might succeed in organizing the Winding Gulf field. Injunctions, however, operated to put a stop to the effort.

OUTPUT OF COMMERCIAL AND FUEL COAL FROM MINES ON THE N. & W., FIRST TEN MONTHS OF 1922 AND 1921

	1922	1921
January	2,016,276	2,351,279
February	2,299,439	1,621,700
March	2,658,616	1,685,542
April	2,726,744	1,668,589
May	3,332,826	1,803,260
June	3,422,879	2,061,422
July	2,256,136	1,934,368
August	2,634,179	1,838,277
September	2,392,892	1,752,960
October	2,098,252	1,967,153
	25,838,239	18,684,550

Production was increased to such a marked extent during the strike at mines in the smokeless area that such mines had an important part in making it possible to produce fully as much coal, so long as transportation facilities were afforded, as had been possible previous to the strike with all mines in operation. The only effect of the walkout of union miners in southern West Virginia was to increase the non-union territory in that part of the state and to put the New River field in the non-union category, at the same time resulting in the abandonment of District 29.

COAL AND COKE LOADING BY MONTHS, 1921 AND 1922 BY MINES ON THE C. & O.

Month	1921 Coal	1921 Coke	1921 Total	1922 Coal	1922 Coke	1922 Total
January	1,934,600	50,390	1,984,990	2,209,910	29,720	2,239,630
February	1,288,910	40,140	1,329,050	2,463,230	29,160	2,492,390
March	1,524,350	25,550	1,549,900	2,663,830	40,410	2,704,240
April	1,867,400	26,210	1,893,610	1,915,820	28,560	1,944,380
May	2,379,040	30,060	2,409,100	2,641,800	36,300	2,678,100
June	2,664,020	24,370	2,688,390	2,994,960	41,920	3,036,880
July	2,002,460	14,000	2,016,460	1,807,840	42,970	1,850,810
August	1,846,500	13,730	1,860,230	1,782,590	33,690	1,816,280
September	2,005,380	21,580	2,026,960	1,569,880	30,470	1,600,350
October	2,533,450	29,520	2,562,970	1,819,560	43,730	1,863,290
November	2,010,940	23,880	2,034,820	1,938,150	46,980	1,985,130
December	1,566,850	20,460	1,587,310	.....	.....	.....
Totals	23,623,900	319,890	23,943,790	23,807,570	403,910	24,211,480

Tracing developments during the course of the year, January was ushered in with low prices prevailing, even the prepared grades selling at as low a figure as $2.65 and with mine-run priced at less than $2 a ton—a figure so low that many operators ceased production of such a grade for a time. Market conditions made for general idleness among the mines and for small production. By the middle of February fear of a strike had begun to stimulate buying so that it was possible to produce at 60 per cent of capacity. The demand was principally for prepared grades, however, with egg and lump bringing $3.50@$4.25.

Even in March, although there was a fairly well sustained market, there was no rush, the opinion apparently prevailing that the non-union fields would be able to supply all the fuel needed. Car shortage began to make itself felt slightly, but not on the N. & W. Production was smaller during the latter part of March, on the eve of a coal strike than during the earlier part of that month.

Even with a strike in effect smokeless buyers continued to bide their time. There was inquiry for a little more steam coal perhaps, but the market was still decidely apathetic and prices were unchanged. During the latter part of April inquiries began to become more plentiful, but even at the outset of May lump was not bringing much more than $3 and mine-run about $2.25.

May was a month of increasing production and falling prices, the N. & W. handling more coal than in any other month during the year except one, with production also on a large scale on the line of the C. & O. and the Virginian. Prices slumped to a marked degree, however, during the latter part of May, pending the outcome of the fair-price conference at Washington.

Production reached the maximum for the year in smokeless territory during June, with every mine working to increase its capacity under the urging of government agencies. It was not until the early part of July, however, that prices showed much signs of advancing, mine-run during the early part of that month ranging $3.25@$3.50, with lump commanding $3.50@$3.75. During the early part of July railroads suffered no ill effects from the rail strike but by the latter part of that period congestion had become somewhat general and production was materially curtailed. Inquiries began to grow in volume. Mine-run was commanding about $3.50 and lump was priced at $5@$6.

There were further declines in production in August. Priority orders began to divert smokeless from its normal channels and that tended not only to create confusion at the point of production but also to create a shortage in markets to which smokeless usually was consigned.

Prices underwent a decline during October owing to the large tonnage in Eastern markets, it being impossible to transport a particularly large volume to Western markets because the proper kind of equipment was not to be had. There was more activity in the buying of high-volatile in fact in October than in low volatile and in general smokeless mine-run did not range much above $3.50@$3.75, with prepared grades quoted $4.75@$5.

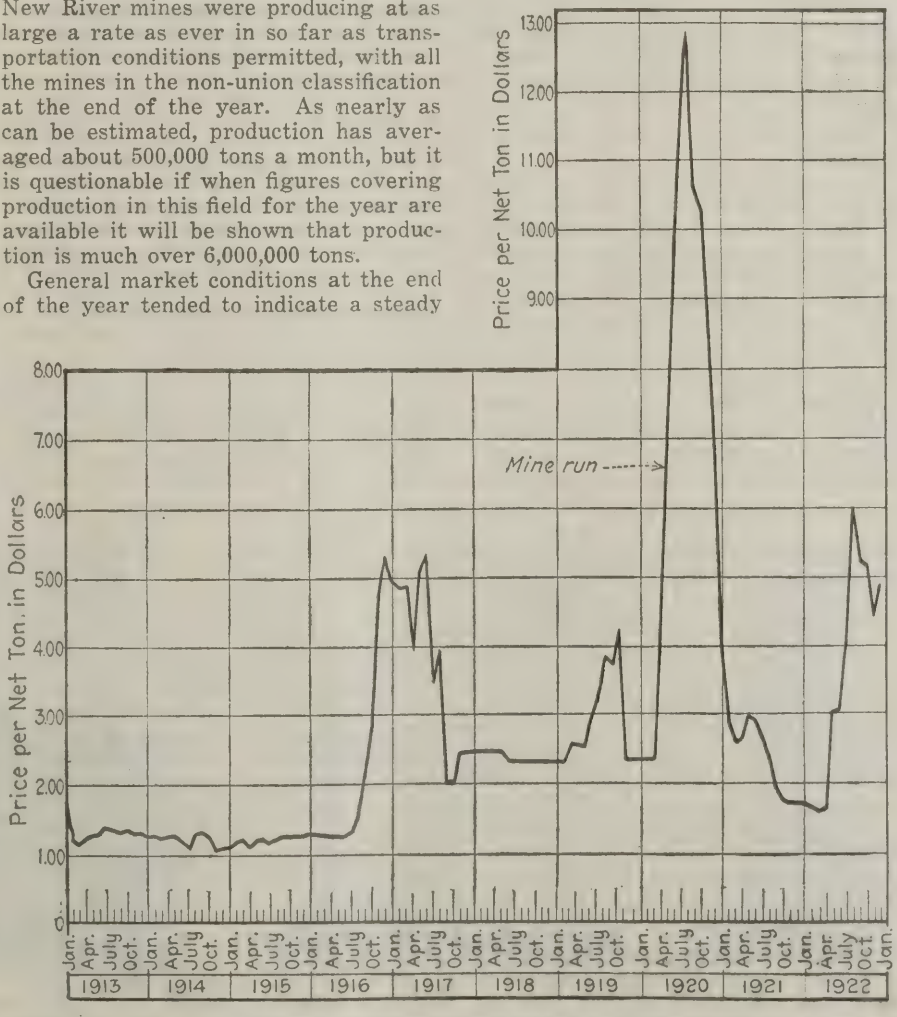
Until the latter part of November there was no change in market conditions. The demand was much better in the West than in the East and tidewater buying was almost at a standstill. The shortage of cars and poor transportation facilities continued throughout the greater part of December, though at times the N. & W. was able to increase the supply. On the C. & O., however, transportation conditions went from bad to worse and many mines had a supply of empties available only about once every ten days. The market veered early in the month, with buying of low-volatile principally in the East. The price on mine-run ascended the scale to $5 and finally to $6, with prepared grades $6@$8 and even more.

Commencing early in the year, operations were continued on a non-union basis in the New River field up until April 1, when the union succeeded in inducing many miners to cease work. The strike was short-lived, however, as many of the miners returned to work before it was a week old and it was possible to operate fully half the mines in the region. Steady gains in tonnage were made thereafter, and when the coal strike officially came to an end New River mines were producing at as large a rate as ever in so far as transportation conditions permitted, with all the mines in the non-union classification at the end of the year. As nearly as can be estimated, production has averaged about 500,000 tons a month, but it is questionable if when figures covering production in this field for the year are available it will be shown that production is much over 6,000,000 tons.

General market conditions at the end of the year tended to indicate a steady demand particularly in Eastern markets, through the shortage of anthracite, so that some producers at least thought that activity in the smokeless market might be expected during the first quarter of 1923.

Winding Gulf mines, of course, were handicapped during the early part of 1923 by a poor market, so that production was not on a large scale. For a time at the outset of the coal strike it seemed possible that a sudden and unexpected invasion of this region by the forces of the United Mine Workers might transform the region into a union district. The injunction issued by Judge McClintic, however, put a stop to organization work and throughout the period of the strike, mines continued to operate regularly, producing a large tonnage. Production will run well over 6,200,000 tons for the year. Those who have made a study of what may be expected during 1923, after taking into consideration the low price of coal during the first four months of the year and the weaker prices prevailing a part of the time during the last four months of the year, the increase in wages and loss of time, entertain the opinion that market conditions will not be above normal at least during the early part of the current year.

It is only necessary to point to a total of 25,000,000 tons of coal handled by the N. & W. during the first ten



SPOT PRICES F.O.B. MINES ON BOSTON MARKET OF MINE-RUN COAL FROM SMOKELESS FIELDS OF WEST VIRGINIA

months of the year to indicate in a measure the large production of the Pocahontas and Tug River fields. There were times in fact when Pocahontas production reached a total of 400,000 tons a week. Only a comparatively small proportion of the tonnage originating in Pocahontas territory found its way westward, owing to the lack of the right kind of equipment. Producers generally are not sanguine of any marked improvement in transportation conditions during the winter months and are therefore inclined to believe that smokeless will be scarce. If that is the case then there will be a steady demand at all times, at least until the beginning of April, when the labor situation, nationally, may become a further factor.

The figures herewith are not exact but are approximately correct and show that production in the Pocahontas field increased 25 per cent over that for the year 1921, bringing the total up to the figure for 1916, the banner year of the Pocahontas field. Southern West Virginia in the whole had a good year.

Colorado Busy and Fairly Peaceful in 1922

Practically Entire State Except Canon City Worked Non-Union, Supplying Widespread Market—Rangers, Now Disintegrating Because of Politics, Kept Order—Car Shortage Was a Handicap

By Fred L. Cunningham
Denver, Colo.

ALTHOUGH Colorado's coal business was considerably hampered during the year with car shortage, strike troubles, mild weather and tunnel blockades, operators declare the year 1922 was one of the most progressive in the history of the state. The strike in the spring was adequately handled by Governor Oliver H. Shoup and his Colorado Rangers. During these critical times the cost of the guard duty was less by far than any previous strikes in the Colorado mining districts. Although it is generally known that Governor-elect Sweet opposes a Ranger force, it is doubtful whether the present ranger law can be repealed, as there is a Republican majority in the state Legislature.

The passage of the Moffat tunnel measure last spring at a special session of the Legislature, with all opposition blocked by the Colorado Supreme Court, will mean the opening of one of the greatest coal fields in the world. Routt and Moffat Counties in Colorado and the Uintah Valley in Utah will be directly benefited by this tunnel when it is built. Many rich mines already have been developed in these regions, but they lack transportation facilities to get their production to a market.

Freight rates that are inequitable have long troubled Colorado and New Mexico. Operators in 1922 appealed to the Interstate Commerce Commission for an adjustment. While a series of hearings were held on one of the cases throughout the West and the Southwest last spring, no decisions have been made. At the present time coal can be shipped from Wyoming into Kansas, Nebraska and other states at a lower figure than from mines in Colorado. Since the railroad strike, little has been said of freight rates, as most of the operators have had difficulty in getting a supply of cars.

The year started out more or less hopefully. The last half of January saw production stimulated greatly by the cold weather, the third week totaling 200,000 tons compared to 260,000 tons for the corresponding week in 1921. Though labor troubles were expected, no disturbances were reported when the reduced wages known as the C. F. & I. scale were put into effect in the bituminous mines of Routt County.

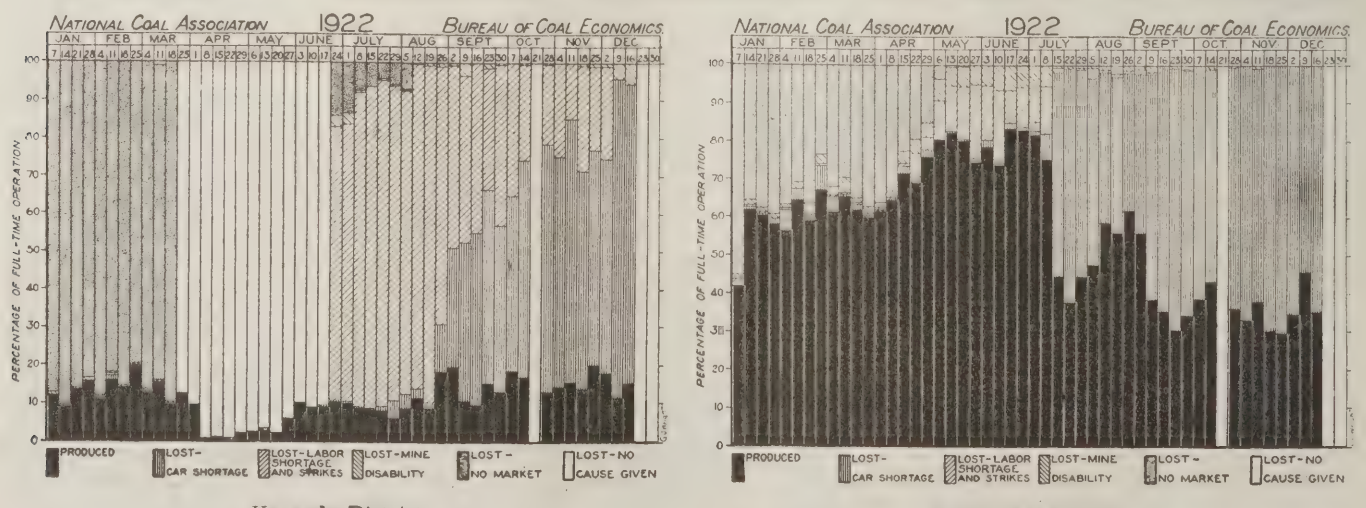
During the first part of March 500 Weld County miners went on strike and this resulted in the closing of eight mines in the lignite district. The miners refused to accept a 30 per cent wage cut similar to that in the bituminous fields. Bituminous lump was $5, slack $2.50 and steam $2 at the mines.

Late in March the worst accident of the year happened. Seventeen miners were killed in Sopris mine No. 2 of the Colorado Fuel & Iron Co., near Trinidad. Two hundred miners had left the mine just before the explosion. The only other great accident was the killing of six men in the Satanic mine of the Colorado collieries at Morrison in January.

With the strike called April 1, operators complained only of lack of business asserting that production was 90 per cent. Colorado was doing the unusual thing of shipping coal into Wyoming, which was almost completely handicapped by the strike. Bituminous lump was selling at $5@$6 at the mine, while lignite brought $4. Weld County lignite sold at $3.50, retailing for $6.20@$7.

During the summer the market grew so slack that many mines shut down for lack of market. Canon City district was the only one in the state closed by the strike. Efforts were made in various fields to cause trouble for miners willing to work. The Rangers quieted several incipient difficulties. The latter part of August Robert Turner, superintendent of the Turner mine, in Huerfano County, was arrested by State Rangers when miners reported that they had gone to the mine to work and that Turner informed them it would not be safe, it is alleged, unless they had a guard of at least 15 Rangers. He was released on bond. This peculiar case has since been dropped.

During September and since, the shortage of cars has been of serious concern to most of the coal operators. Price increases at the mines ranged from $1 to $1.50 per ton. In October the labor situation was somewhat improved with the readjustment of the wage scale. Retail prices were 75c. lower than in 1921. A price war in Weld County was waged between two small coal companies, reducing lignite coal in northern Colorado 90c.@$1.50 per ton. Some operators declared they were selling coal at $2.25@$3.



Kanawha District Pocahontas District

PERCENTAGE OF FULL-TIME OPERATION OF COAL MINES AND TIME LOST BY CAUSES

In spite of the car shortage, production in Colorado from Jan. to Sept. 30, 1922, was 6,916,131 tons, an increase of 307,105 tons over the same period in 1921. The big companies consider they have been successful generally speaking, in their battle against the unions and look forward to the twelve months of 1923 with some satisfaction though the weakening of the Rangers may permit more labor trouble in case of a nationwide union mine strike.

Oil Cuts Deeply Into Coal Trade of Southwest

Exceeds All Previous Annual Inroads, Taking Market for 692,000 Tons of Coal in Kansas City Alone—Helps to Cause Buyers' Strikes—Coal Dealer Tactics Aid Oil—Production Short

By C. F. Butcher
Kansas City, Mo.

NO ONE thing, other than the strike, caused coal men of the Southwest more annoyance in 1922 than the increased use of oil. It is estimated that it is now displacing more than 692,800 tons of coal a year in Kansas City. Estimates based on a knowledge of the number of tanks in use there show that oil is now doing work formerly done by some 540,600 tons of industrial and some 152,200 tons of domestic coal.

On May 1, 1922, there were 9,220 oil burners in Kansas City domestic heating plants. Since then the total has been increased to 15,220. Calculated on a basis of ten tons of coal to a customer, these 15,220 tanks have supplanted grates which provided a market for 152,200 tons of coal a year. At the same time many oil burners have been placed in tributary territory. One firm in the last seven months sent 600 tanks into that territory.

The increase is attributed primarily to fear by consumers of a coal famine, aggravated by reports of car shortage and by geographical confusion on the part of newspaper readers, many of whom failed to distinguish between reported conditions in the hard-coal fields of the East and the soft-coal fields of the Southwest. Oil was partly responsible for the "buyers' strike" which was a major irritant to the coal trade late in 1922.

It must be admitted, also, that the tactics of some dealers in skyrocketing coal prices contributed to smooth the path of the oil-burner salesman. Where Kansas coal had been retailing at $8.50 @$9 a ton in January, February and March, inferior grades, stuff for which there had been absolutely no market before, was sold for as much as $18 in the summer. Coal from non-union mines in Alabama, West Virginia, Kentucky, Tennessee and Colorado was shipped in to augment such coal as was produced in non-union mines of Kansas, Oklahoma, Missouri and Arkansas, and all was sold indiscriminately at one price—the highest obtainable, regardless of its mine cost. As a result, the public was suspicious after the mines reopened when Kansas coal was quoted $1 higher than last March. Consumers placed orders for only one or two tons, and dealers, in their turn, shaved their orders to the skin.

For a time operators, handicapped by a curtailed car supply, welcomed the situation. But as the small orders were filled, "no-bill" cars began to accumulate. In September, October and until Nov. 22, Kansas coal was quoted at the mines at $6 for lump, $5.50 for nut and $2.50 for screenings. On Nov. 22, however, a return to the prices which prevailed in January, February and March was announced. Spot quotations became $5 for lump, $4.50 for nut and $2.50 for screenings.

After a couple of weeks of hesitation the demand slowly began to increase; the number of "no bills" dropped, and the business again began to suffer a little from weakened transportation. Cars again became scarce and power to haul them was scarcer. Coal men in Kansas City insist that if cars were moved at normal speed in transit, there would be little or no shortage in this district.

Southwest production in 1922 was considerably under that of 1921, which was no bonanza year. Tabulations of the Southwest Interstate Coal Operators' Association, the members of which produce between 85 and 90 per cent of the coal mined in Kansas, Missouri, Arkansas and Oklahoma, show that even after the five idle months September, 1922 fell 46,886 tons short of September, 1921. Association figures up to October show these results:

1921				
Jan.	Feb.	March	Sept.	Oct.
937,466	739,091	710,387	816,385	670,000
1922				
Jan.	Feb.	March	Sept.	Oct.
706,142	792,290	1,077,101	767,499	675,831*

*Estimated.

Volume of Business in Toronto Coal Market Much Lower Than for Many Years

Protracted Strike Has Far-Reaching Effect—Delay in Purchasing in Early Months, When Coal Was to Be Had, a Depressing Factor—Government Supervises Fuel Supply

By Philip Thompson

THE coal trade during 1922 suffered severely from the effects of the protracted strike, owing to which the volume of business was considerably less than for many previous years. The extent of the falling off is indicated by the figures furnished by the Canadian Bureau of Statistics of the imports of coal from the United States into the Port of Toronto for the ten months of the year ended Oct. 31, as follows: Anthracite, 448,915 net tons; bituminous coal, 936,750 tons, as compared with 898,616 tons of anthracite and 1,096,052 tons of bituminous for the corresponding period of 1921.

The strike was not the only factor of the situation resulting in decreased trade, as during the earlier months of the year coal was easily procurable in larger quantities had orders been forthcoming. The general impression prevailed both among dealers and the public that prices were likely to be considerably reduced later in the season. Orders consequently were on a much more limited scale than usual. Later in the season domestic buyers who had postponed their purchases were able to obtain anthracite only in small quantities.

In August, when the effects of the strike began to be seriously felt, the situation received attention from the government and municipal authorities. The federal government appointed a central advisory fuel committee to have general supervision over the supply of fuel and the provincial government appointed a fuel controller for Ontario. The public was urged to use the greatest possible economy in the use of anthracite and to employ substitutes as far as possible.

Fuel Controller Ellis issued orders limiting the amount of anthracite to be delivered to a consumer to one ton and fixing the price at $15.50. This regulation has generally been obeyed by the larger dealers who obtain their supplies from the line companies, but others who procure coal from independent companies or through brokers are accused of asking considerably higher figures. The city procured some Welsh anthracite which was distributed in small lots in emergency cases. Representatives of British coal firms have been endeavoring to obtain a permanent foothold in the market, but so far have met with little encouragement.

The supply of bituminous coal has been equal to the demand, which has throughout the year been light owing to depression in the coal-using industries. Prices, however, have been variable lately and consumers all along have been indisposed to buy except for immediate needs. The general improvement in business conditions and some

increase of activity in manufacturing indicate increased consumption in the near future.

Expectations of a more plentiful supply of anthracite toward the close of the year were not realized owing to the acute shortage in the United States and it was found necessary to adopt a rule that orders must include 25 per cent of bituminous coal. It was expected that later in the winter the proportion of soft coal to go with each order would be increased. On Dec. 18 the City Council appointed D. Chisholm civic fuel controller, requesting the provincial government to give him full power to control prices and regulate distribution.

Central Pennsylvania Had Most Eventful Year

Rush to Fill Orders Before Suspension—Record Production When Mining Was Resumed, Followed by Widespread Depression Due to Car Shortage and Lack of Water

BY D. E. SELL

THE year 1922 will go down in history in the central Pennsylvania field as the most eventful since mining on a large scale was started. The year may be divided into four periods. The first was the rush to supply orders prior to the strike. Then came the long period of anxiety and low output during the strike, followed by a record production at its end, in turn followed by a depression in practically all quarters due to a car shortage and in some places a lack of water to operate the mines.

With the resumption of much industry throughout the country and the heavy demands for transportation fuel and with talk of a strike over wage and union disputes, the year started off with heavy production, which gained momentum, reaching the peak in March, during which time considerable coal was stored.

With the declaration of a general strike, only the non-union portions of the district continued to produce, and even these mines were somewhat affected owing in some places to the non-union miners, being afraid of violence, refusing to enter the mines.

Windber, in Somerset County, and Vintondale, in Cambria County, were the principal non-union centers, and the mines in both sections, as well as in the vicinity of the main line of the Pennsylvania near South Fork, operated to 60 to 70 per cent of capacity during the strike period.

Very little attempt was made during the strike period to operate outside the non-union districts but operators took advantage of the time to get ready for the rush for coal that was bound to come, owing to the exhausted supplies.

So eager were the men to return to work and the operators to resume business that no time was lost in getting the mines under way after the strike. Production increased by leaps and bounds so that the coal-carrying roads entering the field, namely the Pennsylvania, Baltimore & Ohio, New York Central and the Buffalo, Rochester & Pittsburgh, were crowded beyond their capacity.

During the high production period, operators were hampered by a car shortage, due largely to a strike of shopmen, which reduced the number of cars available for loading and the number of engines available for hauling. This did not affect the business in this district to the same extent as some other fields due to the fact that the Pennsy shops in Altoona were kept working with a full force.

At the height of production the demand for anthracite removed many cars from the district and the government undertook the assignment of cars. This worked out all right for the mines furnishing railroad fuel, but operators furnishing commercial coal found themselves short.

The worst drought in the history of the district extended into the winter. Some of the larger mines found themselves without water and were compelled to close down indefinitely and the end of the year found most of the mines in the district, except such as own their own cars and those supplying the railroads, without cars and unable to accept orders owing to inability to guarantee shipments.

An advance step was made in organization when the Cenera1 Coal Association, the Central Pennsylvania Coal Producers' Association and the Association of Bituminous Coal Operators of Central Pennsylvania united at a joint conference held in Altoona on Nov. 9. The general office is located in Altoona.

The mines were in operation 130 days during the year. There are in the field 1,015 mines, including many smaller operations. In these mines a total of 65,000 miners are employed, of which approximately 1,000 were still on strike at the close of the year.

Production in 1922 was 34,700,000 tons, 8.54 per cent of the entire country's production. This is the lowest output since 1904, when 32,748,000 net tons were mined. In 1920 the central Pennsylvania field produced 10.32 per cent of the entire country's coal and in 1919 the production reached 14.94 per cent of the entire production.

The close of the year was met with a very serious obstacle in the form of a car shortage, which grew more acute as time advanced. With the car shortage came cancellation of orders and the operators unable to accept orders due to the fact that they could not guarantee shipment.

Utah Operators Had Lively Year in 1922

Coal Camps Under Martial Law During Strike — Grand Jury Investigation Resulted in Indictments of Several Corporations — Production Exceeded That of Previous Year

BY FRED L. W. BENNETT

UTAH coal operators had a rather lively time last year. First came the strike and the placing of the coal camps under martial law for months. As soon as the soldiers were finally withdrawn a bitter newspaper attack was launched charging that the raising of the retail price of coal to $10 was robbery. The retail price on April 1 was $9.50 for lump and a cut in miners' wages caused a 50c. reduction which held good till the figure was raised to $10 at the end of the summer. A grand jury called to investigate the industry, returned an indictment against several corporations and individuals, the result of which is still to be decided by the courts.

The first six months of the year were characterized by poor market, the weather up to April 1 having been unseasonable. Then followed a period of great activity. Producers got behind on their orders. All this was the result of shortage in other states and the alarm which many local citizens were feeling at the prolonging of the strike.

The car situation was acute during the early part of the last quarter and resulted in considerable loss. Toward the close of the year business was rather quiet compared with capacity. Production for the first eleven months of the year was 4,373,470 tons, and another half million, at least, is expected to be added for December. In 1921 the figure was 4,090,397.

The outlook for business this year is improving as a result of increasing industrial activities.

Production of Bituminous Coal By Months, 1920-1922

(Net Tons)

	1922a	1921	1920
January	37,604,000	41,148,000	49,748,000
February	40,980,000	31,524,000	41,055,000
March	50,167,000	31,054,000	47,850,000
April	15,777,000	28,154,000	38,764,000
May	20,287,000	34,057,000	39,841,000
June	22,328,000	34,635,000	46,095,000
July	17,003,000	31,047,000	45,988,000
August	27,358,000	35,291,000	49,974,000
September	39,510,000	35,870,000	50,241,000
October	45,141,000	44,687,000	53,278,000
November	45,303,000	36,805,000	52,576,000
December	46,254,000	31,650,000	53,257,000
Totals	407,712,000	415,922,000	568,667,000

(a) Subject to revision.

What Happened in the Coal Industry in 1922

January

Jan. 1—First break in union in Panhandle region occurs Dec. 30 when 200 men resume work in Colliers plant of West Virginia-Pittsburgh Coal Co. at 20 per cent reduction in wages (Vol. 21, No. 2, p. 61).

Jan. 1—Nova Scotia supreme court enjoins coal companies from making proposed 33⅓ per cent wage cut while board of conciliation tries its hand (Vol. 21, No. 2, p. 61).

Jan. 1—Permanent arbitration board rules that wages be reduced 20 per cent in Tennessee-Southeastern Kentucky field effective Dec. 1 (Vol. 21, No. 2, p. 60).

Jan. 2—Southern Ohio, Eastern Ohio and Pittsburgh operators decline Lewis' invitation to meet union heads in Pittsburgh Jan. 6 to renew four-state wage negotiations for April 1 agreement. Illinois and Indiana say they will meet but do not promise to negotiate (Vol. 21, No. 1, p. 21).

Jan. 3—Union locals in anthracite region draw up many resolutions for higher pay and stricter working conditions to be presented at Shamokin convention Jan. 17 (Vol. 21, No. 1, p. 21).

Jan. 4—Various union demonstrations against non-union mines and mines thought to be ready to open at low-pay ore made in Monongalia county. Fourteen men indicted (Vol. 21, No. 4, p. 175).

Jan. 4—President Lewis of U. M. W. of A. calls off Pittsburgh conference after Ohio and Pennsylvania decline to attend (Vol. 21, No. 2, p. 60).

Jan. 10—A few Georges Creek region mines are resuming operations at lowered wage scale. Manor Coal Co. cuts 30 per cent (Vol. 21, No. 2, p. 59).

Jan. 10—Matthew Addy interests and 120 other credit members of bankrupt Tidewater Coal Exchange sue debit members for settlement of accounts (Vol. 21, No. 2, p. 59).

Jan. 10—Keeney, Mooney and Blizzard charged with instigating Mingo county "invasion" remanded to jail without bond (Vol. 21, No. 2, p. 59).

Jan. 10—Maryland special commission submits to operators and miners for approval, a revision of state coal mining laws (Vol. 21, No. 2, p. 59).

Jan. 10—Coronado case ordered reheard Feb. 27 by Supreme Court so Chief Justice Taft can listen to argument. Bench divided 4 and 4 on it before Chief Justice White died (Vol. 21, No. 2, p. 60).

Jan. 12—Operators and miners in Georges Creek and Upper Potomac fields fail, in 3-day session, to reach agreement on next wage contract. About one-fifth of the territory is working at reduced wages (Vol. 21, No. 4, p. 176).

Jan. 13—Three entombed, many injured when 20 acres of Glen Alden Coal Co.'s National mine caves in (Vol. 21, No. 3, p. 147).

Jan. 13—Keeney, Mooney, Blizzard and 300 other union men indicted for West Virginia war. Two troopers shot trying to arrest a miner (Vol. 21, No. 3, p. 147).

Jan. 13—Government through Secretaries Hoover and Davis trying to find peace making scheme for coal industry. They collect wage data (Vol. 21, No. 3, p. 146).

Jan. 14—T. H. Watkins urges Westmoreland operators to join National Coal Assn. saying it can protect operators' interests as can no other agency (Vol. 21, No. 3, p. 147).

Jan. 14—Missouri Circuit Court judge removes temporary injunction preventing U. M. W. of A. from ousting Alex Howat in Kansas-Missouri union district (Vol. 21, No. 3, p. 147).

Jan. 15—About 100 New River mines resume operations on 1917 scale (Vol. 21, No. 4, p. 178).

Jan. 16—Railroad case against cut in coal rates weakened by doubtful testimony before I. C. C. J. D. A. Morrow says rate cut will increase traffic enough to reduce operating expenses (Vol. 21, No. 3, p. 145).

Jan. 17—Anthracite reaching New England is so poor that Mass. state fuel administrator advises refusals of it (Vol. 21, No. 4, p. 176).

Jan. 18—Keeney, Mooney and Blizzard released from Logan county jail on $15,000 and $20,000 bail (Vol. 21, No. 5, p. 219).

Jan. 21—Anthracite miners in Shamokin convention demand 20 per cent increase in pay and many changes in conditions or they strike April 1 (Vol. 21, No. 4, p. 179).

Jan. 23—Pennsylvania state auditor announces he will collect 1½ per cent tax on anthracite in spite of case to test tax law's constitutionality (Vol. 21, No. 4, p. 175).

Jan. 23—Nova Scotia Court of Appeals suspends injunction preventing coal companies from reducing wages (Vol. 21, No. 4, p. 175).

Jan. 23—Supreme Court again postpones rehearing of Coronado Coal Co. case against miners' union, this time to March 20 (Vol. 21, No. 4, p. 193).

Jan. 24—Anthracite operators' statement says union wage demands would add $1.30 per ton to anthracite price (Vol. 21, No. 5, p. 219).

Jan. 26—Pittsburgh Coal Operators Association and (Jan. 28) Southern Ohio coal operators post scales showing reductions of 30-47 per cent. Say they will not pay check-off. Union officials silent (Vol. 21, No. 5, p. 219).

Jan. 27—Senator Kenyon's report to Senate after investigation of West Virginia coal "war" calls coal a public utility and suggests to Congress a national "industrial code" and a federal arbitration board for mine labor disputes (Vol. 21, No. 5, pp. 215-216).

Jan. 28—Committee of three named to settle demurrage bills of old Tidewater Coal Exchange (Vol. 21, No. 5, p. 218).

Jan. 29—Attorney-General Daugherty says government will not define legitimate scope of trade association activities but associations "doing a legitimate business" will be encouraged. General uncertainty as to associations continues (Vol. 21, No. 5, p. 217).

February

Feb. 1—President Lewis of miners union invites 16 major unions of railroaders, to join miners in "economic alliance." Feb. 6 he refuses to affirm or deny report that only one accepts (Vol. 21, No. 6, p. 261).

Feb. 2—Country's coal stocks Jan. 1 were sufficient for but 32 days as compared to 43 days stock Nov. 1 Bureau of Census and Geological Survey announces (Vol. 21, No. 6, p. 259).

Feb. 2—Forty miners killed by explosions, 25 in Gates mine of H. C. Frick Co., Brownsville, Pa., six in Layman Calloway Coal Co. mine in Bell County, Ky., and nine convicts in Bell Ellen mine of Bessemer Coal, Iron & Land Co., Bibb county, Alabama (Vol. 21, No. 6, p. 258).

Feb. 2—Anthracite tax act of 1921 upheld by court of common pleas in Dauphin county (Vol. 21, No. 6, p. 258).

Feb. 4—Wage reduction of 30 per cent announced for Monongalia County, W. Va., by operators effective April 1 (Vol. 21, No. 7, p. 296).

Feb. 5—Attorney General formulates plan to help prevent April 1 strike but does not announce it (Vol. 21, No. 6, p. 257).

Feb. 6—Winding Gulf Assn. announces smokeless production in West Virginia for 1921 was only 29,800,000 tons as compared with 32,000,000 in 1920 and 36,000,000 in the peak year 1916 (Vol. 21, No. 6, p. 255).

Feb. 6—League of Industrial Democracy headed by Robert Morss Lovett and Chas. P. Steinmetz protests increase in hard coal prices (Vol. 21, No. 6, p. 257).

Feb. 6—Nova Scotia wage cut for coal miner to levels recommended in McKinnon award of 1920 is advised by Board of Conciliation. Day men would be cut 12½ per cent and all others 20 (Vol. 21, No. 6, p. 257).

Feb. 8—Secretary Hoovers 11 questions to Attorney General Daugherty on trade association scope of activity all get affirmative reply constituting new code for associations (Vol. 21, No. 7, pp. 297-8).

Feb. 8—Consolidation Coal Co. buys Carter Coal Co. including four smokeless field mines, thus entering smokeless operation at last (Vol. 21, No. 7, p. 300).

Feb. 10—Southern Appalachian Coal Operators Assn. votes to resist "closed shop" and check-off thus ending "open shop" agreement with union in that district (Vol. 21, No. 7, pp. 300).

Feb. 11—John Lewis announces all important rail unions accept invitation to meet miners in Chicago Feb. 21 (Vol. 21, No. 7, p. 301).

Feb. 13 — Market grows notably stronger. Stocking begins in earnest. Prices rise somewhat (Vol. 21, No. 7, p. 302).

Feb. 13—War Department reports it cost $150,000 to send troops into West Virginia coal fields in September and October (Vol. 21, No. 7, p. 313).

Feb. 13—Virtually all the western coal states are suing for freight reductions. Colorado wants 35 per cent off (Vol. 21, No. 7, p. 314).

Feb. 13—President Lewis of miners union in final statement before union convention at Indianapolis says: "Miners do not desire strike and will do everything possible to prevent it, as public will realize when convention has finished its work" (Vol. 21, No. 7, p. 301).

Feb. 14—Scale committee of miners union reports to convention favoring maintenance of existing wages, "8-hr. day underground." Farrington of Illinois says no five-day weeks, 6-hr. days, or radical demands will be made (Vol. 21, No. 7, p. 301).

Feb. 14—Senator Kenyon files bill based on his coal report. Would set up National Coal Mining Board of nine men representing operators, miners and public (Vol. 21, No. 8, p. 342).

Feb. 15—Dept. of Labor conciliators in report to President blame union for West Virginia field "war" and say there is little suffering among miners and no evictions by companies (Vol. 21, No. 8, p. 342).

Feb. 15—Freeport Thick Vein operators announce 34 per cent wage reduction for April 1 (Vol. 21, No. 8, p. 343).

Feb. 15—Rep. Robison of Kentucky introduces resolution for general investigation of coal-mining industry (Vol. 21, No. 8, p. 343).

Feb. 15—Union calls off strike of 700 miners in Clinton field of Indiana who struck to compel re-employment of a discharged pumper (Vol. 21, No. 8, p. 354).

Feb. 15—Former Gov. Harding of Iowa, Gail Borden of New York, and other capitalists form Pocahontas & Sewanee Coal Co. and buy 13,000 acres near Pikeville, Tenn. (Vol. 21, No. 8, p. 355).

Feb. 15—Sewall's Point Coal Exchange and Lamberts Point Exchange both quit business (Vol. 21, No. 12, p. 507).

Feb. 16—Eight men killed recently in explosion wrecking Pond Creek mine of Marietta Coal Co. in Ohio (Vol. 21, No. 7, p. 312).

Feb. 18—Miners convention at Indianapolis adopts "suicidal" demands for six-hour day, five-day week and annual income sufficient to maintain miners decently. Farrington leads anti-Lewis faction and embarasses Lewis at times during meeting though Howat rehearing is denied (Vol. 21, No. 8, pp. 337-9).

Feb. 18—Howat, deposted Kansas union president sentenced to jail for failing to observe anti-strike injunction of Kansas Industrial Court, appeals to

U. S. Supreme Court (Vol. 21, No. 8, p. 341).

Feb. 18—Cambridge Collieries Co. buys mine and 8,000 acres from Morris Coal Co., near Senacaville, Ohio (Vol. 21, No. 9, p. 395).

Feb. 20—Market subsides again after small flurry. Prices recede slightly (Vol. 21, No. 8, p. 344).

Feb. 20—Coal mining accidents in 1921 reduced, Bureau of Mines report says. Fatalities decreased 13 per cent but rate per million tons is 3.99 as compared to 3.52 for 1920 (Vol. 20, No. 8, p. 353).

Feb. 20—Deep Vein Coal Co. mine caves at Princeton, Ind., and 400 men escape by air shaft (Vol. 21, No. 9, p. 394).

Feb. 20—Consolidation Coal Co. buys land for $500,000 on Clay and Knox county border, Kentucky (Vol. 21, No. 9, p. 394).

Feb. 20—Constitutionality of Pennsylvania anthracite tax act is questioned in Supreme Court on an appeal from Dauphin county (Vol. 21, No. 9, p. 382).

Feb. 20—Circuit Court of Appeals in New York requires debtor members of defunct Tidewater Coal Exchange to settle debts totaling $1,000,000 to the Exchange (Vol. 21, No. 10, p. 420).

Feb. 21—Illinois operators tell Lewis they are willing to meet him in four-state conference. Indiana says there's no use of a conference if whole Central Competitive field isn't in. Southern Ohio and Western Pennsylvania will not meet. Northern Ohio will attend if rest do (Vol. 21, No. 9, p. 381).

Feb. 24—J. E. McCoy resigns secretaryship of Southern Appalachian Coal Operators Assn. after 12 years service (Vol. 21, No. 10, p. 419).

Feb. 24—Railroad unions give miners only "moral support" in alliance conference at Chicago (Vol. 21, No. 9, p. 383).

Feb. 25—Anthracite operators after two-day conference agree to meet union officials in New York March 15. If they have a wage program they will not announce it (Vol. 21, No. 9, p. 383).

Feb. 27—Kanawha operators tell union if it persists in refusing to meet them before March 11 they will post a reduced wage scale without check-off (Vol. 21, No. 9, p. 382).

Feb. 27—National Grange officials urge farmers to oppose coming coal strike (Vol. 21, No. 10, p. 423).

Feb. 28—Preston County, W. Va., operators reduce wages (Vol. 21, No. 9, p. 380).

Feb. 28—Peabody interests and others in Illinois to withdraw before April 1 from National Coal Assn. (Vol. 21, No. 9, p. 382).

Feb. 28—Lehigh Coal and Navigation Co. announces its million dollar anthracite breaker at Coaldale, Pa., will be ready for use April 1 (Vol. 21, No. 9, p. 395).

March

March 1—U. S. Steel Corporation announces its mines produced 21,000,000 tons of coal during 1921 as compared to 30,000,000 tons in 1920 (Vol. 21, No. 13, p. 558).

March 1—After a survey, an engineer for Northumberland county, reports the county's anthracite mines are worth $91,000,000. They are taxed at $67,000,000 (Vol. 21, No. 10, p. 435).

March 1—Illinois operators propose to President Farrington that miners and operators of state hold wage conference. He puts it up to Lewis who says "No," (March 4). Farrington, the union rebel, keeps operators on the string by saying state union meeting will consider matter further (Vol. 21, No. 10, p. 421).

March 1—Nova Scotia operators and union officials reach agreement which goes to men on referendum (Vol. 21, No. 10, p. 422).

March 1—Western Canada's 9,000 union miners will strike if wages are cut April 1, official says (Vol. 21, No. 10, p. 422).

March 2—Miners numbering 1,400 at Old Forge Colliery, Old Forge, Pa., strike to force discharge of miner who was earning too much (Vol. 21, No. 15, p. 623).

March 6—Rail officials oppose coal freights before I. C. C., saying reduction would have little effect in prices in general (Vol. 21, No. 10, p. 419).

March 6—Secretaries Hoover and Davis each make informal efforts to produce peace in coal mining but without noticeable result (Vol. 21, No. 10, p. 423).

March 10—Western Pennsylvania and Southern Ohio tell Secretary Davis they will not change decision not to meet miners in four-state parley. Central Pennsylvania warns government it is "complicating matters" by its suggestion for a four-state conference (Vol. 21, No. 11, pp. 461-2).

March 10—Eight miners are killed and 10 missing in explosion at Sopris mine No. 2 of C. F. & I. Co. near Trinidad, Col. (Vol. 21, No. 13, p. 558).

March 12—Farrington gets into telegraphic tilt with Lewis over Illinois separate wage negotiation offer, but gives operators no definite answer as to time of meeting them (Vol. 21, No. 11, p. 461).

March 13—Supreme Court dismisses Alex Howat's plea against Kansas Industrial Court (Vol. 21, No. 11, p. 460).

March 13—State troops of West Va. dispatched to Thomas to guard miners of Davis Coal & Coke Co. at work on new low scale (Vol. 21, No. 12, p. 507).

March 13—Peabody Coal Co. claims biggest February production of any company in the country—829,000 tons. Buys Carterville & Big Muddy mine at Carterville, Ill. (Vol. 21, No. 11, p. 474).

March 15—Anthracite miners' wages 152 to 166 per cent higher than before the war and far higher by comparison than wages in any other industry, investigation for National Industrial Conference Board shows (Vol. 21, No. 12, p. 501).

March 15—Farrington agrees to meet Illinois operators separately before March 31 unless Lewis succeeds in getting an interstate conference in meantime (Vol. 21, No. 12, p. 506).

March 20—Consensus in Washington is that government is not going to intervene to prevent coal strike (Vol. 21, No. 12, p. 499).

March 20—Fairmont operators reported to be seeking settlement with union granting check-off in return for a scale. All regions in Central Competitive field maintain original positions. Southwestern Inerstate District has had two meetings with miners without accomplishment (Vol. 21, No. 12, p. 505).

March 20—I. C. C. begins hearings on inequalities in freight rates to ports on bunker coal and all other coal (Vol. 21, No. 12, p. 506).

March 20—Pittsburgh Coal Producers' Assn. delegates assemble at appointed time and place for union conference but no union men appear (Vol. 21, No. 13, p. 547).

March 20—Anthracite mining companies prepare to resist taxation under new act. Companies such as P. & R. Coal & Iron Co. are making agreements with Dauphin county officials on valuations much lower than proposed new ones (Vol. 21, No. 12, p. 519).

March 21—Indiana Bituminous Coal Operators Assn. frames up scale showing 30 to 40 per cent decreases over existing one. Secretary Penna now tells Lewis Indiana is willing to meet miners. Lewis refuses (Vol. 21, No. 13, p. 547).

March 21—President Lewis of miners' union declares strike beginning April 1 of all union mine workers of U. S. and Canada, Nova Scotia excepted. He doesn't even wait for finish of strike referendum to union men who are voting 19 to 1 for strike, Secretary Green says (Vol. 21, No. 13, p. 546).

March 23—Miners refuse to meet Southern Ohio operators (Vol. 21, No. 13, p. 547).

March 23—Rep. Bland (Ind.) introduces bill in House at Washington creating commission to "inquire into and report on the coal industry." Senator Borah (March 27) threatens to demand government investigation of causes for impending strike (Vol. 21, No. 13, p. 544).

March 25—Orient No. 1 mine of Chicago, Wilmington and Franklin Coal Co. sets world's record for 8 hours hoisting of soft coal with work of 8,210 tons, beating nearest competitor Zeigler No. 1 mine of Bell & Zoller by 947 tons (Vol. 21, No. 13, p. 547).

March 25—Miners officials in District 17, the Fairmont Kanawha region, meet operators but decline to make a contract saying they were "without authority to take such action until the Central Competitive Field scale has been made" (Vol. 21, No. 13, p. 547).

March 25—Country's coal stocks total 52,000,000 tons, greatest since Armistice Day, U. S. Geological Survey reports (Vol. 21, No. 13, pp. 542-3).

March 27—Farrington, union president in Illinois, finally sets March 29 as date for meeting with Illinois operators (Vol. 21, No. 13, p. 547).

March 27—Heavy production and quiescent market pull spot price of coal down materially, as country goes into strike period with heavy reserves (Vol. 21, No. 13, p. 548).

March 28—Pittsburgh and Central Pennsylvania operators post reduced scale offering 77 cents a ton for pick mining, 50 cents for loading and $4.50 $4.60 per day labor (Vol. 21, No. 14, p. 584).

March 29—Farrington meets Illinois operators, tells them he can do nothing toward making separate state deal unless "an emergency arises" but fails to define "emergency" (Vol. 21, No. 14, p. 583).

March 29—Kanawha operators adopt new scale showing 30 per cent cuts (Vol. 21, No. 14, p. 589).

March 30—Conference of operators and miners adjourns until April 3, having accomplished nothing (Vol. 21, No. 14, p. 584).

March 31—Orient No. 1 and Zeigler No. 1 mines of Chicago, Wilmington and Franklin Coal Co. and Bell & Zoller, respectively, ran world's greatest production race during March. Zeigler set world's record for month's hoist with tonnage of 164,109. On March 25 Orient mine broke daily hoist record with 8,218 tons (Vol. 21, No. 14, p. 586).

April

April 1—A. M. Ogle tells House committee at hearing on Bland bill that operators refused to meet miners in four state negotiation because of disruption of the agreement by the union, court decisions declaring national agreements unlawful and economic conditions caused by non-union competition (Vol. 21, No. 14, p. 587).

April 1—General strike of union miners takes place. Non-union regions but little affected (Vol. 21, No. 14, p. 589).

April 2—For first time in history of West Virginia union local was held liable for damages for suspending a member, at Lumberport, W. Va. (Vol. 21, No. 14, p. 581).

April 2—President Lewis of miners' union, declares "some national authority over coal mining is necessary" (Vol. 21, No. 14, p. 585).

April 4—Chairman Nolan of House Committee on Labor invites operators of Central Competitive Field to meet miners in Washington, saying Lewis would meet any group large enough to negotiate. Every state maintains original position and no meeting is held (Vol. 21, No. 15, p. 625).

April 5—March shipments of anthracite total 6,778,667 tons which makes it third among list of Marches of past years, Anthracite Bureau of Information announces (Vol. 21, No. 16, p. 664).

April 6—Attorney General Daugherty writes Rep. Bland (Ind.) saying the government had no intention of disturbing a Central Competitive Field negotiation (Vol. 21, No. 15, p. 629).

April 7—John Grophy of miners' union tells House Committee on Labor that there should be a commission to investigate the whole coal industry (Vol. 21, No. 15, p. 627).

April 10—Up to now union has been successfully invading the Connellsville coke region (Vol. 21, No. 15, p. 628).

April 10—Supreme Court dismisses for lack of jurisdiction the Lambert's Run case of coal company against rail-

road for failure properly to allot cars (Vol. 21, No. 15, p. 629).

April 12—First coal cargo of season leaves Buffalo for Chicago (Vol. 21, No. 16, p. 683).

April 13—Gillen board of inquiry into Nova Scotian coal mining resions and is replaced by another board (Vol. 21, No. 16, p. 669).

April 13—Secretary Hoover declares in letter to Atty. Samuel Untermeyer that he is absolutely against open price trade associations but believes strongly in those whose functions are legitimate (Vol. 21, No. 16, p. 671).

April 15—Removal of 148 bodies from a Polish cemetery at Plymouth, Pa., to prevent their falling into caving mines is started (Vol. 21, No. 16, p. 683).

April 16—Rep. Johnson of Kentucky gets house at Washington to adopt amendment to Dept. of Justice appropriation bill forbidding prosecution of labor unions and farmers associations under the anti-trust act (Vol. 21, No. 16, p. 666).

April 17—Rep. Bland (Indiana) introduces new bill for commission of 10 representing operators, miners and public to investigate whole industry (Vol. 21, No. 17, p. 705).

April 17—Case to test constitutionality of Pennsylvania anthracite tax law goes to Supreme Court (Vol. 21, No. 16, p. 670).

April 17—Rep. Huddlesm (Alabama) introduces bill providing that federal court receiver shall operate any mine that suspends production and shall not return the property until operation is guaranteed by owner (Vol. 21, No. 16, p. 670).

April 17—Second week of strike finds public apathetic. West Virginia operators get injunctions from Judge McClintic restraining union from organizing there. No breaks in ranks of either operators or miners and no sign of federal intervention Lewis is said to be anxious for (Vol. 21, No. 16, p. 667).

April 19—There are 289,000 miners on strike in Pennsylvania including 95,000 in anthracite fields state bureau of labor reports (Vol. 21, No. 17, p. 704).

April 21—Dr. Harry A. Garfield tells Survey Associates, Inc., at New York banquet that he opposes public ownership of mines and proposes his 1919 idea for coal advisory commissions for both anthracite and bituminous. Philip Murray, vice president of U. M. W. of A. proposes joint fact finding commission and says strikers would go back to work at 1920 commission award (Vol. 21, No. 17, p. 705).

April 24—Twenty-three miners go on trial for treason at Charlestown, W. Va., for "levying war on State of West Virginia" claim indictments are invalid (Vol. 21, No. 17, p. 711).

April 24—Three hundred miners in Bridgeport, Tex., accept wage cut of $1.50 a day and 25 cents a ton and go back to work (Vol. 21, No. 18, p. 751).

April 25—Judge McClintic of U. S. District Court, perpetuates injunction against union proselyting in West Virginia Winding Gulf field, declares union and operators of Central Competitive Field conspired to curtail West Virginia production ever since 1898 (Vol. 21, No. 18, p. 751).

April 26—Anthracite conference resumes in New York, S. D. Warriner says (April 27) that 47,000 miners in hard coal in 1921 averaged earning $1,803.55 per year (Vol. 21, No. 18, p. 750).

April 28—Small riots around a mine or two and fusillade of shots in Carbon county draw out state troops in Utah (Vol. 21, No. 18, p. 751).

April 29—Union miners in West Virginia announce they will stand by the international organization no matter what course is taken by other states where the union is of doubtful strength (Vol. 21, No. 19, p. 793).

May

May 1—Counsel for 23 union miners on trial at Charles Town, W. Va., for treason fail to get indictments quashed but court upholds demand for bill of particulars citing overt acts of each prisoner (Vol. 21, No. 18, p. 753).

May 1—In fourth week of strike, production, demand and price all increased noticeably (Vol. 21, No. 17, p. 749).

May 1—U. S. Chamber of Commerce prophesies coal panic early in June for stocks will have gone below 20,000,000 ton mark by that time (Vol. 21, No. 18, p. 749).

May 2—Many coke workers in Connellsville district go back to work and others serve notice on union they will too, unless strike benefits are forthcoming at once (Vol. 21, No. 18, p. 751).

May 2—House Committee on Labor favorably reports Bland bill for a fact finding commission made up of directors of Bureau of Mines and Geological Survey, Commissioner of Labor Statistics and two representatives each of the public, the miners and the operators (Vol. 21, No. 19, p. 793).

May 3—Miners propose investigation by I. C. C. into anthracite freight rates. Operators say this is only an effort to detract attention from the main business which is the formulation of another wage scale (Vol. 21, No. 19, p. 791).

May 5—Sporadic outbursts of trouble in Utah climaxing in an attack on Carbon County mines where 500 or more shots were fired cause appeals for state troops. Fifty deputy sheriffs are already at Winterquarters and Scofield, President of Utah federation of labor, threatens a general strike if troops are sent out (Vol. 21, No. 19, p. 794).

May 6—Many small disturbances in Colorado up to date but no serious outbreaks. Several mines are working light even in the union stronghold around Canon City (Vol. 21, No. 19, p. 795).

May 9—Anthracite miners in continued conference with operators, refuse to agree to four-year basis for a contract and adjourn to May 16 (Vol. 21, No. 20, p. 853).

May 12—Rep. Petersen (N. Y.) introduces bill at Washington for commission of three to investigate costs between mine and consumer (Vol. 21, No. 20, p. 853).

May 12—Miners' union orders men out of every licensed mine in Ohio, thus closing private and co-operative operations (Vol. 21, No. 21, p. 895).

May 13—Federal Trade Commission files brief and argument in District of Columbia Court of Appeals sustaining its contention it has a legal right to require cost data of Claire Furnace Co. and others (Vol. 21, No. 20, p. 855).

May 14—Production in West Virginia grows heavier with increasing market demands. All fields except Kanawha report great union defections and even the latter field is working 35 mines (Vol. 21, No. 20, p. 854).

May 14—Railroads and some other big industrial buyers form a sort of buying pool with representatives in various fields to restrain ballooning of prices by lessening buying competition (Vol. 21, No. 20, p. 862).

May 15—Markets are topsy-turvy with demand strengthening and railroads buying more heavily. *Coal Age* Index now has ascended to 261, an increase of 31 points in a week (Vol. 21, No. 20, p. 856).

May 15—Development of coal lands in Chicaloon district of Alaska for Navy is planned by Department of Interior. Lake and Export Coal Corporation is to make field examination (Vol. 21, No. 20, p. 866).

May 18—Governor of Utah invokes old law and orders all aliens to surrender firearms before noon of May 22 to prevent further disorder (Vol. 21, No. 21, p. 896).

May 18—Anthracite operators refuse miners' 19 demands, saying that to grant them would impose annual burden of $170,000,000 on the industry. They propose decrease of 18 per cent in contract rates $1.20 a day for men and 72 cents a day for boys and five-year agreement (Vol. 21, No. 21, p. 890).

May 18—Fifty non-union operators at Hoover price control meeting, agree to use Garfield 1917 scale as basis for fair prices today. General conference of operators now producing is called for May 31 (Vol. 21, No. 21, pp. 890-1-2).

May 18-20—National Retail Coal Merchants' Assn. condemns profiteering and other evils of the industry in annual convention at Chicago (Vol. 21, No. 21, p. 897).

May 19—Presentation of the case for the defence in the treason trial of William Blizzard at Charles Town, W. Va., starts. Judge overrules motion to direct verdict of not guilty (Vol. 21, No. 21, p. 894).

May 20—Average margin of about 9 per cent is profit of bituminous industry during past four years—the best years in coal history, J. D. H. Morrow tells House Committee in Bland bill hearing (Vol. 21, No. 21, p. 883).

May 20—Rabbi Wise accepts invitation of Secty. Lewis of New River Coal Operators' Assn., to investigate suffering of miners in West Virginia. Mr. Lewis says the stories of deprivation are exaggerated (Vol. 21, No. 21, p. 896).

May 22—F. S. Peabody tells International Railway Fuel Assn. in convention that coal mines lose $400,000,000 a year through idle time and that ruthless competition is going to solve the coal industry's problem of over development (Vol. 21, No. 22, p. 937).

May 23—A 10 per cent wage increase effective June 1 has been announced by the Tennessee Coal, Iron & Railroad Co. to its miners in Alabama (Vol. 21, No. 22, p. 934).

May 24—A. M. Ogle elected president of National Coal Assn. at annual convention in Chicago indicates association will take a hand in labor problems hereafter, though it will not attempt to make wage agreements (Vol. 21, No. 22, p. 935).

May 25—Anthracite miners reject operators' proposal of 18 per cent wage reduction and reassert original demands thus lessening chances of succes at the miner-operator New York conference (Vol. 21, No. 22, p. 933).

May 27—President Farrington of the Illinois miners finally says "No" to the operators pressing him for a single-state wage conference. He admits frankly he cannot do it until the international union permits, which obviously means Lewis, has at last whipped him into line (Vol. 21, No. 22, p. 934).

May 27—William Blizzard is acquitted of treason arising out of miners' armed march on Logan county, W. Va., last fall. His is first trial of several hundred miners indicted on various charges (Vol. 21, No. 22, p. 936).

May 29—Coal market drops back and prices recede so that *Coal Age* Index now stands at 269. Hoover influence for lower prices and refusal of buyers to go on buying at the peak is knocking prices down (Vol. 21, No. 22, p. 938).

May 31—Secretary Hoover in price conference tells operators there can be no agreement among themselves under the law to keep prices down and that there is no law to furnish profiteers but asks operators to informally assure him Garfield prices, run of mine basis be maintained or maximum with committees in each district to see to it and report offenders. Operators all agree except in Western Kentucky (Vol. 21, No. 23, pp. 975-7).

June

June 1—Pennsylvania employment bureau says 5,000 more miners went back to work in Central Pennsylvania during May. Several Connellsville mines now on normal basis (Vol. 21, No. 24, pp. 1019-20).

June 1—American Wholesale Coal Assn. in annual convention chafes at Hoover price control. No definite decision made as to whether George H. Cushing will be retained as managing director. Seth Morton of Albany is elected president (Vol. 21, No. 23, p. 971).

June 2—Anthracite operators propose arbitration since all direct negotiations have failed to settle upon a new agreement (Vol. 21, No. 23, p. 978).

June 2—Retailers in various centers charge Hoover with hoisting prices by setting a maximum which has come to be a minimum as well and says smokeless that sold for $1.75 now sells for $3.50. This stirs up Senator Borah and others to talk of an investigation (Vol. 21, No. 24, p. 1015).

June 3—Signs of union weakening are seen in statements by William Petry of West Virginia and P. T. Fogan of Pennsylvania union vice-presidents, who say miner-operator conference "by June 15" is to be held and they prophesy

strike will end within 30 days (Vol. 21, No. 23, p. 978).

June 5—Supreme Court unanimously decides Coronado Coal Co. cannot collect strike damages from the miner's union thus reversing lower court, but establishes fact that unions can be sued in federal court for violation of law. In this case the union's responsibility for strike damages to property was not proven (Vol. 21, No. 23, p. 974).

June 5—Coal loaders are driven from slack pile at New Straitsville and attacking party of 200 or more men, shoot one man and injure others in first violence in Hocking Valley field. Judge enjoins union from interfering with work at strip pits (Vol. 22, No. 2, p. 68).

June 5—Coronado Coal Co. gets Supreme Court permission to petition for a reargument of the case against the U. M. W. of A. for strike damages to property (Vol. 21, No. 24, p. 1016).

June 5—Majority of Nova Scotian arbitration board proposes 20 per cent reduction in miners' wages to $3 a day. Minority report signed only by miner representative favors $3.45 (Vol. 21, No. 23, p. 979).

June 6—Homer D. Jones, president of National Retail Coal Merchants' Assn., writes Hoover the price protest of retailers. Hoover replies (June 9) that $1.75 pre-strike price retailers cite is not lump coal such as they sell mainly. Lump price was $3.25 so that increase really is 25 cents not $1.75. Hoover further urges these plans upon retailers a. All coal be sold at cost plus reasonable handling charge. b. Reserve cheap, pre-strike stocks for small household trade. c. Supply large trade from current purchases. d. Co-operate to restrain prices by not buying from mines that exceed Garfield scale. e. Handle coal straight to consumer without speculation (Vol. 21, No. 24, pp. 1015-6).

June 7—Anthracite scale committee decides to reject operators' arbitration plan (Vol. 21, No. 24, p. 1019).

June 9—Utah deputies withdrawn from strike fields duty and no troops are sent in. Foreigners have not generally obeyed governor's order to turn in their firearms (Vol. 21, No. 24, p. 1032).

June 9—Policemen employed by Vinton Colliery Co. at Vintondale, Pa., indicted for assault and battery in preventing public meeting run by A. G. Hays of New York, who tried to hold such a meeting as a test case. He sues Vinton Collieries Co. for $35,000 damages (Vol. 21, No. 24, p. 1021).

June 10—Secretary Hoover tired of politics played by retailers calls upon Roderick Stephens, chairman of the board of directors of the National Retail Coal Merchants' Assn., to "do away with disputes on trivial questions and enter into co-operation with me" (Vol. 21, No. 24, p. 1016).

June 10—District Court in New York decides against five debtor firms in Tidewater Coal Exchange case finding them owing creditor members as follows: Archibald McNeil & Sons Co., $198,000; Johnstown Coal & Coke Co., $17,000; New York & Philadelphia Coal & Coke Co., $11,500; West Virginia & Pennsylvania Coal Co., $72,000; Morrisdale Coal Co., $34,000 (Vol. 21, No. 24, p. 1020).

June 15—Retailers in most regions of the country agree in session at Washington to support Hoover price control plan (Vol. 21, No. 25, p. 1057).

June 16—Illinois & Wisconsin Retail Coal Dealers' Assn., in convention at Lake Delevan, Wis., call upon Hoover to "adjust incorrect and misleading reports" about prices the country over (Vol. 21, No. 25, p. 1059).

June 16—First Illinois coal production of the summer takes place at Herrin strip mine of Southern Illinois Coal Co. now loading coal under heavy guard but without disturbance (Vol. 21, No. 25, p. 1060).

June 16—Utah national guard goes on duty after train is shot up and mine manager wounded. Troops are rounding up armed strikers (Vol. 21, No. 25, p. 1061).

June 16—I. C. C. finally gives Henry Ford right to reduce coal freight rates on D. T. & I. Ry. (Vol. 21, No. 25, p. 1061).

June 17—Vinton Colliery Co at Vintondale, Pa., wins right of supersedeas nullifying injunction miners got to prevent company police from interfering with public meetings (Vol. 21, No. 25, p. 1057).

June 17—Various attacks have been made during the past week on little mines still operating in Indiana (Vol. 21, No. 25, p. 1060).

June 17—Illinois and Indiana operators flatly deny they will go into a four-state conference now (Vol. 21, No. 25, p. 1060).

June 20—Conciliation board in Western Canada recommends reduction of 30 per cent in miners' wages (Vol. 21, No. 26, p. 1100).

June 21—Judge McClintic issues injunction against 149 union men and officials stopping them from practicing intimidation on men working in mines of 70 coal companies in Kanawha field of West Virginia (Vol. 21, No. 26, p. 1101).

June 22—Herrin massacre takes place. Nineteen non-union miners and guards of strip mine killed and many more wounded after mob lays siege to Southern Illinois Coal Co.'s property. A. M. Ogle, president of National Coal Assn., blames John Lewis for inciting miners by wire (Vol. 21, No. 26, pp. 1097-9).

June 23—Two strikers are killed near Clarksburg, W. Va., in fight between union men and guards of non-union miners. However, 177 more mines reopen during latter part of June in Northern West Virginia (Vol. 21, No. 26, p. 1099).

June 24—Pennsylvania supreme court decides that anthracite tax is constitutional (Vol. 21, No. 26, p. 1100).

June 24—Julius Barnes, president of the U. S. Chamber of Commerce asks 1,400 member business organizations to help prevent runaway coal market by making fuel surveys and otherwise co-operating with Hoover (Vol. 21, No. 26, p. 1101).

June 26—President Lewis of miners' union, confers with President Harding and Secretary of Labor Davis. Lewis made the only statement merely saying the situation had been reviewed. Speculation is rife as to possible White House effort to end strike (Vol. 21, No. 26, p. 1101).

June 26—Market jumps up and down in uncertainty with prices generally shading upward. Western Kentucky coal begins to climb notably. Average coal price throughout the country is now $3.44 (Vol. 21, No. 26, p. 1102).

June 30—Pennsylvania Dept. of Labor and Industry in vain offers its services to arbitrate both anthracite and bituminous coal strikes there (Vol. 22, No. 1, p. 25).

July

July 1—Miners at Iverness Coal Co. at Iverness, N. S., threaten strike if wages are cut. Arbitration board is named (Vol. 22, No. 2, p. 68).

July 1—Kentucky-Tennessee Coal Operators Assn. elects J. E. McCoy secretary after his 12 years with Southern Appalachian Assn. (Vol. 22, No. 2, p. 66).

July 1—Wholesalers in an around Cincinnati protest to Hoover because operators in Kentucky take full Hoover price leaving them no margin (Vol. 22, No. 1, p. 24).

July 1—Railway shop men all over the country strike but without any immediate effect on coal shipment.

July 1—President Harding calls operators and miners into conference at the White House. They accomplish nothing on Saturday. Resume Sunday and then adjourn to July 10. Secretaries Hoover and Davis take part (Vol. 22, No. 1, p. 27).

July 1—Anthracite operators and miners meet Secretary Fall who said coal industry should be regulated as a public utility and that government is prepared to fix price of coal to return fair income in investment (Vol. 22, No. 1, p. 27).

July 1—W. B. Reed resigns as secretary of National Coal Assn. to set up in business as expert on mine taxation and accounting (Vol. 22, No. 1, p. 29).

July 1—Union commissaries and bread lines are opened in Terra Haute, Clinton and other Indiana coal mining centers (Vol. 22, No. 1, p. 26).

July 2—Rep. Denison of Illinois explains Herrin massacre as result of miners' reason giving way to passion when mining company violated agreement and imported strike-breakers (Vol. 22, No. 1, p. 24).

July 2—Adjt.-Gen. Hamrock of Colorado, charges Lieut.-Gov. Cooley with addressing mass meeting of striking miners when Gov. Shoup had ordered that no such meetings be held. Gov. Shoup hurries back from vacation (Vol. 22, No. 2, p. 68).

July 2—J. B. McLachlan, secretary-treasurer of the Maritime district of U. M. W. of A., in Nova Scotia, publicly condemns President Baxter for "selling out" the union in the agreement Baxter signed for Nova Scotia. Baxter calls McLachlan a bolshevik (Vol. 22, No. 2, p. 25).

July 2—Smokeless mines of West Virginia now producing at the rate of 3,000,000 tons a month. The Pocahontas field is mining 70,000 tons a day, Winding Gulf, 20,000; New River and Tug River, 20,000 each (Vol. 22, No. 1, p. 26).

July 3—Operators at White House conference propose: (1) Negotiations by districts, (2) Six miners and six operators redistrict the country, (3) Arbitration by districts, (4) President appoint arbitration board of three disinterested men for each district, (5) President name a general investigation board, (6) New wage scales be made by July 15 or referred to district arbitration boards who must report by Aug. 1, (7) U. S. Attorney General pass on legality of this method of settlement (Vol. 22, No. 2, p. 65).

July 5—Howat men in Kansas offer to go back to work seeing opportunity thus to gain reinstatement as union men (Vol. 22, No. 2, p. 68).

July 6—Operators but no miners attend Pennsylvania State Commissioner of Labor Connelley's peace meeting. Operators are for separate district wage agreements (Vol. 22, No. 3, p. 105).

July 6—International Ladies Garment Workers Union votes $100,000 to aid miners (Vol. 22, No. 2, p. 68).

July 7—President Farrington of Illinois miners gets authority from his executive board to call special convention for that state. Illinois operators disclaim any knowledge of what he is going to do (Vol. 22, No. 2, p. 67).

July 9—Union orders interference with pump men in Illinois mines stopped. Companies have been using clerks and other "company men" on such work (Vol. 22, No. 2, p. 67).

July 10—President Harding, seeing the miner-operator conference at the White House is deadlocked, proposes resumption of work at old scale until Aug. 10, while commission of three miners, three operators and five to be named by President works out new scale and makes exhaustive investigation of entire coal industry. President Lewis asked until July 17 to answer after miners whole scale committee assembled in Washington (Vol. 22, No. 2, p. 63).

July 12—Illinois appears to be preparing at last to do something about the Herrin massacre. Atty.-Gen. Brundage offers $1,000 for incriminating evidence and spends two days in Williamson county declaring afterward that he had valuable information (Vol. 22, No. 3, p. 106).

July 12—Shop crafts' strike begins to cripple coal transportation at strategic points on T. & N. and C. & O. (Vol. 22, No. 3, p. 106).

July 15—West Virginia fields produce more than they ever did in their history. Logan, Tug River, Kenova-Thacker and Pocahontas fields exceed normal by 20 per cent or more (Vol. 22, No. 3, p. 106).

July 17—President's conference fails. Miners refuse his proposal to go back to work at the old scale pending formation of new scale by commission. Majority of operators accept but Pittsburgh Operators' Assn., Central Coal Assn., and Indiana operators decline. Operators' majority decision made after most acrimonious series of meetings in coal history. President in disappointment, "invites" all parties to go home and resume operations, a thing which of course none do (Vol. 22, No. 3, 99-100).

(To be continued.)

Asks Legislative Policy to Extend Railroad Credit As Remedy for Coal Problem

The American Railroad Association has made a report to the U. S. Coal Commission in which is discussed some of the problems of the carriers in relation to the production and distribution of coal. The report was prepared by a special committee of which J. E. Roberts of Albany, N. Y., superintendent of transportation of the Delaware & Hudson Co., is chairman.

"We have endeavored to inform the commission as to the causes of the trouble, so far as the railroads are factors in the situation," the report says. "We have set out some facts as to the extent of car shortages in times of peak demand, and have stated our views as to certain suggested remedial measures. We feel that the real remedy is to be found in the adoption by the American people, speaking through legislative bodies and regulating commissions, of policies which will bring about:

"(1) Such an attitude toward the railroads as will convince the public that money invested in railroads will receive a fair return, thereby strengthening railroad credit and making it possible to increase railroad facilities so as to care for the growing transportation needs of the country.

"(2) Peace in the coal industry and in the railroad industry, with such relations between employers and employees as will prevent strikes, the fruitful cause of interrupted production and restricted transportation.

"It has been intimated that an immediate contributing cause of difficulty is found in 'inadequate transportation facilities.' To what extent the conditions which create this impression are attributable to the abnormal overexpansion of the coal industry by the uneconomic multiplication of mine operations it is not our province to determine. It is enough to point out that there is an immediate demand on the part of an important section of the shipping public for additional rail transportation facilities; and, furthermore, the growth of the country and the increase of its commerce would, in themselves, constitute sufficient reasons for developing the carriers' facilities to meet the demands which are sure to be made upon them. But this can be done only by the investment of additional capital, and additional capital can be secured only by the reasonable assurance of a fair return, and this assurance will not exist unless the investing public has reason to expect from the government a liberal, and not a repressive attitude."

The report calls attention to the fact that in 1920 a total of 14,766 bituminous-coal mines were in operation, an increase of 154 per cent over the total number in operation in 1910, while coal production increased only 37 per cent. "This shows a continual decrease in the production per mine," the report says. "Had the 1910 tonnage production per mine been maintained in 1920, the tonnage of that year could have been produced by 7,950 mines instead of 14,766.

"This means that the railroads were called upon to divide the available cars among 6,800 more mines in 1920 than would have been necessary had the average production per mine been maintained on the 1910 basis. Expressed in another way, it meant that the 150,000,000 tons by which the coal production in 1920 exceeded 1910 was gathered from 6,800 additional mines, calling for vastly increased motive power, coal-car supply and man-power for the railroads to serve them all.

"While complete statistics for 1922 are not as yet available, such information as it has in hand justified the conclusion that this tendency toward inflation of the bituminous-coal industry continues.

"The expansion was not confined to the increase in number of mines. The number of cars ordered, based on the rated ability of the mines to produce coal, kept pace with the increase in number of mines, until for the year 1920 the mines ordered cars sufficient to load 830,000,000 tons, which was 46 per cent more than the total consumption of the country.

"In October and November, 1922, after the mines got fully under way following the miners' strike, the mines of the United States ordered cars for 165,000,000 tons, which was at the rate of approximately 1,000,000,000 tons per annum, or at the rate of twice the annual consumption of the country.

"The outstanding feature is the enormous increase in the number of mines contrasted with the relatively small increase in production, and is, we believe, a prime factor contributing to the plight in which the bituminous coal industry and the country finds itself at this time.

"It has been shown that the coal produced increased from 1910 to 1920 37 per cent while the number of mines increased 154 per cent, requiring a greater amount of transportation service. To meet this increased demand the railroads provided additional coal cars, with an increased aggregate tonnage capacity of 42½ per cent, in comparison with an increase of coal tonnage produced of 37 per cent. In addition, the aggregate tractive effort of the motive power provided by the railroads increased 53.1 per cent. Furthermore, the investment in road and equipment, for the purposes of coal and other traffic, increased 39.7 per cent.

"It is therefore pleasing to note the increase in transportation efficiency from the fact that a greater transportation capacity was provided with a minimum increase in individual units. It further indicates an economical policy in providing transportation facilities.

"The results of this policy are to be found in the freight transportation service rendered by the railways during this same period, for in 1920 they handled an increase in freight traffic of 62½ per cent, measured in net ton miles, compared with 1911. This increased freight service in 1920 was accomplished with an actual decrease in the number of freight train miles, while there was an increase over 1911 of 46 per cent in the average train load."

Strikes Have Been Disturbing Factor

The report points out that strikes among certain classes of railroad employees, miners, longshoremen, lake seamen and tugboat men "have all been potent factors in disrupting the orderly and regular flow of coal from producing centers to their normal markets."

"This has thrown undue and abnormal strains upon transportation facilities," the report added, "causing congestion of railway channels and gateways which decidedly slowed up movement of loaded and empty coal cars through such congested channels and gateways, causing great loss of car utilization and decreasing the number of cars available. It will thus be seen that general car-shortage periods are usually related closely to major industrial disturbances.

"It seems that the railways have fairly kept pace with the increase in coal production, but even with such additions and improvement they are unable to provide adequate service to accommodate a sporadic expansion and contraction of the coal industry such as has existed in recent years.

"Notwithstanding the fact that, as shown by the foregoing figures, railroad facilities have increased in greater ratio than coal tonnage, and in spite of the fact that there have been frequent periods when a substantial portion of the carriers' equipment has been stored for lack of traffic, it has also happened that the carriers have been unable to furnish transportation service for the traffic currently offered. In such situations the public insistently contends, as in fact the bituminous-coal operators are doing at the present time, that the facilities of the carriers are inadequate. It is, of course, certain that the commerce of the country will increase with resulting increase of traffic, and that periods will continue to recur when the railroads will be unable, as heretofore from time to time, to transport traffic as offered. If the public desires such service, it is obvious that the facilities of the carriers will have to be substantially increased in order to enable them to meet the public demand, which increase will be possible only in the event that railroad credit is strengthened and a more liberal treatment extended than has heretofore prevailed."

Operator-Road Cenferees Favor Mine-Rating Rules on Each Road to Fit Conditions

After several days' consultation the joint committee of operators and representatives of the railroads called to consider the formulation of recommendations to the Interstate Commerce Commission on the subject of mine-rating and car-distribution rules brought its labors to a conclusion on Jan. 12 and made the following report to Commissioner Aitchison:

"After consideration of the various mine-rating plans submitted by the different railroads and operators throughout the country, and in the light of the record now before the commission, the following was adopted by the joint committee of coal operators and railroad representatives today:

"After carefully studying the mine-rating plans submitted by different railroads and operators throughout the country, we think no set of specific rules can be formulated that would be equitable, just and uniformly applicable to all localities and all railroads, and it is proposed that each carrier or carriers in co-operation with the coal operators along the lines of said carrier or carriers adopt a set of mine-rating rules that will be workable on their railroads, which shall be predicated upon the following:

"(1) That the carriers individually or collectively shall establish and maintain mine-rating and inspection bureaus, or similar agencies, composed of officers or employees exclusively in the employ of the railroads.

"(2) It shall be the duty of this bureau, or agency, in order to prevent the undue inflation of mine rating, in determining the rating of the respective coal mines, to take into consideration the following basic principles: (a) Physical conditions; (b) past performance; (c) labor supply; (d) other factors that may affect the production and shipment of coal.

"(3) There are several codes of distribution rules now before the Interstate Commerce Commission for their consideration, none of which vary materially in fundamentals and which can be generally applied in connection with the proposed mine-rating principles outlined above.

"This is respectfully submitted by the joint committees of coal operators and representatives of coal originating railroads to the Interstate Commerce Commission for their tentative approval."

The coal operators added the following:

"Referring to the attached with reference to the joint conference of the committees representing the coal industry and the railroads, with respect to mine-rating and car-distribution rules:

"It was thoroughly understood, particularly after you addressed the meeting, that the principal objects of the conference should be to make an effort to find some way to prevent the inflation of mine rating in times of car shortage.

"Several codes of mine-rating rules were before the conference. These included all those submitted to the commission during the recent hearing and there was also called for any new suggestion that anyone had to offer, but no new code of rules was presented. There was advanced modifications of some of the rules that had heretofore been submitted for consideration. As the conference progressed and after those present had full opportunity to express their views on every angle of the situation it became clearly evident that none of the rules as written could be satisfactorily applied for the entire country. The operators on the Norfolk & Western made the very definite statement that they were entirely satisfied with the Norfolk & Western plan, that it had worked out satisfactorily to them and that they did not want it changed. The Indiana operators advised that they were entirely satisfied with the round-robin system in operation in that state. There, of course, by an arrangement between the mine workers themselves, all of whom are unionized, they do not go to work unless the car supply is at the mine, so there is not the opportunity for their loading up on a day on which no cars are furnished a lot of mine cars to make a better showing on a day that they do receive the cars. As near as could be ascertained this condition does not exist in any other territory to this same degree.

"Neither the Colorado operators nor the railroad representatives from the territory were present, but they all favor the idle-hour system in effect in Colorado and want to work in accord with that plan.

"Therefore, it finally developed that it was impossible at this time to make effective, by agreement, a uniform code of mine-rating rules that would be applicable to all the varying conditions in the varying territories.

"All in attendance at the meeting appeared to be strongly in favor of some method by which the inflation of mine rating could be prevented and an agreement was finally unanimously reached as to the adoption of the basic principles for establishing any system of mine rating. Particular attention is directed to that part of the attached referring to mine-rating and inspection bureaus. This would in reality be a sort of police system for not only rating the mines but checking the mines from time to time in an effort to prevent inflation.

"It was the unanimous opinion of the railroad representatives and the opinion apparently of the great majority of the coal operators present that in making any rating rules the present rules which gave development mines a preferential car supply should not be rewritten in the new rules but that this feature should be left to the mine-rating or service bureaus and each new operation should be rated strictly on its merits.

"For purposes of the record, the National Coal Association wish to state that a number of the representatives of the various territories in attendance at this meeting were not members of their association. We make this explanation so that it may be understood that this meeting was as nearly as possible representative of the entire country and not of any particular association."

Defence at Herrin Assails State Witnesses; Many Who Have Testified Threatened

The first case growing out of the Herrin massacre of June 22 is rapidly drawing to a close. The defence had practically all of its case in when court adjourned Saturday noon until Monday. The main effort all week had been to cast all sorts of reflections upon the veracity of the state's best witnesses who have testified that Otis Clark, one of the present five defendants, made an inflammatory speech to the mob which led 68 non-union captives from the Lester strip mine near Herrin, Ill., after the siege, and that Clark was one of two men who led crippled C. K. McDowell, mine superintendent, down a road and shot him and that the other four defendants played leading parts in the massacre. The defense witnesses also have testified that Clark was not at the place where McDowell was killed nor at the spot where the prisoners were shot to pieces running for their lives through a barbed-wire fence. These witnesses have been more or less in doubt about several points under cross questioning. All of them have said they knew not a man in the mob.

Dire threats have been laid at the doors of five or six of the principal state's witnesses in the form of letters accompanied by pieces of hangman's rope. They demand that the witnesses retract their testimony or be killed. The union organization, which is defending the whole case, declares this would-be campaign of frightfulness must be the work of "reds" outside the union who wish to throw all the discredit they can upon unionism. The business and professional practice of state's witnesses in the town of Herrin have suffered greatly since the trial started.

The defence has asked for the list of the indicted men whom the state proposes trying for the murder of John Shoemaker. That case will follow the present one. The state says it cannot be sure of the list until it learns the outcome of this first trial.

The State of Illinois is about to put $75,000 in the hands of Attorney General Brundage to prosecute the case further. A bill carrying such an appropriation has already been approved by the Senate Committee on Appropriations. Before the Attorney General began working on the case last summer, he had no funds and the Illinois Chamber of Commerce raised approximately $50,000 for him by solicitation through the chambers of commerce throughout the state.

Expect Contracts to Be Signed When U. S. Guarantees Immunity from Prosecution.

The West believes now that the present contract with mine-union labor will be signed for another year, as the United States Coal Commission requested. There is no doubt that negotiations toward that end will be begun at New York soon after the miner-operator conference starting Jan. 18. Illinois on Wednesday, Jan. 10, accepted the invitation to the meeting and Indiana's scale committee of operators is all ready to start. But there are obstacles to be overcome. The contract is not yet signed.

The main obstacle is the ever-present danger of federal prosecution of both miners and operators for making contracts on the four-state basis which the commission now favors. Both Indiana and Illinois go into the New York conference ready to sign if government sanction is given. The operators are by no means clear in their own minds about who is to give such sanction and guarantee it to hold water.

If President Harding could go to Congress and "get authority within twenty-four hours" to seize the coal mines of the country, as he threatened last summer, it is supposed he can now go to Congress and, within about the same length of time, get immunity from prosecution assured to operators and miners who do as the commission suggests. The New York conference will try to determine whether the President should be asked to do it or whether immunity should be obtained from some other official source.

While many other debatable points may arise in the conference, especially if the miners insist upon a contract for two years instead of one, the immunity question is expected to be the main one.

As operators gather in New York in advance of the meeting the opinion is more or less freely expressed that the commission has helped the operators out of a hole, although many are dissatisfied to have the government assume any position in the matter. Operators are saying that they would have had slim chance of winning a strike in 1923, after what happened in 1922, and to have the Coal Commission step in and assume the responsibility for holding wages up another year relieves them from the task of giving in or starting a hopeless fight.

In the East the union operators are expecting a very dull market this summer, with a repetition of strenuous non-union competition paralleling that of 1921. This they say means union mines closed down in every field. It is asserted that it is cheaper to close a mine down without a strike than with one, and if the union insists on its present wage scale, it may have it, without the work. There seems to be no one who now expects a strike this year.

The telegram from John Lewis and Philip Penna, dated Jan. 8, calling the meeting of the operators and miners of the old Central Competitive Field in New York on Jan. 18, follows:

"Acting, as we believe, in the interest of the coal industry and in accordance with sound public policy, the undersigned individuals request that a joint conference of the accredited representatives of the operators and miners of the Central Competitive Field, including western Pennsylvania, Ohio, Indiana and Illinois, meet at the Pennsylvania Hotel, New York City, at 11 o'clock a.m., Jan. 18, 1923, for the purpose of negotiating a wage contract effective April 1, 1923.

"We suggest that the representation be as in our previous interstate conferences—eight operators and eight miners from each of the four states. Kindly reply by wire to P. H. Penna, Opera House Block, Terre Haute, Ind., advising of the action taken upon this request."

Harry N. Taylor Succeeds G. F. Getz as President of U. S. Distributing Corp.

Harry N. Taylor, vice-president of the Central Coal & Coke Co., of Kansas City, Mo., has been made president of the United States Distributing Corporation and will soon establish offices in New York and Chicago. George F. Getz, head of the Globe Coal Co., one of the biggest Chicago coal jobbing houses, who has directed the corporation for three years as president and chairman of the board of directors, retains the chairmanship and will give much less of his time to the organization. Mr. Taylor, who resigns as vice-president of the Central Coal & Coke Co., also resigns the presidency of the Southwest Interstate Coal Operators Association and completely severs his active connection with coal operation in the Kansas and Oklahoma field, where he has been a dominant factor for years. Previously he operated in northern Illinois and Iowa.

Mr. Taylor has spent 40 years in the coal business, beginning with the Sunday Creek Coal Co., of Columbus, Ohio. He was at one time president of the National Coal Association. For years Mr. Taylor's voice has been heard with respect in the labor councils of the coal industry.

The United States Distributing Corporation was organized several years ago by the late Francis W. Peabody, of Chicago, and a group of associates including Mr. Getz; Fred W. Upham, president of the Consumers Co., the largest retail coal organization in Chicago, and coal and financial men in New York and elsewhere. The corporation is a financing organization designed to finance and link up various enterprises directly or indirectly concerned with coal. Beginning with a capital of several million dollars it now has heavy investments and controls several coal interests as well as the United States Trucking Corporation of New York City.

General Goethals Succeeds W. H. Woodin As New York Fuel Administrator

General George W. Goethals, builder of the Panama Canal, was named as State Fuel Administrator of New York by Governor Alfred E. Smith on Jan. 9 to succeed William H. Woodin. He was sworn in the following day and immediately assumed the duties of the office. General Goethals will receive a salary of $2,500 per month.

General Goethals announced that he contemplated making no changes in the personnel of the Fuel Administrator's office except in one or two instances where the officers have insisted upon being relieved. He said he expected to continue the policy followed by Mr. Woodin.

Colonel William J. Donovan, of Buffalo, who was counsel to the Fuel Administration, resigned and was succeeded by Colonel C. W. Wickersham.

General Goethals, accompanied by Mr. Woodin, went to Philadelphia on Jan. 12 to have a conference with E. W. Parker, of the Anthracite Distribution Committee.

I. C. C. Amends Service Order 32

The Interstate Commerce Commission has issued amendment No. 1 to its Service Order No. 32, authorizing the Pennsylvania R.R. to assign hopper-bottom cars to the No 5 mine of the Arrow Coal Mining Co. at Reitz, Pa., at the rate of five cars per day for five consecutive days. The cars are to be consigned to the Government Fuel Yards and are not to be counted against the distributive share of the mine.

In notifying F. R. Wadleigh of his appointment as Federal Fuel Distributor, the President wrote: "The resignation of C. E. Spens as Federal Fuel Distributor becomes effective Jan. 1, and I am writing to notify you of your appointment as Federal Fuel Distributor to succeed to the duties heretofore performed by Mr. Spens. Your appointment is in conformity with the act of Congress of Sept. 22, 1922. Your services as assistant to the Federal Fuel Distributor have already acquainted you with the policy of the government in keeping that service in touch with the Secretary of Commerce and the Interstate Commerce Commission. You will, of course, maintain this intimate relationship as heretofore."

Directors of the National Coal Association and operators from many fields met in New York on Tuesday, Jan. 16 Routine business was transacted.

Coal Commission to Report Again March 15; Public Hearings to Be Held Soon

With its Jan. 15 report behind it, the President's Coal Commission now is concentrating its attention on the public hearings which it will hold in the near future. Matters pertaining to the scope, time and places of these hearings are now occupying the commission.

It was revealed on Jan. 13 that further tentative reports are to be forthcoming. The next report to the President and to Congress will be made on March 15. It is anticipated that it will be possible to include in that report some pertinent data as to wages and earnings. Another of the series of reports will go into the matter of profits, Chairman Hammond declared.

Returns now have been received from 40 per cent of the bituminous production, Mr. Hammond stated. There has been little or no protest on the part of the producers, he asserted, despite the fact that the compilation of the facts and figures for these questionnaires is an onerous task.

The commission regards the matter of restricting anthracite exports as coming under the jurisdiction of the Federal Fuel Distributor. This question has not been brought officially before the commission, however.

Fuel Administrators Warn Coal Buyers

As a warning to prospective purchasers of coal that they should assure themselves of the responsibility and standing of concerns offering coal for sale and shipment, F. R. Wadleigh, Federal Fuel Distributor, has made public the following correspondence with the chairman of the Pennsylvania Fuel Commission in regard to reports which have been received of the shipment of unmerchantable coal. Under date of Jan. 2, 1923, Mr. Wadleigh wrote W. D. B. Ainey as follows:

"Recently this office has received reports of the shipment of anthracite of unmerchantable quality, largely composed of slate, bone, clinkers and other foreign matter, apparently made by irresponsible and unscrupulous people. Assuming the accuracy of these reports, such acts constitute not only a violation of the law but indicate a particularly heartless attitude on the part of the persons guilty of such violation in taking advantage of the public during the national emergency in fuel supply. Innocent consumers who are furnished worthless coal on orders placed in good faith may be subject to great physical suffering in addition to pecuniary loss in the inevitable delay involved in procuring a supply of domestic coal of proper quality to replace deliveries of worthless fuel.

"In view of the gravity of the offenses reported, I am sure that you will agree with me that everything possible should be done not only to punish those guilty of such acts, but also to forestall the possibility of a repetition by warning prospective purchasers of coal to take the proper steps to assure themselves of the responsibility and reputation of any concern offering coal for sale before purchasing."

Mr. Ainey replied as follows on Jan. 10:

"Numerous complaints have come to this commission with respect to coal being offered for sale and delivery, the quality of which is such as to make it objectionable and unmerchantable.

"In every instance thus far brought to my attention, the coal was sold by companies who are not operating and whose names do no appear upon our list of coal companies of Pennsylvania. In order that the public may be protected from making purchases from unreliable dealers or jobbers, it occurs to me that a warning may with propriety be given by the Fuel Administrators of the several states against making purchases from people or alleged coal companies without some investigation or inquiries through the State Fuel Commission as to the standing of these people.

"We have now located in the field inspectors from our Bureau of Mines to check up the quality of coal put out as loaded in the car, and are doing everything that we reasonably can to protect our sister states and ourselves from exploiters. It is difficult to check those who are taking advantage of the public's necessities in the way indicated, and while our efforts will not be relaxed they can be made more efficacious if greater care will be exercised on the part of the purchasers.

"P.S.—Above letter sent to all State Fuel Administrators."

The Pennsylvania Fuel Commission has requested the Attorney General of Pennsylvania to investigate the activities of these shippers of unmerchantable coal and to look into the legal aspects of the whole matter.

Would Exempt from Taxes Coal in Storage

A resolution was introduced in the House of Representatives last week by Representative Appleby, Republican, of New Jersey, requesting the several states to take appropriate action through their legislators to exempt from taxation all fuel of any kind and character in storage within the limits of those states.

The resolution recites that "The fuel shortage in practically every section of the United States is becoming constantly more acute; conditions are such as to clearly indicate some practical steps must be taken toward the accumulation of reserves of fuel necessary to stabilize industry and protect the consumer in periods of acute shortages. It is evident that the seasonal demand for coal can, to a great extent, be met by storage at points near large centers of consumption. The practice of distributing agencies, railroad companies, corporations and individuals in storing large quantities of coal during the summer months in anticipation of future demand has practically been discontinued, largely because of the imposition of local taxes upon such storage stocks. The resumption of the practice of creating great storage piles of coal would establish valuable balance wheels to the trade and facilitate steadiness of operation of the mines, as well as assuring adequate sources of supply for seasonal demand."

Hazard Operators Hold Annual Convention

Although the all-day meeting was concluded with a big banquet in which everything was forgotten except fun, the 200 coal operators who attended the annual convention of the Hazard Coal Operators' Exchange at Lexington, Ky., on Friday, Jan. 12, spent most of their time discussing the extreme car shortage which has curtailed production in the Hazard field for many months.

Congestion of Louisville & Nashville cars at Covington and other Ohio River points has become so acute that the railroad is able to supply only 15 or 20 per cent of the demand and the mines are working only one or two days a week.

J. E. Johnson, of Lexington, was elected president and secretary of the organization, with J. T. Hatfield, of Cincinnati, vice-president and E. E. Bullock, treasurer.

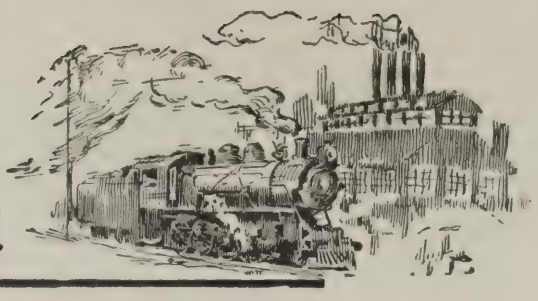
The newly-chosen executive committee is as follows: Carol Robinson, Lexington; William J. Brown, Jr., Lexington; S. R. Jennings, Johnson City, Tenn.; J. H. Bowling, Lexington; Henry Pfenning, Lexington; James Bonneyman, Cincinnati; H. K. English, Lexington; Prentice Burlington, Cincinnati; W. E. Davis, Lexington; George W. Hay, Jenkins, Ky.; W. S. Dudley, Lexington; H. H. Heimer, Columbus, Ohio; A. L. Allais, Chicago, and G. P. Fitz, Hazard, Ky.

J. D. Haydon, superintendent of the eastern division of the Louisville & Nashville, was one of the principal speakers. On the program at the banquet were many prominent speakers and entertainers, including Governor Edwin P. Morrow, of Kentucky; Emery L. Frazier, Whitesburg, Ky.; Circuit Judge R. B. Roberts, Perry County; Prof. W. D. Funkhouser, of the University of Kentucky, and J. Edward Bassett, president of the Fayette National Bank, of Lexington.

That a large amount of development in the Kentucky river valley coal lands is being held up pending the return of railroad service to normal was the opinion generally expressed at the convention. Operators contemplating extension of their projects and outsiders contemplating entering the Hazard field are naturally reluctant to go deeply into coal propositions while the car shortage is so acute.



Production and the Market



Weekly Review

Markets are feeling the full effect of the holiday idleness and consequent heavy resumption of mining. Railroads made the most of the operating lull to clear away their line congestion of loads. These cars, together with the heavy tonnage produced during the first week of the year, moved to destinations in better time than for months. The larger receipts quickly eased the market tension of the last few weeks and lower prices resulted. *Coal Age* Index of spot bituminous prices receded 10 points last week and stood at 365 on Jan. 15, with a corresponding average price at the mines of $4.42 as compared with $4.54 the preceding Monday.

The strongest feature is the domestic market. Retailers are re-ordering promptly but report that the consumer demand is for smaller lots than formerly. The Western demand for Southern fuels is unabated, but movement in that direction is slow. A stronger Tidewater call has also diverted more tonnage to Hampton Roads, where coastwise prices on spot business recorded a stiff advance last week.

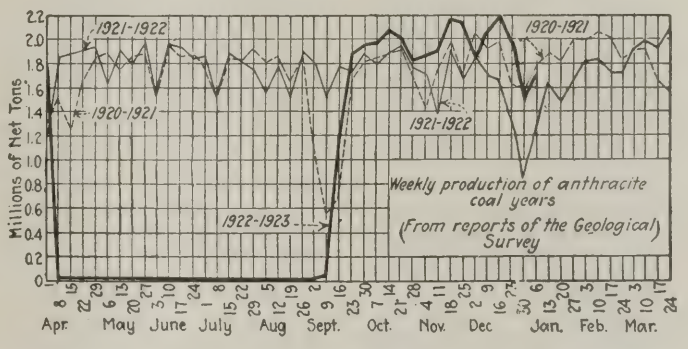
Demand Good But Not of High-Market Caliber

Demand continues fairly brisk but is not showing the tendency which makes for a high market. The better grades are still hard to obtain and are fairly firm in price. At the present rate of operations, railroads and contract users are taking so much of the total output that the volume of free tonnage is unusually small. Some anxiety is being shown over the labor situation. This is true among the large consumers in particular and with possible trouble less than 90 days off some of them admit they soon will have to change their buying policy to safeguard their operations.

American exporters are following with keen interest the developments of the French occupation of the Ruhr coal region in Germany. The possibility of a coal war between German producers and the French Government is absorbing their attention as it is realized that here may lie a temporary outlet for American coal. Should the price of German coal increase ever so slightly it will equal and even exceed the world price, which would release a flood of foreign coal into Hamburg.

Milder temperatures are the saving feature of the anthracite situation. With not enough coal to go around people manage to get along with the limited quantity available. The price list approved by the Pennsylvania Fuel Commission, which ranges up to $12, has caused some comment, especially as some quotations are heard at $13.25.

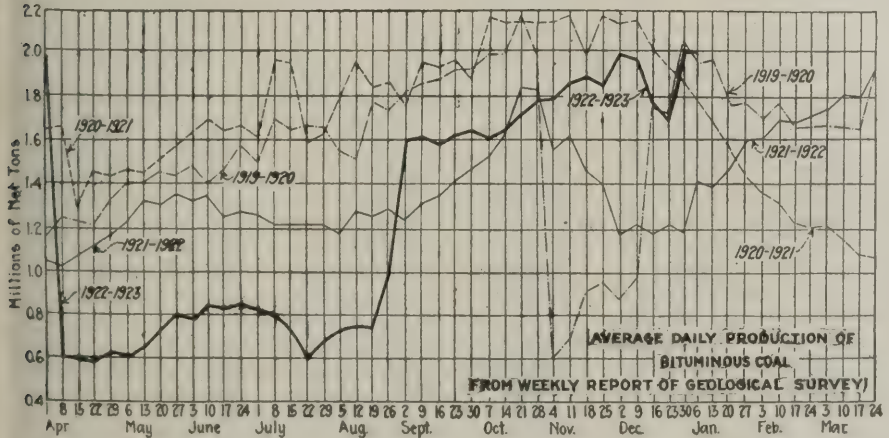
Shortage conditions are worse in New England and the Northwest than in other sections of the country. Only 69,000 tons of anthracite remains at the Head-of-



the-Lakes and this tonnage is all sold up. Blocking gales and snowstorms along the Atlantic Coast hinder the movement to New England and distributing companies are experiencing the worst delivery conditions in years.

The steam trade is now all that can be desired, as with so much buckwheat going into the retail trade, rice has come into strong demand, while barley has needed no urging at all for the past few weeks.

Blast furnaces are well supplied with Connellsville coke by contracts now running, most of them being for



Estimates of Production

(Net Tons)

	1921-1922	1922-1923
BITUMINOUS		
Dec. 23	7,450,000	10,031,000
Dec. 30 (*b*)	5,960,000	10,171,000
Jan. 6 (*a*)	7,460,000	10,895,000
Daily average	1,437,000	2,056,000
Calendar year	7,460,000	10,895,000
Daily av. cal. yr.	1,437,000	2,056,000
ANTHRACITE		
Dec. 23	1,320,000	2,028,000
Dec. 30 (*b*)	851,000	1,560,000
Jan. 6 (*a*)	1,242,000	1,725,600
Calendar year	1,242,000	1,725,000
COKE		
Dec. 30 (*b*)	103,000	263,000
Jan. 6 (*a*)	108,000	308,000
Calendar year	108,000	308,000

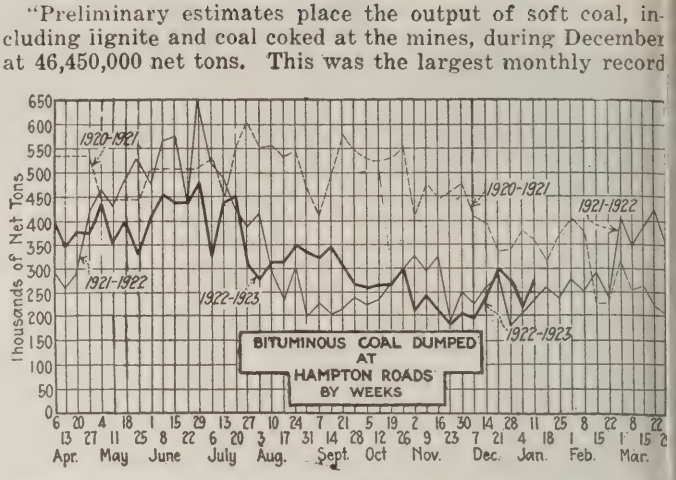
(*a*) Subject to revision. (*b*) Revised from last report.

the quarter. Only occasional purchases of spot or prompt coke would be made, and the furnaces are quite indisposed to pay the current market price. Foundries are buying sparingly, but are taking somewhat more tonnage than in December. As to coke for domestic use, the heavy buying movement from the East subsided recently, but there is still scattered buying. Coke below furnace grade has been well cleaned up.

BITUMINOUS

"Revised estimates of soft coal output in the week of Jan. 1-6, 1923, show a total of 10,895,000 net tons," says the Geological Survey. "Production on New Year's Day amounted to little more than one-fourth of the average for recent normal Mondays. On the following day the output rose to a high level which was sustained throughout the week by reason of the opportunity which the holiday afforded the railroads for bettering the service. According to preliminary reports of cars loaded during the second week in January that week opened with a large production, 45,238 cars loaded on Monday, but there was a sharp decline thereafter to 34,206 cars on Tuesday and to 31,491 cars on Thursday. The total output for the week is expected to be between 11,000,000 and 11,250,000 tons.

"Preliminary estimates place the output of soft coal, including lignite and coal coked at the mines, during December at 46,450,000 net tons. This was the largest monthly record



since March, 1922, and, in fact, it has been exceeded but once since December, 1920.

"The test of the sufficiency of production to meet requirements is the state of consumers' stocks. On Oct. 1, there was in commercial storage approximately 28,000,000 net

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Jan. 16 1922	Jan. 2 1923	Jan. 8 1923	Jan. 15 1923†
Smokeless lump	Columbus	$3.45	$7.25	$7.25	$6.75@$7.75
Smokeless mine run	Columbus	2.15	6.60	6.60	6.50@ 6.75
Smokeless screenings	Columbus	1.50	5.75	5.85	5.50@ 6.25
Smokeless lump	Chicago	3.10	7.75	7.75	7.50@ 8.00
Smokeless mine run	Chicago	2.50	6.60	6.35	6.25@ 6.50
Smokeless lump	Cincinnati	3.00	7.00	7.50	**7.00@ 8.50**
Smokeless mine run	Cincinnati	1.90	6.25	6.25	**6.25@ 6.50**
Smokeless screenings	Cincinnati	1.30	6.25	6.25	*6.00@ 6.25*
*Smokeless mine run	Boston	4.80	8.60	8.35	**8.50@ 9.00**
Clearfield mine run	Boston	2.05	5.10	5.10	*4.50@ 5.25*
Cambria mine run	Boston	2.45	5.50	5.60	*5.25@ 5.75*
Somerset mine run	Boston	1.80	5.35	5.35	*4.75@ 5.50*
Pool 1 (Navy Standard)	New York	3.00	.....	6.35	*5.50@ 6.00*
Pool 1 (Navy Standard)	Philadelphia	3.00	5.80	6.00	.....
Pool 1 (Navy Standard)	Baltimore	2.30	6.75	6.60	*6.00@ 6.25*
Pool 9 (Super. Low Vol.)	New York	2.25	5.75	5.85	*5.00@ 5.50*
Pool 9 (Super. Low Vol.)	Philadelphia	2.30	5.55	5.75	5.50@ 6.00
Pool 9 (Super. Low Vol.)	Baltimore	2.15	5.75	6.10	*5.50@ 6.00*
Pool 10 (H.Gr.Low Vol.)	New York	1.95	5.75	5.35	*4.50@ 5.00*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.00	5.10	5.25	5.15@ 5.40
Pool 10 (H.Gr.Low Vol.)	Baltimore	1.90	4.50	5.60	*5.00@ 5.40*
Pool 11 (Low Vol.)	New York	1.70	4.50	4.35	*4.00@ 4.50*
Pool 11 (Low Vol.)	Philadelphia	1.70	4.75	4.35	4.25@ 4.50
Pool 11 (Low Vol.)	Baltimore	1.80	4.35	5.00	*4.00@ 4.40*
High-Volatile Eastern					
Pool 54-64 (Gas and St.)	New York	1.45	.....	4.00	*3.50@ 3.75*
Pool 54-64 (Gas and St.)	Philadelphia	1.55	4.10	4.30	*4.10@ 4.25*
Pool 54-64 (Gas and St.)	Baltimore	1.40	3.85	4.25	*3.75@ 4.00*
Pittsburgh sc'd gas	Pittsburgh	2.65	5.25	5.25	4.50@ 6.00
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.25	3.60	*3.25@ 3.50*
Pittsburgh slack (Gas)	Pittsburgh	1.80	3.25	3.25	*3.15@ 3.25*
Kanawha lump	Columbus	2.95	5.75	6.25	6.00@ 6.50
Kanawha mine run	Columbus	1.80	3.35	3.75	3.50@ 4.00
Kanawha screenings	Columbus	1.50	3.10	3.35	3.25@ 3.50
W. Va. lump	Cincinnati	2.50	6.50	6.50	6.00@ 7.00
W. Va. Gas mine run	Cincinnati	1.40	3.75	3.85	*3.50@ 4.00*
W. Va. Steam mine run	Cincinnati	.....	3.60	3.60	*3.25@ 3.50*
W. Va. screenings	Cincinnati	1.00	3.35	3.35	*3.00@ 3.50*
Hocking lump	Columbus	2.85	5.25	5.25	**5.00@ 5.75**
Hocking mine run	Columbus	1.85	3.10	3.10	3.00@ 3.25
Hocking screenings	Columbus	1.50	2.85	2.85	*2.65@ 2.90*
Pitts. No. 8 lump	Cleveland	3.50	5.10	5.10	*4.50@ 5.50*
Pitts. No. 8 mine run	Cleveland	2.10	3.45	3.50	*3.35@ 3.50*
Pitts. No. 8 screenings	Cleveland	1.95	3.30	3.30	*3.10@ 3.25*
Midwest					
Franklin, Ill. lump	Chicago	3.50	5.35	5.35	5.25@ 5.50
Franklin, Ill. mine run	Chicago	2.80	4.10	4.10	*3.75@ 4.00*
Franklin, Ill. screenings	Chicago	2.00	3.10	2.85	*2.50@ 2.90*
Central, Ill. lump	Chicago	3.10	4.35	4.35	4.25@ 4.50
Central, Ill. mine run	Chicago	2.50	3.10	3.50	3.25@ 3.75
Central, Ill. screenings	Chicago	1.80	2.30	2.25	*2.00@ 2.25*
Ind. 4th Vein lump	Chicago	3.35	5.10	5.10	5.00@ 5.25
Ind. 4th Vein mine run	Chicago	2.55	3.85	3.85	*3.50@ 3.75*
Ind. 4th Vein screenings	Chicago	2.10	2.60	2.50	2.40@ 2.60
Ind. 5th Vein lump	Chicago	2.95	4.75	4.75	*4.00@ 4.25*
Ind. 5th Vein mine run	Chicago	2.25	3.60	3.60	*3.00@ 3.25*
Ind. 5th Vein screenings	Chicago	1.65	2.35	2.10	**2.10@ 2.40**
Standard lump	St. Louis	2.75	3.85	4.10	4.00@ 4.25
Standard mine run	St. Louis	1.90	2.40	2.60	2.50@ 2.75
Standard screenings	St. Louis	1.35	1.50	1.85	1.75@ 2.00
West Ky. lump	Louisville	2.75	4.35	4.50	*4.00@ 4.75*
West Ky. mine run	Louisville	1.75	2.75	2.75	*2.35@ 2.75*
West Ky. screenings	Louisville	1.25	2.10	2.10	**2.10@ 2.50**
West Ky. lump	Chicago	.....	4.25	4.25	4.00@ 4.50
West Ky. mine run	Chicago	.....	2.75	2.75	*2.50@ 2.75*
South and Southwest					
Big Seam lump	Birmingham	2.75	3.95	3.95	3.45@ 4.45
Big Seam mine run	Birmingham	2.10	2.60	2.50	*2.25@ 2.50*
Big Seam (washed)	Birmingham	2.15	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	6.25	5.25	6.00@ 6.50
S. E. Ky. mine run	Chicago	.....	3.85	3.85	3.75@ 4.00
S. E. Ky. lump	Louisville	2.85	6.60	6.60	*6.00@ 7.00*
S. E. Ky. mine run	Louisville	1.55	3.50	3.75	*3.00@ 4.00*
S. E. Ky. screenings	Louisville	1.25	3.20	3.35	*3.00@ 3.50*
S. E. Ky. lump	Cincinnati	2.55	6.50	6.50	6.00@ 7.00
S. E. Ky. mine run	Cincinnati	1.35	3.50	3.65	3.25@ 4.00
S. E. Ky. screenings	Cincinnati	1.10	3.25	3.35	*3.00@ 3.25*
Kansas lump	Kansas City	5.00	5.50	5.50	5.50
Kansas mine run	Kansas City	4.10	3.75	3.75	3.75
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	Jan. 8, 1923 Independent	Jan. 8, 1923 Company	Jan. 15, 1923† Independent	Jan. 15, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@ 12.00	8.00@ 8.35	9.25@ 12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 11.00	8.10@ 8.35	9.25@ 11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@ 12.50	7.20@ 8.25	12.00@ 12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@ 12.00	8.00@ 8.35	9.25@ 12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@ 12.50	7.35@ 8.25	12.00@ 12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@ 12.00	8.00@ 8.35	9.25@ 12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@ 12.50	7.35@ 8.35	12.00@ 12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@ 11.00	6.15@ 6.30	7.50@ 11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.50	6.15@ 6.20	7.00@ 9.50	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.00@ 6.00	4.00@ 4.10	**5.25@ 6.25**	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00	4.00	**5.00@ 5.50**	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.50@ 3.00	2.75@ 3.00	**2.75@ 3.00**	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	**1.65@ 2.00**	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.

tons of soft coal. The available information indicates that the rate of consumption has increased since September, but has not yet equalled the rate of production. Consequently, coal has been flowing into storage, and stocks on Jan. 1, 1923, exceeded those in October. It is not yet clear how great the increase was, but further light will be shed on stocks and consumption after analysis has been made of reports now being received from consumers."

Coal trade in the Midwestern region is moving along at a fair clip in spite of warm winter weather and the general opinion that there will be no strike. No coal is soaring but most domestic is still in fair demand and steam is not exactly dragging. The last two days of last week saw a let-down, but sales managers for operating companies thought that was merely temporary and that this week conditions would strengthen slightly.

However, the keen demand for the best domestic grades at top prices has lost its edge and the lower-grade coals are getting a chance at the market at their lower prices. Dealers buy merely for their immediate trade, but this is enough to absorb a big volume of fuel. Big steam buyers have not stocked any to speak of. Most railroads are running along with much less than a week's supply on hand and practically every steam plant has wide empty spaces in its storage yard. Public utilities are so sure of an even and steady coal supply henceforth that none of them have stocked for more than 45 days. The average among them is said to be nearer 30 days, which is a low-water mark.

Car supply in several of the Midwestern fields has remained poor, thus cutting down to some extent the volume of southern Illinois and Indiana coals. Eastern Kentucky, on the other hand, has experienced a noticeable improvement and is now running along with a 40 per cent supply which means practically four days a week in that field since it is general practice there to over-rate mine capacities in determining car allotments.

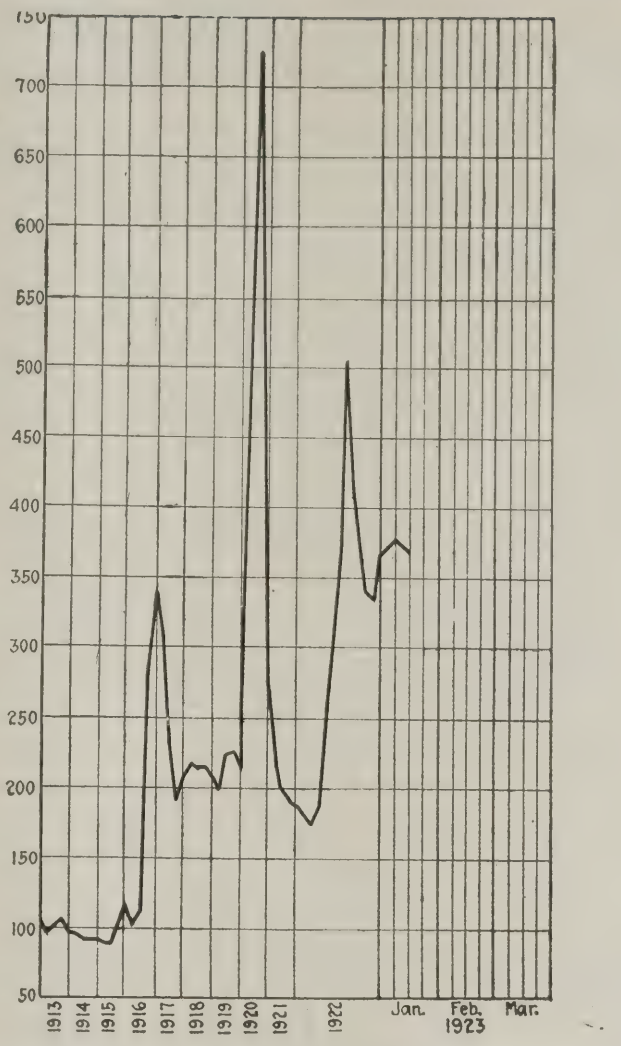
Very little Eastern coal gets across Indiana to Western markets. This practical exclusion of Pocahontas together with the low volume of anthracite in the region, gives Western lump and egg the best chance they ever had at the domestic markets.

In southern Illinois fields most mines are averaging 2½ days a week. Steam demand there is heavy enough to absorb the whole output and domestic pretty well takes care of itself. There has been no change in association domestic prices which hold firm at $5.50 for lump while independents are getting as low as $4 for lump, egg and nut. Screenings range $2.75@$3.

Western Kentucky, with a car supply averaging around 20 per cent on the L. & N. and about 47 per cent on the I. C., is moving out a good deal of coal toward the South. Prepared is in fair demand because of a little cold weather coming along just when dealers' stocks were low. Screenings are holding steadily above $2 and up to $2.50. The best lump from this field is bringing up to but not exceeding $4.50. Eastern Kentucky, with a steady byproduct demand to fill, is making good use of a fair car supply, getting $6.50@$7 for block, $6@$6.50 for lump, $3.25@$3.50 for steam mine run and 50c. more for gas mine run, and $3@$3.50 for screenings.

During the week the Northwest felt a slight firming up of the market for most soft coal because of the general feeling of tremulousness with which the countryside watches the dock stocks melting down. It is assured there will be no carry-over worthy of the name this year. Bituminous coal is bringing higher prices. Lump is up to $9.50, run of pile has jumped from $8 to $8.50@$8.75 and screenings have ascended from $6 to $6.25@$6.75. Northwestern dealers could sell all the Pocahontas they could get—if they could get any—but the supply is even shorter than the supply of anthracite. In Milwaukee Pocahontas mine run sells for $12.50 and screenings are hard to get at $11. In Wisconsin the state fuel commission eyes all sorts of domestic coal with interest because it says the state needs 175 cars of anthracite at once to protect against suffering in case of a severe cold spell.

In direct variance to the liveliness of the Northwest, coal markets in the West and Southwest are distinctly slower.



Coal Age Index 365, Week of Jan. 15, 1923. Average spot price for same period, $4.42. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913,1918," published by the Geological Survey and the War Industries Board.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Six Months July to Dec. 1921	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Week Ended Dec. 30, 1922
U. S. Total	45.6	55.7	....	....
Alabama	63.5	64.6	84.7	(a)
Somerset County	55.5	74.9	36.3	(a)
Panhandle, W. Va.	55.3	51.3	57.3	64.2
Westmoreland	54.9	58.8	65.8	58.5
Virginia	54.8	59.9	55.7	56.1
Harlan	53.3	54.8	22.1	26.5
Hazard	51.7	58.4	16.4	14.6
Pocahontas	49.8	60.0	36.6	43.0
Tug River	48.1	63.7	28.8	44.0
Logan	47.6	61.1	26.2	38.8
Cumberland-Piedmont	46.6	50.6	31.7	(a)
Winding Gulf	45.7	64.3	30.4	38.1
Kenova-Thacker	38.2	54.3	42.4	45.5
N. E. Kentucky	32.9	47.7	28.4	36.1
New River	24.3	37.9	31.6	36.8
Oklahoma	63.9	59.6	59.1	56.3
Iowa	57.4	78.4	75.9	95.8
Ohio, Eastern	52.6	46.6	40.8	43.2
Missouri	50.7	66.8	76.3	90.0
Illinois	44.8	54.5	49.9	53.3
Kansas	42.0	54.9	55.9	73.7
Indiana	41.4	53.8	37.7	(a)
Pittsburgh†	41.2	39.8	41.2	47.5
Central Pennsylvania	39.1	50.2	53.4	47.6
Fairmont	35.3	44.0	35.5	53.7
Western Kentucky	32.5	37.7	32.4	(a)
Pittsburgh*	30.4	31.9	56.1	61.2
Kanawha	26.0	13.0	15.6	18.5
Ohio, southern	22.9	24.3	38.1	45.1

* Rail and river mines combined.
† Rail mines.
(a) No report.

Mild weather throughout the plains and Rocky Mountain states has cut down demand and fairly regular car supply in the mountains have combined to force prices down materially.

The Kansas, Oklahoma and Arkansas fields, flooded with fairly cheap oil and attacked on the west by non-union Colorado are feeling the pressure right now as keenly as they ever have. A poor car supply is not such a saving grace, either, for it prevents operators from holding such markets as they have been feeding all winter. Some choice Oklahoma coals have been shipped all the way to Chicago.

There has been a lull in the spot market in New England. Receipts have not been large enough to induce any lowering of prices, but there have been fewer buyers in the market willing to take coal at present figures. A little lack of faith in the spot market 60 days hence is also shown by operators who are willing now to make contracts to Jan. 1, 1924, on a basis much lower than the same coals would command at this time. Consumers are inclined to hold off, preferring to rely upon their present stocks until they can get a better line on the developments the remainder of the winter. In consequence there is just enough demand to absorb what tonnage offers.

Pocahontas and New River are being firmly held. Output is still on less than a 50 per cent basis, and the Western demand for prepared sizes is still sufficient to withhold coal from Hampton Roads except on contracts and for remunerative spot prices. Hampton Roads dumpings were 280,060 net tons during the week ended Jan. 11, as compared with 231,386 tons in the preceding week. The all-rail movement to New England was 3,115 cars during the first week of January, as compared with 2,696 cars during the previous week.

The North Atlantic market has developed a decidedly easier tone. There is a further easing off of quotations. Demand is slow in New York and the number of cars at the local terminals increased last week to over 4,000. Much of this was due to the embargo placed on shipments to New England and to orders placed for shipments a few weeks ago when quotations were 50c.@$1 higher. The break in the market, to some extent, is reflected in the fact that there is now a difference in Baltimore quotations on some of the coals running to such pools as 9 and 10, with the price paid for Pennsylvania line fuels 25c.@50c. higher than for B. & O. and Western Maryland coal. Gas coals showed considerable weakness last week and the drop in price was more marked than for steam fuels.

ANTHRACITE

Production of hard coal was 1,725,000 net tons during the first week of 1923, as compared with 1,560,000 tons during the preceding week. Shippers and distributors agree that the milder weather of late has been the saving feature, as the supply is still inadequate. New England received 3,627 cars during the week ended Jan. 6, a marked increase when compared with 3,166 cars in the preceding week.

COKE

Production of beehive coke recovered quickly from the holiday slump. The output during the week ended Jan. 6 was 308,000 net tons as compared with 263,000 in the preceding week. Connellsville production continued to improve, despite the lessened demand for coke for domestic purposes.

Car Loadings, Surplusages and Shortages

	Cars Loaded — All Cars	Coal Cars
Week ended Dec. 30, 1922	711,200	173,378
Previous week	834,591	181,325
Same date in 1921	528,556	104,625

	Surplus Cars — All Cars	Coal Cars	Car Shortage	
Dec. 31, 1922	14,981	3,651	82,927	36,525
Dec. 23, 1922	9,563	2,532	99,908	43,664
Same date in 1921	465,000	220,000	.....	.....

Foreign Market And Export News

German Troubles Aid British Coal

Christmas holidays dropped British weekly production below the 5,000,000-ton mark for the first time since early in September. The output for the week ended Dec. 30, was 3,428,000 gross tons, according to a cable to *Coal Age*. Demand for coal is active, however, and prices are strong.

The United States has open orders for January and February loadings of around 250,000 tons and further large commitments are expected from Canada. The Brazilian Railways recently contracted for 150,000 tons, delivery in six months, and the Continental demand is strong. French occupation of the Ruhr has produced heavy orders for Germany. The holiday mine idleness has given an opportunity for shippers to clear away much of the congestion on wheels and at the piers.

Brisk Trading at Hampton Roads

The situation at Hampton Roads showed considerable improvement last week, with supplies of coal on the increase and a somewhat better outlook in the car situation. Demand was brisk but shippers were unable to meet all spot requirements as so much tonnage is rolling westward.

Stronger demand gave the market a decidedly firmer tone throughout. The bulk of the movement was coastwise, increased demands from the North having stimulated trade.

Car shortage was still pronounced, but not on the plane that had obtained for the previous six weeks or two months.

Hampton Roads Pier Situation

	Week Ended Jan. 4	Jan. 11
N. & W. Piers, Lamberts Pt.:		
Cars on hand	1,057	1,104
Tons on hand	74,625	74,243
Tons dumped	87,254	82,623
Tonnage waiting	5,850	13,000
Virginian Ry. Piers, Sewalls Pt.:		
Cars on hand	983	1,341
Tons on hand	55,800	75,550
Tons dumped	59,449	89,588
Tonnage waiting	6,733	1,850
C. & O. Piers, Newport News:		
Cars on hand	1,610	1,769
Tons on hand	92,200	95,200
Tons dumped	59,892	77,843
Tonnage waiting	4,425	8,240

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations by Cable to *Coal Age*

	Jan. 6	Jan. 13†
Admiralty, large	28s.@ 28s.6d.	28s.@ 28s.6d.
Steam, smalls	17s.@17s.6d.	**17s.6d.@ 18s.6d.**
Newcastle:		
Best steams	24s.@ 25s.	**24s.6d.@ 25s.**
Best gas	24s.6d.	**24s.6d.@ 25s.**
Best bunkers	22s.6d.@ 23s.6d.	**23s.6d.**

† Advances over previous week shown in **heavy** type; declines in *italics*.

Export Clearances, Week Ended Jan. 11, 1923

FROM HAMPTON ROADS

For Cuba:	Tons
Nor. SS Sangstad, for Cienfuegos	3,457
Dan. SS Trompenberg, for Nuevitas	2,576
Nor. SS Gefion, for Sagua de Tanamo	595
Dan. SS Elizabeth Maersk, for Santiago	1,989

Pier and Bunker Prices, Gross Tons

PIERS

	Jan. 6	Jan. 13†
Pool 9, New York	$9.00@ $9.25	*$8.25@ $8.75*
Pool 10, New York	8.35@ 8.75	*7.75@ 8.00*
Pool 11, New York	8.00@ 8.25	*7.25@ 7.50*
Pool, 9, Philadelphia	8.50@ 9.00	8.50@ 9.00
Pool 10, Philadelphia	7.90@ 8.15	7.90@ 8.15
Pool 11, Philadelphia	7.30@ 7.65	7.30@ 7.65
Pool 1, Hamp. Roads	8.25@ 8.75	**8.50@ 9.00**
Pools 5-6-7 Hamp. Rds.	8.00	**8.50**
Pool 2, Hamp. Rds.	8.25@ 8.75	**8.50@ 9.00**

BUNKERS

Pool 9, New York	$9.40@ $9.65	*$8.70@ $9.15*
Pool 10, New York	8.80@ 9.15	*8.15@ 8.40*
Pool 11, New York	8.40@ 8.70	*7.70@ 7.90*
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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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An Endurance Test in the Ruhr

EVERY eye is now on the Ruhr. Can the horse be made to drink, now that he has been led to water? The French have the coal fields under their control, but can they mine and transport the coal? It was generally agreed in this country last summer that soldiers do not make good coal miners.

In Europe Coal—coking coal—is King. Coal has become the real basis of the German currency, the shortage of fuel in that country has become a chief source of trouble and the centralization of its control the chief source of wealth of great industrialists, like Stinnes. Germany, from having an exportable surplus of coal as before the war of some 25,000,000 tons, now stands in need of net imports of nearly a like amount. The loss of the Saar and the partition of Upper Silesia, whereby about three-quarters of the coal and half the coke went to Poland, left Germany little but the Ruhr and the brown-coal mines.

Of a total of around 100,000,000 tons of Ruhr annual output France wants and needs some 15,000,000 tons and Germany the remainder. The steel industries of both countries depend on this supply. The present contest will test the resistance of both France and Germany to a coal shortage that by the very nature of the case will be much the more serious to the east of the Rhine.

"Not Guilty"

TWO words from a jury in "bloody" Williamson County, Illinois, have brought happiness to various officers of the United Mine Workers of America and unutterable relief to scores of union miners in southern Illinois. That is the best that can be said of the verdict returned Jan. 19 in Judge Hartwell's court at Marion, Ill., where were tried the first five of 77 men indicted for slaughtering 21 non-union strip miners and guards June 22 at Herrin. Surely that same happiness cannot be felt by all officers of the United Mine Workers of America, for there are a host of sane and law-abiding men among them. Surely that same unspeakable relief is not felt by all union miners in southern Illinois, for there must be good American citizens in that solidly unionized region. Thousands of them had no part whatever in wantonly butchering the surrendered strip miners. Among those thousands surely there are men who rue Jan. 19 as a day when mob violence definitely enthroned itself as ruler of Williamson County.

A good case was built up by state and federal investigators and attorneys in the face of every obstacle that public sentiment and organized action in Williamson County could lay. A fair presentation of that case before the jury was made. The defence devoted most of its efforts merely to impeachment of the state's evidence so that by the time the case was given to the jury it was a matter of one man's word against another's—the word of a free-talking, nothing-to-fear witness on the popular side of the miners' union against the word of an eye-witness who talked in fear of his life yet testified damningly and swore it was the truth. The jury took the word of the free talker, and the United Mine Workers won the case.

It would have been unhealthy at least for the "twelve good men and true" to bring in any other kind of a verdict. Now that the verdict is in, thus setting the pace for the massacre trials to ensue, what of the victory of the United Mine Workers of America? Their attorneys exultantly greeted the end of the case with a statement that the verdict made them "happy because this may, and ought to be, the birth of a new era in industrial disputes in America"! If it is, then by this bloody perversion, murder and physical torture are set up by the United Mine Workers of America as legitimate weapons in industrial disputes. What an era these spokesmen for the union desire!

The Coal Commission's Report

IN ITS effort to be absolutely fair and to avoid placing responsibility before the blame is proven, the President's Coal Commission has brought out a report which is certain to be a disappointment to the consumers of coal and to many members of Congress. In the coal trade itself there is an evident sense of relief. In the average investigation of this kind it is customary to have some harsh things to say to operators, wholesalers and retailers, even before it has been established that they are guilty.

The Jan. 15 report has all the indications of a desire to avoid expressing conclusions until all the facts can be weighed. As a consequence, it may be predicted that the smaller consumers and a certain element in Congress will feel that the report is colorless and that the commission is not reaching the seat of the trouble. It does not express an opinion as to whether or not current prices are just. It does not say whether or not the miners are receiving a higher rate of wage than the consumers should be called upon to pay. No one is accused of profiteering. The report indicates in a general way something as to the spread between the cost at the mine and the delivery cost of coal, but it gives no clue as to who is responsible. Labor, transportation, overdevelopment, storage and other matters are discussed, but little is said about the business factors in coal. For that reason it is certain that some of the gentlemen on Capitol Hill will conclude that the commission has written "Hamlet" with Hamlet left out.

The more constructive thinkers both within and without the industry seem to be agreed that the commission did well in making haste slowly. Even those who are expressing much disappointment with the report are

inclined to suspend final judgment as to the possibility of the commission bringing out something concrete at a later date.

A careful analysis of the report shows that there is little material in it which could not have been written on the first day that the commission sat. Nevertheless the presentation of this material is regarded as being valuable because the wide publicity will contribute greatly to the popular understanding of the entire subject. The report must be regarded more as a statement of the problems of the commission than as a contribution to their solution. Not one shred of new statistical information is contained in the document. From a constructive point of view this failure is regarded by some as the most serious because the report as it stands holds out no assistance to the New York conference. A significant feature of the report is the indication that the commission is not inclined to allow the industry to blame all of its ills on transportation.

"Changing a Dollar Into Four Quarters"

THE epidemic of stock dividends which broke out so virulently during the closing months of the old year continues to excite much public discussion. Opinions continue to differ widely as to their purpose and effect. In view of the leading part played by the Standard Oil group in the distribution of such dividends particular interest attaches to the vigorous defense of the policy advanced by A. C. Bedford in his address before the American Petroleum Institute, now available in the form of an attractive brochure.

Mr. Bedford flatly denies that stock dividends result in any tax evasion. Further, he makes a strong plea for the essential soundness of the process of building up a surplus from current earnings, putting it back in the business and capitalizing it through the issuance of new shares to old stockholders. The issuance of the stock dividend, he insists, means merely "changing a dollar into four quarters." It creates no new wealth.

Economists and accountants generally will agree with Mr. Bedford in his contention that the simple act of declaring a stock dividend creates no new wealth. They also will agree that the increase of the capital fund is essential to the progress of business and the country generally. Finally, they will admit that the stock dividend does not offer a method of tax evasion in any legal sense.

However, having conceded all of these points, an honest, inquiring mind may still hunger for a deeper analysis than Mr. Bedford has made. Is there nothing more than this to the stock-dividend epidemic? Is there no rational explanation for the conviction so generally prevalent that the stock dividend is significant of some condition which needs correction?

Mr. Bedford apparently accepts the orthodox definitions of wealth and income, for he argues that the stock dividend is not income because it creates no "new wealth." One has income when his wealth—his economic strength, in the sense of command over goods and services—has increased. This is the general conception of income which underlies our federal income-tax law. With this definition in mind, let us raise a few queries which may serve to clarify the issues.

Suppose I invest 25c. in the Standard Oil Co. of New Jersey. Suppose the company prospers and builds up a large surplus, my share of which amounts to the value of 75c., so that my interest in the company is now worth a dollar. Suppose the company declares a stock dividend "changing the dollar into four quarters." Has anything of significance happened? Has my economic strength increased? Have I really received any income?

Clearly the stock dividend simply recognizes an existing situation. It recognizes that the quarter has expanded into a dollar and makes the convenient "change." But the significant thing is that I am ahead to the extent of 75c. in value—not merely because of the stock dividend but as the result of the whole process. At the beginning I had a quarter invested in productive enterprise. Now I have an investment worth, by assumption, a dollar.

The real nub of the matter from the tax point of view is this: the process described in the above example is about the only way I can make 75c. and reinvest it in productive enterprise without subjecting the three new quarters to the heavy surtaxes of the federal income tax. The corporation pays the normal tax—slightly higher, it is true, than the individual normal rate—when it adds the new quarters to surplus, but I am asked to account for them only *if* and *when* the corporation distributes them to use as a cash dividend or *if* and *when* I sell my stock at the enhanced value due to the surplus which has been built up. This "if and when" is of considerable importance.

If I had invested my original quarter in an equally prosperous individual enterprise or partnership I should have been asked not only to pay the normal tax as the new quarters were earned and reinvested but in addition I should have been compelled to pay the surtaxes on them *when earned* rather than *"if* and *when"* distributed or *"if* and *when"* I sold the stock at an advance.

Clearly the corporate form of business organization has an advantage under the tax law because of this situation and the stock dividends are advertising this advantage in a most striking manner. It is this advantage which is really the shining mark at which the "agitators" are aiming. Is it not an advantage which must in some manner be equalized if the "sturdy qualities" of individual initiative and resourcefulness, which Mr. Bedford so properly praises, are to be given full play?

How to accomplish this is, indeed, perhaps the most puzzling tax problem which the federal government is facing. It cannot be solved by refusing to recognize its existence or by approaching it from the point of view of one industry, one form of business organization, or one economic class. The differential in favor of the corporation may conceivably be removed by increasing the burden on the corporations or by decreasing the burden on the other forms of business enterprise.

The "agitators" suggest a new tax on the undistributed surplus of corporations as closely equivalent as possible to the present surtax burden on reinvested earnings of other forms of business enterprise, a suggestion which Mr. Bedford labels "a proposal of sabotage by legislation." The fear of such a tax probably is a contributing cause although not the sole or perhaps not the most important cause of the stock-dividend epidemic. The alternative plan for eliminating the corporations differential would be to reduce the present burden upon reinvested profits of partnerships and individuals. But he who proposes this must be prepared to convince the public that a dollar of wages should be more heavily taxed than the dollar of reinvested profit. This is the dilemma!



Surface and Underground Methods at Blue Diamond Mine; Modification of Elkhorn System of Mining Used

Lengthy Hillside-Scraper Conveyors—Hoist Hauls Supplies Up Two Hills and Places and Retracks Cars at Tipple—Wide and Narrow Rooms Alternate—Pillaring System Can Be Adapted to Roof Encountered

By Alphonse F. Brosky*
Pittsburgh, Pa.

FOUR miles northwest of Hazard, Ky., as the bird flies, and twice that distance by rail, on First Creek, off the North Fork, lies the town of Blue Diamond and the mine of the same name, which are the property of the Blue Diamond Coal Co.

In the Hazard field, of only one tipple can it be said that it is constructed entirely of steel, and that one is at the Blue Diamond Mine. The reason why steel tipples are not to be found doubtless is because of the difficulties of transportation. A steel tipple complete seldom costs more than 20 per cent more than a wooden tipple of similar proportion and design. The fire hazard, which is unusually severe in places such as Hazard, where little water is to be had in the dry seasons and where forest fires are common, would warrant the additional investment that the steel tipple entails. Few of the tipples in eastern Kentucky, even though of wood and of recent construction, have adequate fire protection. One properly provided with a fire line will be described in a later issue.

The Blue Diamond tipple is designed to size 300 tons of coal per hour into slack, nut, egg and lump, or any combination of the first three or run of mine. The mine can load about 3,000 tons daily and this is the capacity of the tipple. The Hazard No. 6 seam varies in thickness from 6 to 7 ft. It has two partings, neither of which, however, persists throughout the field; first one and then the other runs out. The Blue Diamond acreage is comparatively free of either parting. A representative analysis of the coal shows 1.96 per cent moisture, 37.16 per cent volatile matter, 56.32 per cent fixed carbon, 4.60 per cent ash and 0.56 per cent sulphur. Its heat value is 13,800 B.t.u.

The coal lies about 200 ft. above the railroad in two main hills which flank the spur track and in the hills adjoining, the holding measuring 4,000 acres. Coal is dropped to the tipple from the two sides by means of scraper-conveyors, one of which is 410 ft. long. For part of its length it is on a 26-deg. slope. The other is 210 ft. long, the slope being 23 deg. The company officials favor the scraper-conveyor, believing that the rope-and-button conveyor, though a satisfactory lowering medium, does not have the needed capacity. They prefer the conveyor to monitors, gravity planes and chutes.

At No. 2 headhouse the mine cars in twos are dumped, still coupled to the trip. For this purpose, a two-car rotary dump is used, the coal dropping into a 50-ton bin. A reciprocating feeder feeds it to the scraper-conveyor which carries it to the tipple. At Headhouse No. 1 the same arrangement has been made

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Note—The headpiece shows the tipple at Blue Diamond Mine, Blue Diamond, Ky. On the left may be seen the shed of the scraper-conveyor by which the coal is lowered down the hill on that side. Coal is brought to the horizontal shed on the right by a scraper-conveyor housed and supported in a similar manner. Scaffolding has been erected for the purpose of adding another lump picking table. The small shed that appears to be directly under the scaffold, but is really behind it, houses the hoist by which supplies are pulled up the hill and railroad cars are placed and retracked.

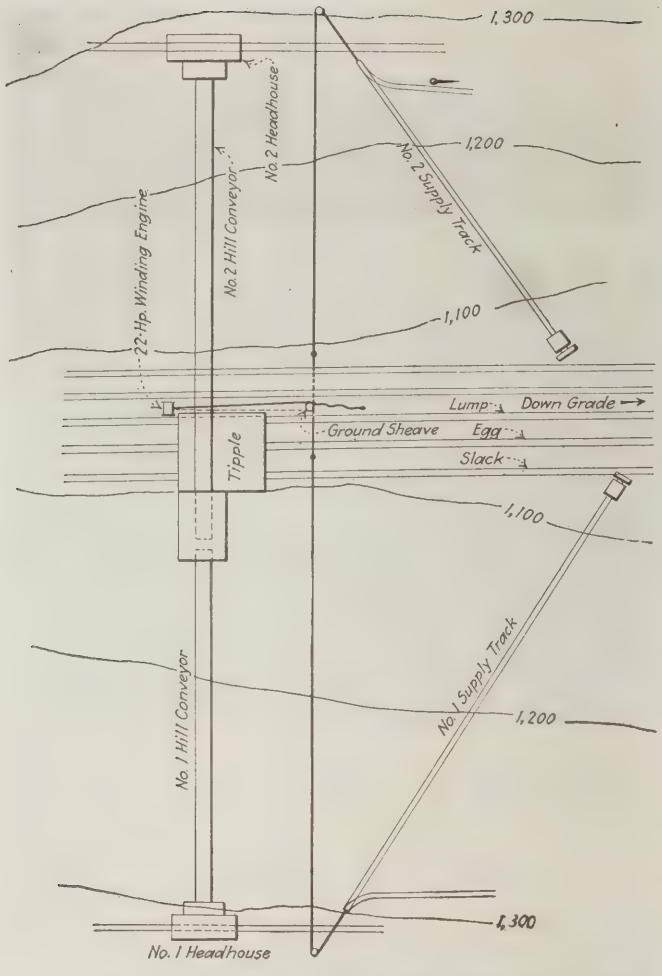


FIG. 1—HOW ONE HOIST PERFORMS THREE DUTIES

Schematic plan showing the electric hoist near the tipple of the Blue Diamond Mine and the connections which make it possible to use it for hauling railroad empties, loads and supply cars on the railroad tracks and to hoist mine cars filled with supplies on the two inclines which scale the steep hillsides.

except that only one car is dumped at a time. The arrangement of the tipple has no unusual features.

The coal from the two conveyors falls into a common bin and becomes merged. Thence it is fed to the shaker screens. The slack removed in the second cleaning which is made over the egg screens is carried to a slack bin by an unusual method of conveyance, namely, a worm conveyor. The original tipple had but one lump picking table. An additional lump table has been installed in an annex to the tipple, so that part of the lump coal will go over the old and part over the new table. After passing over the new table for picking purposes only, it will pass back to the end of the old table at the head of the loading boom over the lump track.

An extremely interesting and practical hoisting arrangement is used on the tracks of the Blue Diamond plant. A 22-hp. electric winding engine with a single cylindrical drum 2x2½ ft. is placed at the upper end of the tipple between No. 3 and No. 4 tracks. A close inspection of the headpiece will show the shed in which this engine is housed and its position relative to the tipple and tracks. About the drum is wound approximately 1,500 ft. of ¾-in. steel-stranded cable at the end of which is a clevis block.

This rope is used for various purposes about the tipple tracks such as bringing up supplies in freight cars from the siding, hauling back coal cars that might by chance get away from the tipple, pulling back on the track derailed railroad cars and performing like services. In a way it performs many of those duties about the tipple that usually are performed by that class of steam locomotive known as a "shifter."

Located directly in front of the winding engine and below the tipple is secured a horizontal ground sheave about which the hoist cable may be made to pass. This is used to turn the rope either to the right or left.

A supply track on each hill raises all materials to the level of the coal. Ropes similar to the main rope pass up the respective hills over sheaves and pulley blocks and down the supply tracks. The end of the main rope may be attached by a clevis coupling to either of the free ends of the two supply-track ropes. This gives the hoist duty in three different directions, straight ahead for railroad work or to the right or left when used on one or the other of the two supply tracks on the hills. Fig. 1 is a schematic sketch of the plan.

Cleavage Planes in Coal Not Pronounced

The cleavage of the coal is not pronounced, so it matters little whether the rooms are driven "face on," "end on" or in any of the intermediate directions. As the shape of the coal area is not regular the rooms cannot be driven in the same direction everywhere throughout the mine. The main entries under the several hills are driven in a manner to obtain the most economical haulage and mining, sometimes askew to each other, depending upon the lateral axis of the several hills. Rooms are driven parallel to these. The varying direction of the room owing to the mining of irregular bodies of coal makes it difficult for those superintending the work to obtain large recoveries. Conditions in this field differ from those in the deeper seams of other states, for there mining may be performed more systematically.

As has been said already, the rooms usually are driven parallel with the main entries, developing a true room-and-pillar system, with only one pair of main entries and with stub butt headings on either side. Those who followed the description of the mining methods of the Columbus Mining Co. in the Hazard No. 4 seam which appeared in the issue of *Coal Age* of Nov. 11 will remember that in that mine the panel system has been adopted. Both companies use the modified Elkhorn system of mining. In the Blue Diamond Mine the four mains are driven on 62-ft. centers, 12 ft. wide,

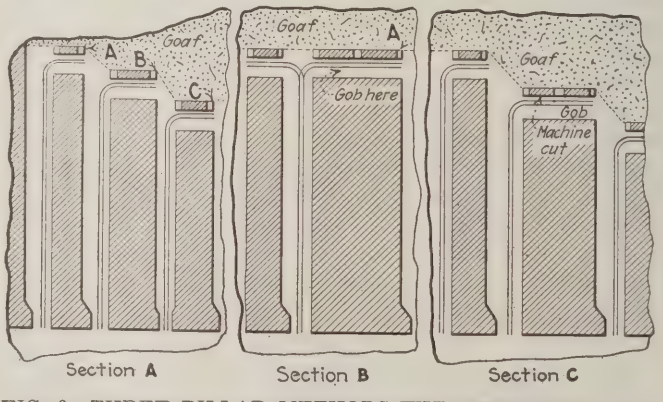


FIG. 2—THREE PILLAR METHODS WITH ELKHORN PLAN

If the wide pillar cannot be mined from the wide rooms on either side of it, because the large open areas would make such work dangerous, then the pillar may be split in two by a narrower room and each pillar worked independently as illustrated in the left panel. Sometimes it is found advisable to bring both the wide and the narrow pillar back from the same room as in the center panel. On the right is shown still another way to mine these pillars. Most of the pillar coal is cut by machine.

giving a 50-ft. chain pillar. Further protection is afforded by 100-ft. barrier pillars. The butt entries are driven every 404 ft. on 52-ft. centers, thus providing a chain pillar 40 ft. in width.

The rooms are driven 200 ft. long and in both directions. It will be recalled that the Columbus Mining Co. has gone even further and makes its rooms only 175 ft. long. By employing the 200-ft. room this company indicates that it is its belief also that the short room is preferable. In the past the Blue Diamond Coal Co. made its rooms 250 ft. long, but it has found that the present 200-ft. room has its advantages. Briefly, its merits are: That room track is tied up for a shorter period of time; that a room with bad roof is speedily driven up and the pillars withdrawn; that the pillaring is completed more quickly and that gathering locomotives and undercutting machines can be operated with less cable.

The rooms are 20 ft. wide, the neck being only 12 ft. long. The rooms are driven alternately on 45-ft. and 85-ft. centers, leaving alternately a 25-ft. and a 65-ft. pillar. This sequence is maintained from the



FIG. 3—ROOM BEING DRIVEN INTO SOLID COAL

Rooms are driven 20 ft. wide and necked when 12 ft. from the heading. Timbers are carried on a line that affords just enough clearance for safety. The room as shown has not been cleaned ready for the next cut.

main entries to the crop. The rooms are driven to meet each other, and the pillars are brought back immediately, providing drainage is not hampered thereby.

The wide pillar lying between two sets of two rooms on 85-ft. centers comes in handy where bad roof conditions prevail, for it assures adequate support of the cover. It also gives a broad choice as to the manner in which the pillar may be drawn, depending upon the roof conditions at that particular point.

Fig. 2 indicates three distinct methods of mining out a wide pillar and a narrow pillar adjacent to it. Thus if the roof will not permit of taking the pillar off the end "long face," as it is termed, then the pillar may be split from end to end by a 12-ft. room driven through the center of it. The two smaller pillars are then worked independently of each other, as indicated in section A, Fig. 2.

In other places only a portion of the pillar will be split, say from the last crosscut forward, in the hope that when the retreat reaches the unsplit pillar that pillar may be worked across its entire width. Although it is not customary in this system to bring back two pillars from one room, this is being done in a few places in the mine, and with satisfactory results. Where the roof refuses to break close up to the pillar and extends like a cantilever into the goaf, the weight is likely to be concentrated on one corner of the pillar



FIG. 4—ROAD DRIVEN THROUGH COAL PILLAR

A 12-ft. roadway is driven through the end of the pillar, leaving a pillar 6 ft. wide which can be penetrated by a mining machine. Two cuts are made in the pillar, leaving three small stumps 6 ft. square—one at each end and one in the middle. These are drawn by the use of the hand pick.

as at *A* in section *B* of Fig. 2, and this corner is likely to give way under the strain.

But if the roof breaks readily then the wide and narrow pillar may be brought back together, the wide step in the pillar front in that case not being undesirable; otherwise it might be advisable to bring the pillars back out of line so that the steps on the pillar front will be many and easy, as in section *A*. With this arrangement three bearing corners would support the weight of the hanging roof as at *A*, *B* and *C* in section *A*. Bringing the pillars back as in section *C* is yet another way. It must be understood that only in places would the roof fail to break off close to the coal in the manner just mentioned. Roof thus obstinate is not commonly found; if it were it would indicate that the rooms were not being properly laid out, and a dangerous squeeze would follow.

Mining Usually Governed by Bad Spots

However, even in the best regulated systems, careful as we may be, there are spots in any mine where the roof does not break down as well as at other places. It is these few spots, though they are in the minority, that govern the mining throughout the mine. Right here is where the wide pillar offers an alternative: It may be mined unsplit, thus producing a larger tonnage per working place, or else it may be split in two, giving two pillars of the usual width. If conditions favor working a wide pillar, then work it as such; if not, then split it. Certainly the wide pillar reduces track costs in the pillar section and, incidentally, the daily mileage of a gathering motor in any given area.

When a wide pillar is butted off, a place 12 ft. wide is cut through the rib, leaving a wing 6 ft. wide to be taken out in coming back. The cutter bar of the machine can cut through this. The track usually is laid close to the wing to facilitate cutting and loading and to provide a space for the gob between the track and the solid pillar of coal behind it. The wing is loaded out in two cuts, leaving two end stumps and a center sprag, which later are extracted by hand picks.

The mine village is second to none in the Hazard field. Its plan is peculiar in that the dwellings are scattered and stretch over a considerable distance. The little bottom land available is occupied by a few houses, but the preference seems to be to locate the dwellings, as far as may be, on the hillsides. The main part of the town is its upper end. Below, and extending for nearly one-half mile down First Creek, the lines of houses branch out as tentacles on both sides up the

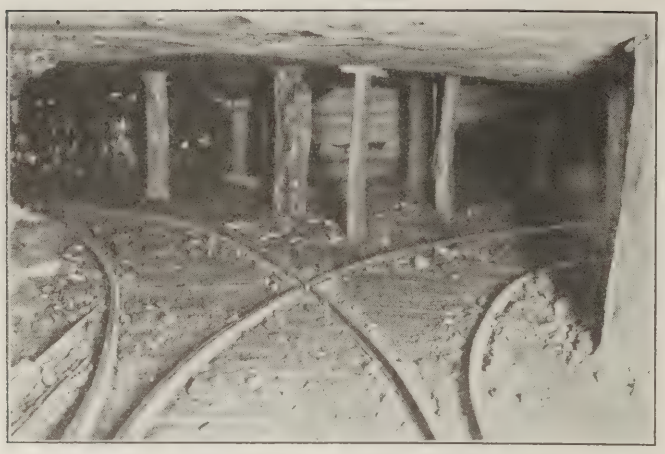


FIG. 5—WHERE PILLARS ARE DRAWN AS IN SECTION *B*
On the right the pillar is 65 ft. wide and on the left only 25 ft., both pillars being drawn simultaneously. The fallen goaf can be seen at the end of the road. A goodly portion of the coal in the pillars can be saved with this method of operation.

several hollows that enter the main valley in that distance. Sometimes they are placed in a single row not far from the bottom but often they are arranged in double rows, the last at a considerable distance up the hillside. The extended house line is quite long. It must be at least three miles in length.

The inhabitants of the town are provided with good drinking water. The company removes garbage and rubbish twice each week and every means possible is utilized to maintain the community in good health. The usual care has been taken to provide the people with recreative amusements.

The town has a beauty spot which abounds in such evergreen shrubs and trees as holly, pines and rhododendrons. Many of these have been set out by the company. Walks with concrete steps and a rustic bridge give the inclosure the appearance of a country estate. Within its bounds are some thirty dwellings for single families. I mention these things to set aright those readers who are of the opinion that the owners of isolated camps in far-away places never show any appreciation of beauty or of the possibilities of landscape gardening.

The Blue Diamond officials instead of planning a bad imitation of a small city—a treeless waste with all manner of disarray—have sought to maintain the beauties of the Kentucky mountain region.



FIG. 6—VILLAGE SCENE IN BLUE DIAMOND
The mining company has hesitated to improve overmuch on nature. The average mining town is started by destroying everything that could render the town beautiful. The Blue Diamond Coal Co. has spared the trees but cleaned up the underbrush and logs and removed the rotten timber, so as to eliminate the fire and accident hazard, giving the town a beauty that uniformity could not afford. The houses are well spaced so as to leave the landscape but little spoiled by human intrusion.

Chromium-Iron Alloy Resists Oxidation, Corrosion, Abrasion and Heat

ONE of the main troubles in mining work is the rapid corrosion of all metals exposed to the acid action of mine water. It has been found that alloys can be made that resist oxidation, corrosion and abrasion with eminently satisfactory results, but in most cases these alloys are extremely expensive and do not adapt themselves with any degree of flexibility to the varying needs of the industry. Some can be cast but not rolled. Many cannot be drilled, bent or punched.

Certain chromium-iron alloys, known as Duraloy, are manufactured by the Cutler Steel Co., of Pittsburgh. They may be obtained either cast or rolled. The proportions of the constituent metals are varied so as to resist oxidation alone, or corrosion and oxidation combined or abrasion, corrosion and oxidation—all three. Bars or sheets of the metal can be made sufficiently ductile to permit of bending, punching, forming and stamping. They are afterward treated to increase their hardness and wearing qualities. Such metal can be made into wires or tubing.

The alloy has an ultimate tensile strength of 40,000 to 90,000 lb. per square inch, an elastic limit of 30,000 to 80,000 lb. and an elongation of from 2 per cent to nothing. The rolled or forged alloy has a tensile strength of 80,000 to 130,000 lb. per square inch, an elastic limit of 65,000 to 110,000 lb. and an elongation from 26 to 8 per cent.

Can Be Tapped, Threaded and Drilled

Some of the rolled or forged alloys can be machined as easily as medium-carbon steel, and some of the castings can be tapped, threaded and drilled, but if hardness is sought the alloy can be furnished at 600 Brinell, in which condition, it is, of course, possible to finish it only by grinding.

The strength is well maintained under heat. At a temperature of 932 deg. F. it is still 98,000 lb. per square inch, and at 1,832 deg. F., no less than 10,000 lb. The alloy may be welded by either oxyacetylene or electric-arc methods, using a welding rod of the alloy where two pieces of the metal are to be joined or a standard welding rod where the alloy has to be welded to some other metal. Preheating is desirable but not essential. The metal is readily cut by the oxyacetylene cutting torch, for it does not oxidize.

Its weight loss to corrosion after two hours was zero, that of nickel was 0.01 per cent; that of an alloy of nickel and copper, 3.81 per cent; that of cast steel, 5.39 per cent; that of cast iron, 5.57 per cent, and that of steel 6.80 per cent. In the same corrosive liquid the weight loss of Duraloy in 300 hours was 0.01 per cent.

J. W. Paul, coal-mining engineer, of the U. S. Bureau of Mines, has made a study of the barricades constructed by entombed miners in the recent Argonaut mine disaster in California. A miners' circular on the use of barricades following explosions and fires in mines will be issued at a later date by the bureau.

Additional local chapters of the Joseph A. Holmes Safety Association have been formed at Brewster, Fla.; Bay City, Mich.; Cuylerville, N. Y., and at Newcastle, Wash. On Nov. 1 there were 27 chapters located in 12 states, representing the coal, gold, lead, copper and phosphate mining and petroleum refining industries.

Grudekoks

By O. P. Hood*
Washington, D. C.

WHEN a new material is put on the market a name must be found which is either descriptive of the material or warranted to attract attention. A new member of the family of fuels in Germany carries the name of "grudekoks," which means "embers coke." In our own country we have been hunting for a suitable name for the material that remains after lignite is subjected to a heating process by which most of the moisture and volatile matter is driven off. The term "lignite coke" suggests itself, but this is a little misleading, as the material does not look like the familiar coke as made from bituminous coal. The term "lignite char" is perhaps a little more descriptive, and this may be taken as the American equivalent of the German grudekoks.

In attempting to improve lignite as a fuel it is desirable that the large quantity of water—from 25 per cent to 40 per cent—be driven off in order to concentrate the fuel values sufficiently to warrant distant transportation and to make a stable product. With the water removed the ash remains and about equal parts of volatile matter and fixed carbon. The volatile matter may be more valuable as a source of byproducts than as a raw fuel, and, furthermore, when it is partly removed the resulting char is mechanically stronger than the lignite from which it is made. The following analysis of lignite char is perhaps typical:

Constituents	Per Cent
Moisture	2
Volatile matter	12
Fixed carbon	72
Ash	14

A semi-anthracite from Pennsylvania analyzes as follows:

Constituents	Per Cent
Moisture	3.4
Volatile matter	8.5
Fixed carbon	76.6
Ash	11.5

A sample of buckwheat No. 2 anthracite analyzed:

Constituents	Per Cent
Moisture	6.2
Volatile matter	5.6
Fixed carbon	71.5
Ash	17.5

The similarity between these products is striking, and it can be said that lignite char can be made that has an analysis quite comparable with anthracite. Physically, however, it is quite different. In expelling the moisture from lignite the material breaks up into small pieces of a size about like corn, wheat and broken rice kernels, with some of it even finer. A screen test of this material made from North Dakota lignite last summer is as follows:

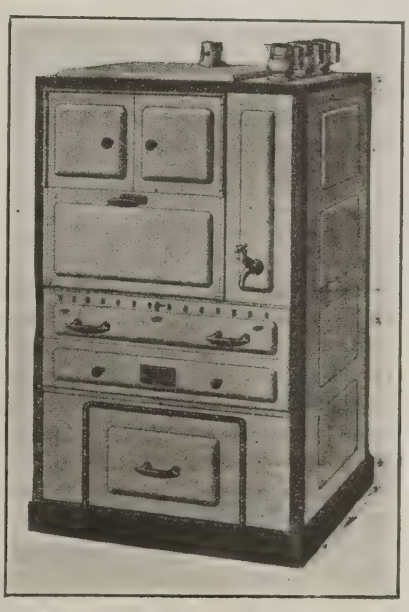
Sizes	Per Cent
Over ½-in. round-hole screen	6
Over ¼-in. through ½-in. screen	19
Over ⅛-in. through ¼-in. screen	35
Through ⅛-in. screen	40

The material is gray black, and if "hard burned" has a slightly metallic ring or rustle as one pours the grains from hand to hand. The characteristic piece has rectangular faces like a miniature brick; the cleavage is therefore unlike anthracite, which is conchoidal. The material is clean to handle and its heating value does not decrease on exposure. It is stable—that is, it does not change in the weather or break up further in the fire. The material is, however, smaller in size than any fuel we use except the fine sizes of anthracite. Having more volatile matter it kindles better than anthracite, and holds the fire well. It is also smokeless.

To use this material there are two possible procedures, one of which is to grind all the material fine and add a suitable binder, making briquets simulating anthracite of domestic size, and the other procedure would be to dodge the relatively expensive briquetting process and use the material direct. Past work has shown that very acceptable briquets can be made from this material, but industry in this country hesitates at the considerable expense and uncertainty of entering the briquetting field. The briquet in this country is still considered as a rather strange intruder in our family of fuels, even in our Eastern states, where briquets are becoming more common. A pile of briquets dropped on the sidewalk is still apt to attract the curious attention of the passerby. In Europe the briquet in several forms has long since been accepted as a standard fuel and not as a curious substitute.

Besides if we are slow to adopt the briquetting process perhaps we may learn to use at least a portion of this lignite char in its natural state. The material is too fine to be held on the usual furnace or cooking-stove grate or in a base burner. It has another peculiarity also which makes it different from fine sizes of anthracite: A glowing bed of lignite char reduces CO_2 to CO in an effective manner. In other words, it makes a most excellent producer gas, and this reaction, which is a cooling one, is so rapid that if the fuel bed is more than an inch or so in thickness the upper part of the bed is cooled and the fire appears to be dead.

For domestic heating lignite char lacks the cheerful glow of anthracite, unless the fuel bed can be kept uniformly thin. By introducing on the grate of an ordinary magazine base burner suitable for anthracite, a concentric cone so arranged as to extend into the magazine opening, and placed so that the fuel is compelled to flow over its surface in a thin sheet, the air entering through perforations in the cone will support rapid combustion, will give a glowing surface to a thin fuel bed and support a luminous and smokeless flame in the combustion space. This makes a fire quite as acceptable and grateful as anthracite. In this way the small lignite char



KITCHEN STOVE FOR CONSUMPTION OF "GRUDEKOKS"

On the top on the left is the warming oven; below it lies the cooking section. To the right of these compartments is the hot-water tank with its spigot. Below them all is the drawer-like grate for the burning of the "grudekoks" and another drawer which acts as ash bin for the fire above. Under the ash box is another box in which the fuel is stored. The stove is composed of tile and acts as a heat reservoir.

*Chief Mechanical Engineers, U. S. Bureau of Mines.

can be used direct, but no equally satisfactory solution of the problem for either the cooking stove or the heating furnace as yet has been found.

There was some doubt, therefore, as to whether the unbriquetted material was sufficiently practicable to warrant being actively advocated, and hence it was with much interest that I found that the material was already in rather extensive use in Germany under the name of "grudekoks." Although made from brown coal the residue is substantially the same as the residue we get from American lignite. It is broken up in the same small sizes and analyzes high in fixed carbon and low in volatile matter. It is, perhaps, a little softer than our material, but it presents the same questions as to how it shall be burned as does our lignite char.

In central Germany some brown-coal deposits contain material yielding a high percentage of tar when subjected to low-temperature distillation. This material appears in the brown-coal bed as lighter colored layers, which are mined separately from the darker material. This lighter colored brown coal is subjected to low-temperature distillation in a circular kiln of simple construction, the resulting char being considered as a by-product, as the main objective in this process is the paraffin contained in the tar.

No attempt has been made in Germany to briquet this material, as an acceptable way has been found of burning the fine char direct without further processing and as the Germans do not have an anthracite habit to take into account. It is interesting to note also that this method of burning is entirely different from our own attempts at burning the char, which probably is due to national habits of heating. The American has always been used to an abundant fire, and, like the Englishman, he enjoys the feeling of radiant heat.

There is something in the glowing base-burner fire or the fire from an open grate that is much more cheerful, comfortable and homelike than can ever be obtained from the milder heat of a radiator. Even the old cannonball stove, that was so voracious of bituminous coal, never seemed to be quite at its best until its swelling sides were glowing red hot and radiating cheer to a circle of outstretched hands and feet. Most of our heating methods are built on the idea of a lively fire.

Burned in Tiled Structure with Many Flues

The fireless cooker, with its relatively low-temperature cycle, seems to be the only popular exception to this general rule. In Continental Europe, however, the habit has been quite different. The household stove developed into a ponderous tiled structure with a relatively small grate, a labyrinth of flues, and a highly ornamented tiled surface, against which one must lay one's back to get any considerable feeling of heat. The mass of the tile and brick absorbs and gives off heat, and performs the same function of heat storage as does the mass of water in our hot-water heating systems.

In fact, these tiled surfaces have temperatures of about the same order as a hot-water heating plant would give to radiator surfaces. The German is quite thrifty in his use of fuel in these stoves, regulating the air supply almost with a micrometer adjustment, and by devices much better designed than those usually found on our own stoves.

These people also are used to cooking with charcoal, which gives a relatively mild heat. There appeared to be no considerable demand, therefore, for a glowing, radiant fire to meet a national habit of either heating or cooking. The result was something quite different from anything we have here. It might be said that grudekoks is burned in a bureau drawer, for the stove structure is a cabinet with a series of drawers and door-covered compartments that would challenge the curious to guess whether he was looking at a bureau or an ice chest.

The device is based on a simple fact that has been observed by everyone who has used lignite. In burning lignite, although much fuel may drop through the grate, the carbon content of the ash always is extremely low. There is practically no loss due to carbon in the ash in burning either lignite or lignite char. Such material as does drop through the grate will continue to burn in the ash much as charcoal covered in a bed of ash will hold a fire for a long period, and finally be entirely consumed. Lignite char acts much as charcoal in this respect, and will burn also with air supplied entirely from above.

Thin Covering of Char Over Bed of Ash

If, therefore, a bed of ash be provided of sufficient depth, the char will burn on it and continue to hold a fire for a long time. If lignite char be scattered over this bed of hot ash to a depth of, say, half an inch, and slightly raked into the bed, so as to make contact with the hot char, the material will be gradually ignited and will burn slowly, as does charcoal in a brazier. The German grudekoks oven provides, therefore, a drawer arranged to hold a bed of ash, and to have at a short distance above it a cast-iron stove top with lids, in the usual manner.

From the back of the drawer space a small pipe 2½ or 3 in. in diameter connects with the house chimney. Air is admitted over the fuel bed through a damper in the face of the drawer. It is needless to say that the quantity of heat generated is small, and an American would call the fire slow, but that it fits with the German habit, and is effective, is shown by the fact that last year over 400,000 tons of grudekoks was used in this manner for domestic cooking and heating. The accompanying illustration depicting this oven shows below the fire drawer another similar drawer adapted to receive the excess ash as it is shaken from the upper drawer.

Below this is shown a deeper drawer in which grudekoks is stored. To replenish the fire an ordinary sugar scoop is used to sprinkle a thin layer over the glowing surface in the drawer. This surface has an area of about 2½ sq.ft. Grudekoks is a very clean fuel; it does not stain the hands or blacken material with which it comes in contact. The space above the fire drawer, where cooking is done, is shown to be inclosed as a cabinet which can be closed by a front upward swinging door. This inclosure is carefully insulated to conserve heat as much as possible.

Above the cooking space is a warming oven, and to one side is a water tank which can be filled at the top, the contents being drawn off at a faucet as needed. Whether this kind of a cooking device will appeal to the American housewife is yet to be determined. We cannot forget that even the fireless cooker has a host of friends. The Bureau of Mines hopes to get some information on this phase of the subject, but it is at least encouraging to know that this char, unbriquetted, has had a commercial demand that absorbed in one year over 400,000 tons. It can therefore well lay claim to careful consideration as a member in good standing of the family of fuels.

Flotation Methods Successfully Used in Great Britain To Clean Coal, Culm and Sludge

Sulphur, Less Attracted to Froth Than Coal, Reduced in Percentage—Culm, Three-Fourths Ash, Cleaned by Flotation—Good Coal Sold—Plants Use Middlings—Advantages of Clean Coal for Blast-Furnace Coke

By C. H. S. Tupholme
London, England

HITHERTO in Great Britain coal has been washed by various gravity methods, which, being dependent on differences in specific gravity, are, economically speaking, limited to material above a certain size. A supplementary, or complimentary, system has been needed for the washing of finer material.

Such a method has been evolved by the Minerals Separation Ltd.,* the owners of the froth-flotation processes used hitherto only for the separation of metalliferous ores. In this process the coal to be cleaned, after being ground in the majority of cases until the particles pass through a screen of $\frac{1}{16}$ linear inch aperture, is mixed with from three to four times its weight of water. The mixture is then agitated by suitable methods and a small quantity of special reagent added. The reagent may be an oil or a coal-tar product or the waste from some industrial operation, one pound, generally speaking, being required for each ton of material treated.

Frothing Agents of Many Kinds Can Be Used

Several kinds of "frothing" agent are available, the selection of which is made according to the type of the coal and the nature of ash it contains, for some frothing agents are capable of floating even the ash. Again, by successive addition of frothing agents, a fractional separation of raw coal into concentrates of varying grade can be made.

Thus, Bury reports that the flotation of Welsh coal can be effected best in the presence of the wash water from naphthalene washing after all the naphthalene has been removed. By this preliminary floating a deashed coal containing about 3 to 4 per cent of ash is obtained. If now, a further addition of about half a pound of paraffin per ton of coal treated is made and agitation and floating are resumed, a second concentrate in the form of "bone coal," containing 12 to 15 per cent of ash, is obtained. This is well suited for use under boilers. The final residue is, of course, a material of a high ash content—80 to 90 per cent.

Besides the above coal flotation reagents, cresols, oil of pine, naphthylamine, xylidine and various tar oils have been suggested and, in some cases, used with success.

Agitation in the presence of the reagent produces a multitude of minute air bubbles, to which the coal particles attach themselves. The loaded bubbles rise to the surface of the water and form a froth containing the coal, which accordingly is removed. Meantime such material as contains a high percentage of ash sinks.

*Apparently in Great Britain the Minerals Separation Co., Ltd., has entire control of the flotation of minerals by oil. In the United States and Canada other systems of flotation are in operation, though little has been done in the United States in the cleaning of coal by this method.

The process may be applied to a wide range of material: (1) Coking coals, (2) low-grade coals for fuel purposes, (3) dump wastes, (4) stocks of slack, and (5) washery sludge or other coal-bearing material. The main difference between the treatment of high-grade coal and low-grade waste lies in the respective proportions of coal and waste—a factor for which plant design readily makes allowance.

A striking feature is the facility wherewith one grade of coal is, by means of reagent control, separated from another without screening or classification. By flotation it is possible to separate into its component parts any kind of coal. The raw product from the mine is a mixture of what may be termed pure coal, bone coal and shale. The first of these may be defined as a coal substance having no free but only fixed ash. As a result of the frothing process the pure coal is separated,

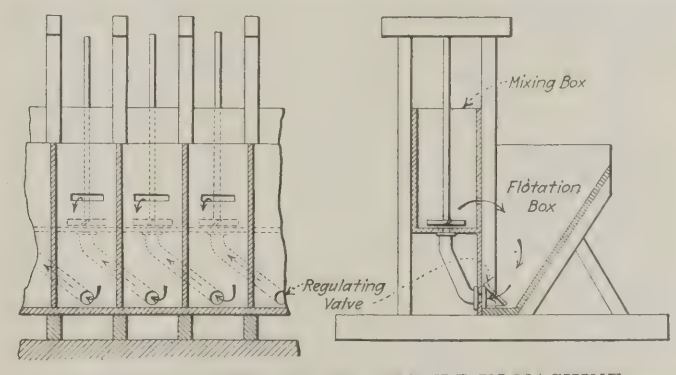


DIAGRAM SHOWING FLOW OF PULP IN MACHINE

Flotation reagent and water are introduced with coal in a mixing box, the mixer being driven by a vertical shaft. The product passes into the flotation box, where the froth rises and is scraped off with its coal. Thence it may be delivered by a conveying belt or trough.

the bone coal being left with the shale. In a later part of the process the bone coal is segregated. It may be added to the pure coal already obtained or it may be reserved for boiler, locomotive or producer uses.

The dimensions of a machine having a capacity of 672 to 1,120 net tons per 24 hours are as follows: Length, 37 ft. 6 in.; width, 16 ft.; height, 15 ft. 3 in. The coal for treatment, the flotation reagent and the water are introduced into the machine, the mixture passing at once to the first mixing box, the vertical shaft driving the mixer, or agitator, being indicated in the illustration.

Two steel joists running the whole length of the plant carry the horizontal shaft and gear boxes for driving the vertical agitator shaft, the agitators themselves being merely four-bladed horizontal paddle wheels. In front of each mixing box is a flotation box of V shape, the hand wheels being for the purpose of regulating the transfer of the material under treatment from flotation

TABLE I—RESULTS OBTAINED FROM WASTE MATERIAL AT THE ABERAMAN TIPPLE OF THE POWELL-DUFFRYN COAL CO.

		Percentage of Waste Material Recovered	Ash Percentage	B.t.u. per lb.
(1)	Raw coal	..	70.4	2,280
	Washed product	15	15.6	12,450
(2)	Raw coal	..	67.6	5,230
	Washed product	21	10.5	12,280
(3)	Raw coal	..	48.5	4,390
	Washed product	30	10.5	12,680

box No. 1 to mixing box No. 2 and from flotation box No. 2 to mixing box No. 3, and so on through the plant.

The material in the last box of the series forms the reject from the plant, practically all the coal having been separated out by the time that stage is reached. The flappers, or paddles, at the front of each flotation box are for scraping off the separated coal, which may be delivered to any appropriate form of conveying belt or trough.

The illustration shows the method of connecting each flotation box to the next mixing box—for example, flotation box No. 1 to mixing box No. 2—and so on as previously explained. The machine is designed for continuous working and operates automatically, one man per shift being capable of supervising plants capable of dealing with a maximum of 9,000 net tons in 24 hours. The application of the process to the treatment of all coal-bearing material is well established. Table I shows the results obtained from waste material at the Aberaman tipple of the Powell-Duffryn Coal Co.

Commercial operations on the Aberaman property show that a cleaned product containing from 6 to 10 per cent of ash can be obtained from dump material in which that impurity runs to 60 per cent.

The main difference between the treatment of high-grade coal and low-grade waste lies in the different proportions of product to waste—a factor which is readily allowed for in designing the plant. The perfect separation of coal from shales and other impurities is obtainable in whatever proportions the minerals may be mixed. The finest coal-dust, that found on colliery roads, on the floor of the tipple and in washery settling ponds, to which the fine untreatable discard of gravity washers is let, is readily amenable to treatment.

Strange to Say, Pyrite Also Is Removed

At first sight it might appear that the presence of pyrites in a coal would bar its treatment by flotation, as pyrites is one of the metallic minerals readily concentrated by the process. The reagents employed to treat coal, however, are different in character from those necessary for pyrites, and it is found that in the treatment of pyritic coal the coal floats more readily than the pyrite, with the result that the product obtained contains a lower percentage of sulphur than the raw material. Gypsum and other sulphates, practically speaking, are totally eliminated by the process.

It will be appreciated that the foregoing table includes, for purposes of brevity, final products only, and that the coals cited are readily separable into the constituent parts, thus yielding two, three or four products, as desired, each of which may be devoted to its appropriate use.

Actual results obtained by the flotation process include the following: (1) A coking coal was treated and two concentrates obtained. From 100 parts of the original, 62.7 and 13.2 parts of the concentrates were obtained, and 24.1 parts of residue were left. As the ash content of the original, the first and second concentrates and the residue were respectively 24.0, 3.4, 24.5 and 78.5 per cent; the combustible recovery was over 90 per cent. The low ash content of the first concentrate and the relatively large proportion of the latter are noteworthy.

(2) Similar trials were conducted with a non-coking coal, 100 parts of which gave 41, 28.6 and 30.2 parts of first and second concentrates and residue respectively. The high ash content of the original coal—21.8 per cent—was reduced to 6 per cent and 9.1 per cent in the concentrates, the ash in the residue rising to 74.4 per cent. The recovery of combustible matter was nearly 85 per cent. As the original coal was high in ash, this must be regarded as a satisfactory result.

(3) A washery residue, which of course, contained a high quantity of ash—namely, 61.2 per cent—was treated to produce a combustible concentrate and a residue, which were obtained in the proportion of 33.2 and 66.8 per cent. The ash content of the former was somewhat high, 10.1 per cent, but under the circumstances, especially as a combustible recovery of 75 per cent is shown, the result must be considered satisfactory. The washery residue in its original state is of little or no value, and the production of a good fuel, coking coal, or other combustible material has much economic signficance.

(4) Experimental runs have also been reported with washery fines as starting material. The ash contents varied from 13 to 45 per cent, and satisfactory yields of concentrates have been obtained such as have proved capable of being used for the manufacture of a good metallurgical coke.

(5) High efficiency is reported in the washing of a Welsh coal containing 10.1 per cent ash, from which a total recovery of combustible matter of more than 95 per cent was obtained. Thus, the washery afforded 87.2 per cent in the first concentrate, with 3.25 per cent of ash; 2.4 per cent in the second concentrate, with 19.2 per cent of ash, and a residue of 9.5 per cent, with an ash content of 72.1 per cent.

(6) Somewhat fuller details are available as the results of washing Derbyshire coal, analyzing 29.55 per cent of ash, 48.2 per cent of fixed carbon, and 22.35 per cent of volatile matter. A yield of concentrate of 75.1 per cent was obtained, which showed only 9.86 per cent of ash, the fixed carbon and volatile matter running respectively 60.24 and 29.9 per cent. The residue (24.9

TABLE II—RESULTS OF TESTS

Original		Cleaned Product		Tailings	
Sample Number	Ash, Per Cent	Weight, Per Cent	Ash, Per Cent	Weight, Per Cent	Ash, Per Cent
Crude Coals					
Coking					
1	12.4	87.8	3.8	12.2	72.4
2	24.2	75.9	5.2	24.1	78.5
3	15.8	83.2	5.4	16.8	76.0
Industrial (non-coking)					
4	25.5	73.8	8.9	26.2	84.5
5	27.0	68.3	9.0	31.6	76.0
6	21.8	69.8	7.3	30.1	74.4
7	28.2	66.7	9.4	27.5	78.8
Slack					
8	30.0	68.9	12.2	31.1	80.0
9	30.5	71.0	9.6	29.0	86.5
Silt					
10	35.5	60.2	8.1	39.8	74.0
11	33.8	48.5	11.7	51.5	78.0
12	21.5	83.8	9.9	16.2	81.5
13	45.2	59.0	12.5	40.5	82.8
Dumps and Washery Waste					
14	74.0	16.8	13.0	83.2	86.6
15	40.3	53.0	7.9	47.0	75.8
16	61.2	30.2	10.1	67.8	86.1
17	76.0	14.5	13.5	83.0	87.6
18	62.2	24.3	9.6	70.7	84.8
19	62.0	22.8	9.25	71.0	82.7
20	75.0	16.2	14.0	83.8	88.5
21	63.8	28.7	10.8	71.3	86.5

per cent) contained 82.45 per cent of ash, with only 2.75 per cent fixed carbon and 14.8 per cent volatiles.

The most striking feature of the process undoubtedly is the facility with which one grade of coal is separated from another merely by the control of reagents and without the aid of any form of screening or classification. This property renders the process extremely easy to regulate: it requires only elementary skill and a little intelligence on the part of the operative in charge to produce the most profitable separation into: (1) Fine, high-grade, low-ash coal; (2) band, bone or bastard coal of dull appearance and high combined ash; and (3) shales, clays, gypsum, etc., the results varying, of course, with the type of coal treated and the purposes for which the products are intended.

Bone, band or bastard coal cannot be separated by any gravity treatment, and success such as this is new in the annals of washery practice. The ash content in band coal may be said to be almost entirely molecularly mixed with the carbonaceous substances, and no degree of crushing and washing would effect its purification. As it can be removed by froth flotation the true coal can be made available for the manufacture of fuels of a new standard. This suggests a probable revolution in blast-furnace practice. We have succeeded in making from such concentrates coke containing 4.8 to 5.0 per cent of ash, the physical strength of which is much greater than that previously obtained.

TABLE III—RESULTS OBTAINED IN FLOTATION OF A COKING COAL WITH 10.14 PER CENT OF ASH

	Per Cent By Weight	Ash Content Per Cent
Pure coal	87.2	3.25
Bone coal	2.4	19.2
Shale	9.5	72.1
	99.1	

The main factors in the preparation of coal for coking were established in the course of extended investigations by a well-known firm of Cleveland ironmasters, who are now installing a plant having a capacity of 672 to 1,120 net tons per 24-hour day.

The samples on which the investigations were conducted consisted of high-grade coal associated with bone coal and closely admixed with carbonaceous shale, the ash content of the whole being about 12 per cent. The complete recovery of the pure coal was effected and the ash content reduced to less than 4 per cent. These experiments proved that the recovery of good coal would in practice be between 98 per cent and 100 per cent.

Table III shows a typical separation effected in the cleaning of coking coal carrying 10.14 per cent of ash in the raw state.

Obviously the bone coal may be mixed with the high-grade product if desired, but in this particular case it was proposed to make from the pure coal a high-grade coke carrying from 5 to 5.5 per cent of ash and to employ the bone coal for boiler or producer use, rejecting the shale as waste.

The value of the flotation process to ironmasters is indicated in Table IV and is based on the reduced consumption of coke per ton of pig iron produced as a result of the low ash content of the coke.

These figures may be resolved into a saving of 71.8c at normal exchange per net ton of pig iron produced from ordinary Cleveland ironstone, the bone-coal constituent of the original coal being utilizable at its purchase value in industries other than the manufacture of pig-iron coke.

For the production of coke for metallurgical purposes various coal-washing devices have found employment, efficiency being dependent on the difference between the specific gravities of the coal, shale and other impurities.

By means of these gravity processes, which involve prior or subsequent screen sizing for their effective operation, moderately good results are obtained on various sizes between 2½-in, and, say, ½-in. or ⅜-in. aperture. But on material which passes the ⅜-in. or ½-in. screen established methods of specific-gravity washing yield but poor results, whereas the extremely fine dust or silt cannot be cleaned by jigging or classification.

Efficient specific-gravity washing thus is limited to coarse material, and any attempt to include the smallest size in the washing process results in serious trouble, owing to the finely-divided shale being included in the washed product, which raises the ash content and obstinately retains water. Even with the coarser sizes the efficiency of these processes is entirely dependent on the nature of the coal.

Run-of-mine, generally speaking, consists of a mixture of high-grade coal (carrying little fixed ash) bone coal (relatively high in fixed ash) and shale carrying various small proportions of carbonacous matter, according to the nature of the deposits. Other impurities, such as iron pyrites, calcium sulphate, etc., sometimes are present. The mixture in some cases is intimate, in others the constituents occur in layers of greater or less thickness. Where the layers are thin or the separate constituents finely divided, effective separation, of course, is impossible, unless the material is crushed fine enough to separate these constituents.

Ash Particles in Coal Greatly Weaken Coke

In these cases it is clear that jig washing cannot be fully effective. Similarly gravity processes fail where the specific gravity between the high-grade and low-grade material is only small. Shale and low-grade bone coal are doubly harmful constituents of a coking coal, as not only does their presence increase the ash content of the coke but each particle present forms a center of weakness from which cracks radiate. It is chiefly due to the presence of these foreign substances that fine coke, or breeze, is produced. It has become customary to lessen this effect and to produce a more homogeneous product by crushing coking coal to about ⅜ in.

Froth flotation is, as has already been stated, applicable to the treatment of coal which will pass an aperture of approximately 0.1 in. square; it is independent of any difference in the specific gravity of the constituents and will separate with equal effectiveness the coarsest and the finest of suitably crushed product, classification being neither necessary nor advisable. By means of froth-flotation high-grade coal can be separated from bone coal and bone coal from waste, which makes it evident that the method has a much wider range of efficiency than specific-gravity methods.

Several full-oven charges of coke have been made on material thus prepared by flotation, and the following advantages obtained:

TABLE IV—SAVING EFFECTIVE IN COKE PER TON AT BLAST FURNACE

Coal	Per Cent Ash in Coal	Coke per Net Ton Of Pig-Iron, Lb.
Mine coal	12 to 15	2,500
Jig-washed coal	8	2,300
Froth flotation	3 to 4	2,100

(1) Ash reduction—saving in cost of handling, particularly where the product has to be transported some distance before it reaches the coke oven.

(2) Economy in coking—the product is more highly bituminous, yields a richer gas and a larger quantity of byproducts. Furthermore, the ash reduction makes it possible to charge the ovens with coal that will yield a coke with greater thermal capacity per pound.

(3) Production of superior coke—the coke produced from flotation-washed material is superior to any other type; it is harder and denser; it contains a minimum quantity of ash—sometimes under 4 per cent; it resists the crushing effect of the blast furnace, and offers all those advantages that only such a coke could offer.

(4) Economy in furnace space—where a coke cleaner than usual is employed there is room for an increased quantity of iron ores and fluxes. At an iron works in the North of England it recently was proved that flotation coke melted 17 per cent more iron than an equal weight of normal coke; in other words, 85 parts of flotation coke did the work of 100 parts of normal coke.

(5) Minimum of silica owing to ash reduction—less coke is required and less limestone flux per ton of ore.

(6) Economy of thermal efficiency of blast-furnace—the production of slag is reduced. Fewer thermal units are therefore employed in its production, and fewer taken from the furnace by the molten slag.

(7) Less fines—a dense coke affords a greater quantity of large coke, a lesser quantity of fines being removed in screening. The total value of the product of the oven thus is raised. At a large steel works in the North of England it was found that only 1½ to 2 per cent of coke breeze was made in place of 7 to 8 per cent which was produced when washed coal had been used.

(8) Maximum thermal efficiency at critical zone of furnace—the resistance of the hard coke to the crushing effect of the furnace burden minimizes the tendency toward coke consumption in the upper zone of the furnace, and the maximum number of heat units is developed at the tuyere lines; or, in other words, at the point of highest thermal effectiveness.

(9) Economy in transportation—savings are effected in the cost of transportation in two ways: (a) Directly, by eliminating the ash for the transportation of which freight charges must be paid, and (b) indirectly, for, owing to the superior hardness of the coke less fines are produced, and the maximum quantity of product arrives at its destination as large coke, a point most important to foundrymen and smelters.

Coal Furnishes Its Own Flotation Oil

Several plants are in course of erection where by-product ovens are employed for coking coal, the process in such cases being independent of outside sources for the supply of reagents, as coal tar produces everything that is required.

The cost of flotation is in the operation itself, and as the cost of the flotation oil is almost negligible, the main charges are for power and labor. It has been stated that the power cost is 1.34 kw.-hr. per short ton of coal treated, so that a few cents per ton covers this cost. Labor charges are small, and interest and depreciation cost little, as a plant that is capable of treating 1,000 net tons of coal per day costs $130,000. Allowing an interest and depreciation charge of 20 per cent per annum and 300 working days in a year, the charge will be less than 9c per net ton of coal treated.

Welders for Rail Bonding and Repairs

TWO new portable electric arc-welding machines recently have been constructed for mine use. The lightweight welder weighs only 46 lb. and is intended primarily for rail bonding. The resistance is made up of coils of nickel-chromium wire, mounted by a patented method on refractory porcelain insulators. Sufficient ventilation is provided so that the machine operates well below the critical temperature of the resistance wire. This welder can be used with any line potential between 175 and 275 volts. Four knife switches control the welding current. With these switches it is possible to get ten combinations giving current values from 20 to 150 amperes. The shunt welder also is a resistance machine but with a shunt connection which is used when the work is positive in polarity and the electrode negative. With this shunt in use, the machine has practically the same characteristics as a motor-generator outfit—that is, low voltage, short arc and uniform welding heat. The welds made in this manner are tough and machinable.

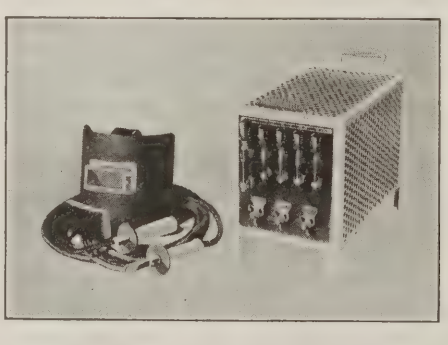


SHUNT WELDER CAN BE USED WITH CURRENT OF POSITIVE POLARITY

Welder has much the same characteristics as a motor-generator outfit.

If desired, the shunt welder may be used, unchanged, as a straight resistance machine. It may be used with the shunt for repair welding and without the shunt for rail bonding.

The resistance element in this machine is of the same type as that in the other welder. It will not be overheated by a continuous short-circuit at 280 volts, and may be used on any line having 150 to 280 volts potential. It weighs about 100 lb. Both machines are manufactured by the Ohio Brass Co., of Mansfield, Ohio.



FORTY-SIX POUND WELDER

Is suitable for rail bonding and will work with any potential between 175 and 275 volts.

Welders of the types above described find wide application at mining plants as the uses to which they can be applied are many and varied, embracing both field and shop repair work. As a result they are useful pieces of equipment.

Longwall Retreat with Coal Conveyors Modified so as To Make Each Face Independent of Every Other

Air Rooms Are Driven in Pairs so That It is Not Necessary to Maintain Communication Between Working Faces in Adjoining Sections—Faces Are Made Long Enough to Keep Cutting Machines Busy

By F. C. Cornet*
New York City

IN MY article that appeared in *Coal Age*, Jan. 4, p. 7, I showed a working method much like that in Fig. 1 but with single instead of twin air rooms. The air ran up the single air room and split at its head, the two air currents running back along the working faces of two separate sections and returning each by the conveyor rooms of its particular section. As the sections are not, or may not be, kept equally advanced, the air must travel the few feet between the faces of the sections by an airway which it may be difficult to keep open. At least there might be cases where the operator might fear that he could not keep such an airway free from falls. In Fig. 1 of this article is shown a way in which this objection might be met.

But here a few words of comment on the plan may be interposed. To the left of the main heading, shown in the center of this illustration, the workings are retreating and on the right they are advancing. The following description applies more specifically to the latter, but the reader will have no trouble in understanding, from the description of the right or advancing area, how the left or retreating area is to be operated.

Referring to the Second Right Heading, in Fig. 1, it will be seen that the rooms have a total length of 820 ft. and that the pillars between rooms are 400 ft. wide. All these pillars, however, are not solid. Forty feet inbye of the room separating two successive sections, an extra air room is driven, as shown, thus creating what I have designated as "twin air rooms." Each twin room receives air direct from the aircourse through a separate pipe overcast, as shown.

While the outbye member of any twin airway along the heading insures the ventilation of the face of the outbye section, the inbye member of the same twin airway conveys air to the face of the section next inbye. The face of every section being ventilated by a separate air room, it is no longer necessary to maintain a connection between sections, and so none is shown in Fig. 1.

As each section is independent, mining in any section may forge ahead of or lag behind that in contiguous sections, as the operator may decide. Each face in Fig. 1 of this article is twice as long as the faces in Fig. 1 of the previous article but they get twice as much air. Hence the number of men who may be employed per lineal foot of face (or lateral heading) is the same in both cases.

It is true that with this arrangement the cutting machines cannot pass, rapidly at least, from section to section, but the two faces of a section taken together offer enough development to the cutting machine to keep the latter occupied without seeking work in other sections. As to supervision, it is to be expected that a face development of 800 ft. is all that any assistant foreman will be able efficiently to supervise, especially if the same employee has charge also of the loading station connected with his section, which probably would be the arrangement made.

The distance between successive lateral headings has

*Consulting engineer.

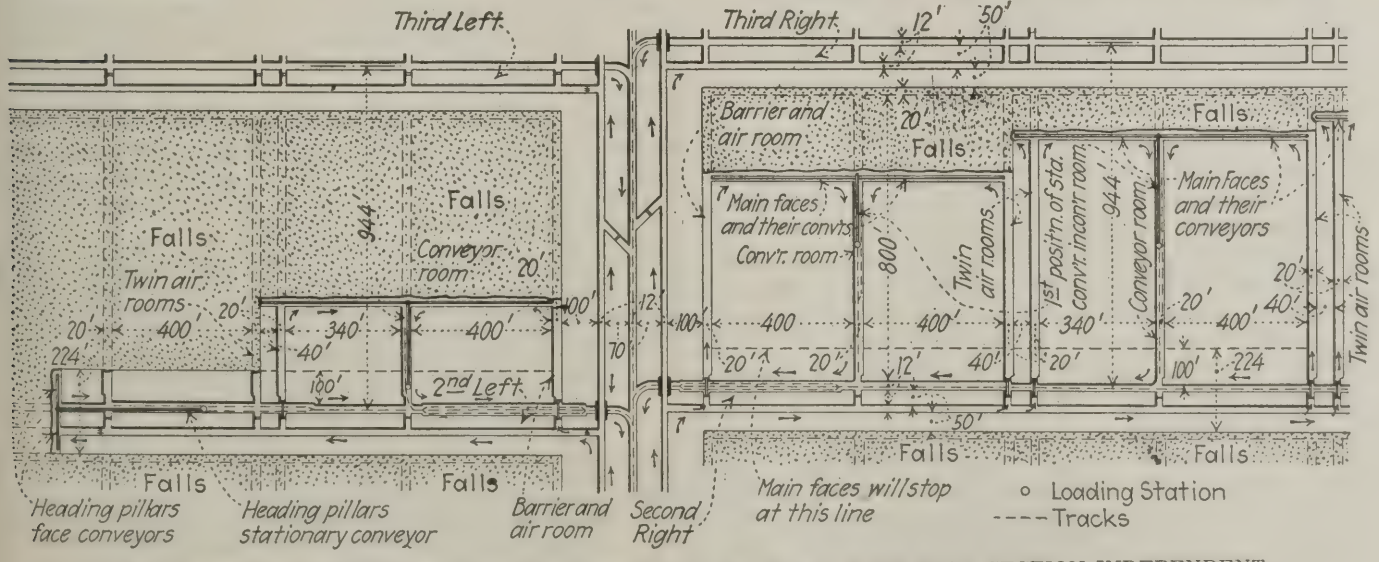


FIG. 1—RETREATING AND ADVANCING LONGWALL METHODS WITH EACH SECTION INDEPENDENT OF THE OTHERS

Of course, the longwall faces themselves are all worked retreating, but the order in which the individual sections are started may be made either retreating or advancing at will. The retreat is shown on the left and the advance on the right. By the use, where the sections join, of two air rooms at 60-ft. centers, each of the sections is separately ventilated, so that it is not necessary to maintain a connection between them.

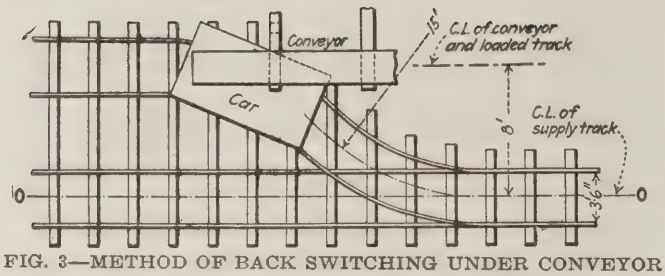


FIG. 3—METHOD OF BACK SWITCHING UNDER CONVEYOR
By this method the cars come continuously to the discharge end of the conveyor, saving much time in spotting them.

been increased in this plan so that it is now 944 ft. from center to center. The former arrangement reduced the narrow work considerably, but this layout makes a further important reduction. The great length of the rooms (820 ft.) consequent on the increased distance between lateral headings, together with the inadvisability of using conveyors more than 400 ft. long, caused the designer to locate the loading stations in the conveyor rooms themselves.

A loading station is placed in the beginning about half way up the room, as is shown in two of the sections off second right in Fig. 1. When mining gets close enough to this first location to interfere with the handling of cars on the tail track, the loading point is moved back toward the neck of the room, the new position chosen being the same as that shown in the first section off second left. Here the stationary conveyor is shown in its second and final location which is within that zone of coal, 100 ft. wide, which is left along the upper side of all lateral headings and which ultimately will be recovered when the heading pillar is withdrawn. This 100-ft. zone is shown also at the left of Fig. 1.

At both their locations in the conveyor rooms nothing prevents laying the conveyors as shown in Fig. 2, the loading end being curved gently upward instead of somewhat abruptly, as was shown in Figs. 2 and 6 of the previous article. As shown in Fig. 2 of this article, the more desirable inclination and the head of the conveyor can be included entirely within a space of 50 ft., which is short enough to permit the curved part of the conveyor and the loading tracks to be all laid within the 100-ft. zone above referred to.

The heading pillars will be recovered as shown in Figs. 1 and 3, the cars being taken beyond and beside the conveyor head, switched under it and taken out by another track, thus avoiding separately shuttling each car under the conveyor.

As the cutting machine proceeds on its work along the face, a line of props, called the "face line," should be set between the face and the conveyor at a distance from the latter equal to the depth of a cut. The distance between props in the face line may be less than 4 ft. and as much as 8 or 9 ft., depending on the kind of roof to be retained in place. As these props are set, the old face line, now against the conveyor on its working face side, is taken down. Ninety per cent of such props are good for further service. The conveyor is now moved against the new face line. Without loss of time a break line is then set against the conveyor on the side away from the face. This line is made of two or three rows of props set 2 or 3 ft. apart. As only two break lines are maintained, the old line is now removed. This is done easily if the props have been set on wooden slabs 15 in. long, and these slabs in their turn have been laid on fine coal.

In the salvaging of props, no risk to life or limb should be run. If mining is evenly and regularly conducted, it will be found practicable in most cases to save a large proportion of the props without any risk being taken. But no props ought to be left standing behind. Those which cannot be knocked down otherwise must be dynamited. An expert timberman or the average assistant foreman knows how to dispose of the most refractory prop by means of a quarter of a stick of dynamite extended at the end of a 16-ft. joint of half-inch pipe, or its wooden equivalent. Props left standing in the rear are much like the so-called "protective stumps" left in pillar work. Instead of protecting anything or anybody they are a source of trouble in that they disturb the regularity with which the roof breaks.

In some cases it will be preferable to make the break lines of cribs. These should be erected on wooden slabs resting on slack. When a mine operated on the system above described, or a modification of it, works irregularly, it may prove good policy to adopt the crib exclusively in constructing the two break lines, using props only for the face line.

Difficulties are quite likely to occur on a longwall face when a long shutdown occurs, especially in a mine in which the roof hangs and does not collapse as close to the break lines as desirable. In such a case an undue burden often rests on these supports. In cases like these when there is reason to believe that a long shutdown is in sight the break lines should be supplemented to tide over the idle period. Thus two good rows of supplementary cribs could be built, one between the two rows of props forming the regular break lines, the other in the place of the conveyor against the face line of props, the conveyors being placed in the air and conveyor rooms to make room for the cribs.

There will be few mines operated along the lines described above where temporary supplementary timbering, well done and done in time, will fail to keep the working faces open through the long periods of idleness. Most of the timber used in such work will be found still serviceable when the time comes to put the faces in working order.

I have no hesitation in saying that after a long shutdown—a protracted strike, for example—less repairs will be found necessary in a mine operating according to this new system than in one of same capacity where the room-and-pillar method is used.

Intimate acquaintance with the roofs of mines in West Virginia and Kentucky makes me confident that the timbering practices described, more or less modified and improved if need be to meet unusual local conditions, could be used with good results in those regions.

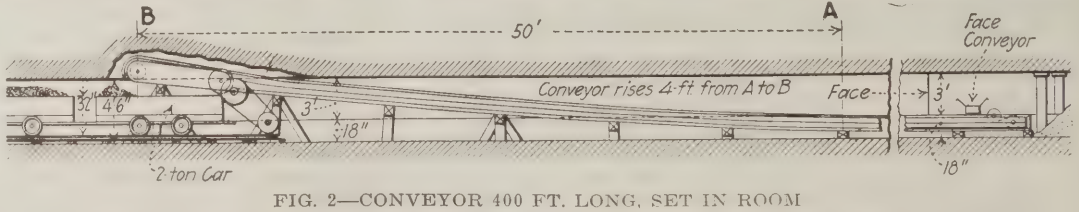


FIG. 2—CONVEYOR 400 FT. LONG, SET IN ROOM
Instead of lifting up the conveyor head steeply it can be given a grade of about 8 ft. in 100 at its discharge end. At the loading end it is kept down in the cut that was made to give passage to the car while the room was being driven. In consequence the face conveyor delivering to it can be kept on the coal bottom.

Rubber Is to Be Imported as a Liquid

HITHERTO the milk or latex of the rubber tree has been coagulated before being shipped, this being originally performed by smoking it in the smudge made by burning uricuri nuts, as in Brazil, or by adding chemicals by which the same or a better result is obtained. Under the Hopkinson process the rubber is extracted as liquid from the latex and brought in that form to the place where it is to be manufactured.

It is claimed by the U. S. Rubber Co. that the action of kneading the rubber into the required shape, area and thickness by heat, pressure, tearing and mastication are harmful to the product and that the rubber produced from the liquid form without such intermediate action shows a substantial increase in tensile strength and resistance to abrasion, two vital matters in crude rubber. The product also is said to be unusually uniform.

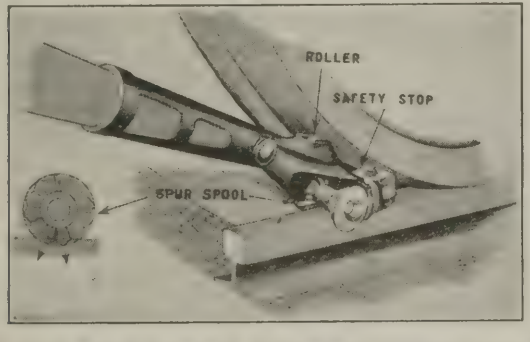
There is the further advantage that fabrics can be made more readily to absorb the liquid than to knit up with the rubber dough, the latter process being one in which much pressure is used. It is also stated that rubber in the form of a solution injures the threads of the fabric to which it is applied.

Pinch Bar with Changeable Grip Cannot Slip and Fall and Will Block Wheel

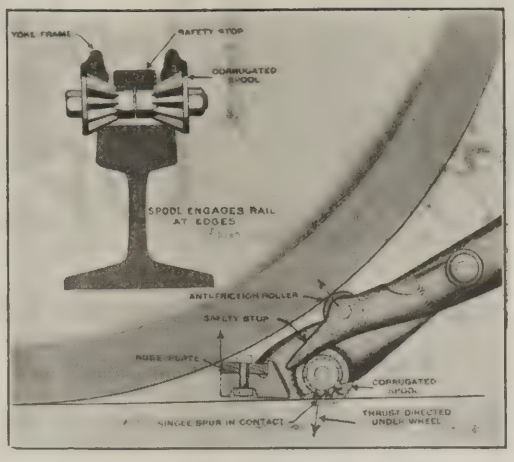
CAR-moving bars usually have only one grip. This soon wears on the rail and until it is sharpened the service given by the bar is unsatisfactory. Furthermore, when the car is induced to move by the pinch bar the point soon reaches a critical position on the wheel where any further movement of the car will rapidly move the wheel out of range of the point of the bar. In consequence the car mover must watch carefully lest he continue to bear so long on the bar that it will suddenly slip and lose its hold entirely, dropping him onto the tracks.

In consequence his fingers will be caught between the rail and the bar. This is a sufficiently severe accident but a worse may occur if the man is barring the car alone and uphill. The pinch bar being removed, the car may come back on him when he thus falls, and if it does not hit him he may console himself with the thought that he has lost only his labor and not his life. Fortunately a grade up which one man can pinch a car rarely is steep enough for a car to run back on it. But even with two men there is a risk, for the other man may not act with judgment.

To give the grip on the rail which is so important in

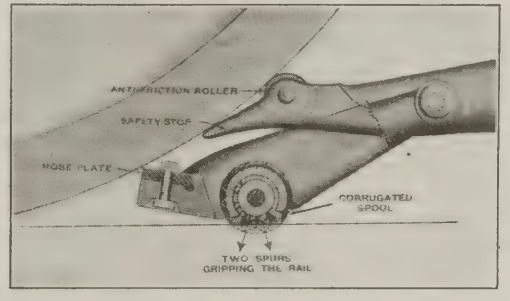


PINCH BAR WITH SAFETY AND TIME-SAVING FEATURES
This bar has a safety stop to prevent a sudden loss of grip on the wheel, a spool grip that being changeable will always give a firm hold and a nose plate that if the pinch bar is left on the rail will prevent the wheel from running backward.



DETAIL OF GRIP, NOSE PLATE AND SAFETY STOP
In this view the safety stop is not in operation, for the car has not moved far enough to let the handle down near the rail. The roller is and remains in contact with the wheel.

a car mover, the Smiley Car-Mover bar has a pair of corrugated spur spools, or wheels, so positioned that they grip or bite at four points on the lateral edges of the railhead, thus absolutely preventing the bar from slipping under load, no matter if the rail is greasy or even



CAR MOVES FORWARD AND SAFETY STOP IS AT WORK
The handle is suddenly arrested in its downward way by the safety stop. The pinch bar is so placed on the rail and under the wheel that it can be left unattended and will hold the car from rolling backward.

covered with thin ice. The spools are heat-treated so as to give extreme hardness without brittleness. Worn spur edges can be quickly replaced by simply loosening the nut of the holding bolt and turning the spool so that a new edge will come in contact with the rail.

To prevent the sudden falling of the bar when in use, due to movement of the car, the lower or short end of the handle casting is extended to form a safety stop which makes a positive contact with the under surface of the wheel when the bar handle is depressed to within about 8 in. of the rail. This arrests or greatly retards the downward motion of the handle of the bar, thereby preventing serious injury to the operative, such as bruised knuckles, broken knee caps, a sprained back or a wrenched neck.

The combined action of the spur spool and the safety stop prevents the car from rolling backward on grades. Furthermore it will hold all the headway gained in pinching up a grade, and it enables a single operative to do the work of two on slight grades, as the car is securely blocked, thus permitting the operative to leave the bar under the wheel while he goes forward and sets the brakes or places permanent blocking. A slight depression of the handle enables the bar to be removed. The bar is manufactured by H. D. Ganung, 209 Elk St., Syracuse, N. Y.



Problems of Operating Men

Edited by James T. Beard



Relative Safety of Safety Lamps Under Varying Conditions in Mines

Term "Safety Lamp" Somewhat of a Misnomer—Fatal Gas Explosion Makes Plain the Necessity of Extraordinary Care in Use of Safeties When Testing for Gas

REGARDING the use and care of safety lamps in mines, as suggested by several correspondents, in letters appearing recently in *Coal Age*, I desire to add my quota. The occurrence of a fatal explosion of gas and dust at our Wakesiah mine, Nanaimo, B. C., Nov. 24, 1922, prompts me to do this.

Notwithstanding our knowledge of the principles and conditions affecting the use of safety lamps and which we are prone to pass up, in practice, we fail to realize what has been so often pointed out in *Coal Age*, that a safety lamp is not safe under all conditions, but only when properly constructed, cared for and used. In fact, the term "safety lamp" is rather a misnomer.

The Wakesiah Mine Explosion

For the benefit of those who may not have heard or read of the accident in the Wakesiah mine, I will briefly recount the occurrence. It was an explosion of gas augmented by coal dust and cost the lives of two men, Gilbert McBroom, a pumpman; and Alfred Odgers, a fireboss. The former was killed by the force of the explosion, while the latter was asphyxiated by the afterdamp.

There were thirteen men working on the nightshift, at the time the explosion occurred. With the exception of the fireboss, Odgers, who carried a Wolf safety lamp, all of the men were equipped with Edison electric head lamps. The eleven men who escaped without serious injury were all working on the intake side of the explosion. McBroom, who was killed by the blast, was working on the return at a point 250 ft. distant from its origin.

Explosion Started in Brushing in Slant Heading

The place where the explosion started was a slant driven up the pitch off the first left level on the new slope. Two other places had been turned from this slope and were driven in a direction to parallel the level. In this section of the mine, the coal was 3 ft. 8 in. thick and overlaid with from 3 to 5 ft. of shale above which is a thinner seam of coal varying from 20 to 24 in. in thickness.

The seam is worked longwall, the roads being cogged on both sides. The roof is brushed in order to gain the required headroom. The brushing in the slant where the explosion started was about 3 ft. thick and had exposed the upper seam of coal. In such a case, it was not uncommon to get a little gas in a place.

Compressed-Air Pipe System in Use

A two-in. compressed-air pipe had been installed in the level and a 1¼-in. pipe extended up the slant. A 50-ft. length of hose was attached to the pipe for running a jack hammer. This hose was also used to drive out any gas that might accumulate during the night or when the place was not working.

From the evidence given at the inquest, the fireboss, Odgers, had fired a shot for two miners, about thirty minutes before the explosion occurred and about 250 ft. distant from that point. On leaving their place, he told them he was going to clear out some gas from a place above to make it ready for the morning shift. That was the last seen of him until his lifeless body was found a few hours later.

Rescuers Enter the Mine

Following the explosion, a rescue party entered the mine and within thirty minutes from the time the blast occurred they had found and carried out the body of McBroom, who was killed at a point on the return 250 ft. distant from the origin of the explosion. The body of the fireboss was not found until some time later, about 7 a.m.

The investigation showed that the hose had been changed from the level to the slant, for the purpose of clearing out the gas as the fireboss had said he was about to do, on leaving the men. The end of the hose, it was observed, had been deflected upward into the brushing and was blowing down the slant. The Wolf lamp, carried by the fireboss was found 21 ft. from the end of the hose and the man's body 84 ft. beyond the lamp. His cap bag containing 16 detonators or electric fuses, still intact, and a shotfiring cable were found lying at the stopcock, where the fireboss had turned on the compressed air.

Judging from the position of his lamp, the fireboss, after turning on the compressed air, had evidently advanced toward the face of the slant, against a highly explosive mixture that was blown from its lodgment by an air pressure of 90 lb. per sq.in. at the nozzle of the hose, which was pointing down the slant. The velocity due to this pressure may have been anything from 2,000 to 3,500 ft. per minute.

Though the lamp was provided with a double gauze, it apparently failed to isolate the flame of the gas burning within the lamp. The gauze chimney, as in all Wolf lamps, was further protected by a corrugated steel bonnet. Examination of the lamp when found showed that it was in perfect condition, properly assembled and the gauzes and glass undamaged. Later, the same lamp was subjected to a severe test in an explosive mixture, at the lamphouse, and withstood that test four times in succession.

Heating of Lamp Caused It to Fail

It is important to note, here, that a close examination of the interior of the gauzes showed the wires had been subjected to an intense heat, which was not apparent on the outside of the gauze where the wires showed little signs of having been heated. All who examined the lamp and observed the tests to which it was subjected in the lamproom are fully convinced that this lamp failed in the mine.

As a result of this experience, all of our firebosses are now required to carry two lamps, one a double-gauze Wolf safety lamp, having its flame set so low that it could only be used as a gas tester and eliminating, as we hope, some of the dangers of the lamp becoming heated when used for illuminating as well as for testing purposes. The other is a twin-bulb electric headlamp that can be turned off when making a test for gas.

Every Lamp Tested Before Being Taken Into Mine

Before being taken from the lamp cabin, each safety lamp must be tested in an explosive mixture. For a time, these requirements proved a little irksome to men who had been accustomed, for thirty-five years or more, to practice in the old way. The lesson taught by this sad occurrence, however, has impressed all our officials, particularly our firebosses, with the need of exercising the utmost caution in the use of their safety lamps.

In closing, let me say that the question of the relative safety of safety lamps in explosive mixtures, and even

in low velocities, appears to me to be worthy of further investigation and report. In my opinion, the fact that this lamp had been in use, for illuminating purposes chiefly, seven hours prior to its failure, indicates that it was overheated at the time and that probably caused it to fail. Is it not time when we can hope for some other means of testing for gas than by the safety lamp, which always introduces an element of danger?

W. H. Moore,
Manager, Wakesiah Mine,
Western Fuel Corp. of Canada.
Nanaimo, B. C.

Tamping Holes in Blasting

Different experiences the result of varied conditions, or differences in practice — Steel bars a menace to safety — Work of experts in demonstrating explosives.

FREQUENTLY, when reading the letters of correspondents in *Coal Age*, which invariably expresses the views of practical mining men, I have been at a loss to explain the difference in the conclusions and experiences of men engaged in the same undertaking. More than once, I have asked myself the question, Is this difference the result of varied conditions in mining; or does it come from difference in the habits and training of the men themselves?

Only recently, I became deeply interested in an article by John Rose, former district mine inspector in Tennessee, in which he expressed opinions at variance with the experiences generally expressed by coal-mining men of long practice. (*Coal Age*, Nov. 30, p. 880.)

Disparaging Danger

Commenting on the remarks of a previous writer in reference to the use of steel tamping bars being dangerous in blasting, Mr. Rose states that, while he does not wish to be understood as approving of the use of steel tamping bars, he does not consider the danger as great as the previous writer would have us believe. At the close of his letter, he again remarks that, during his experience of thirty-five years in mining in Tennessee, he has not seen or heard of an accident resulting from the use of steel bars for tamping.

While it is true that accidents from this source are not common, still I cannot agree with any one who assumes an attitude of indifference in respect to a condition that may cause an accident, with every probability of the result proving fatal.

Fatal Use of Steel Bars

In contrast with the claim of this writer, let me say that we have experienced two fatal accidents, in Northeastern Kentucky, both of which were known to be the result of using iron tamping tools. One of these accidents occurred at Willard, Ky., in 1920; and the other at Betsy Layne, in 1921. Others have occurred that were ascribed to the same probable cause, but generally lacked the necessary evidence to prove the fact.

The use of iron tamping tools, like coal slack for stemming, is generally recognized as dangerous practice. Nothing is to be gained by assuming that they are anything other than bad. Every effort should be made to discourage such practices, regardless of the fact that with proper care and caution, accidents may be avoided.

In this connection, let me say that to assume present-day miners can be depended on to use different size cartridge sticks to avoid danger in charging a hole drilled with a worn bit; or to suppose that they will employ heavy shooting paper when making up their cartridges; and use special care in placing their shots, is to expect more than what is warranted by actual facts and observation.

Seldom do we find a miner with more than one cartridge stick; more often he has none at all. We are most likely to find him using ordinary newspaper for shooting paper, and stemming his hole with coal slack. It is these conditions that have prompted me to offer a few comments in the interest of greater safety in blasting.

Looking Backward on Discipline Twenty Years Ago

Looking back on mine discipline of, say twenty years ago, and comparing it with the conditions that have existed in our mines during the past six years, one is led to believe that better mining conditions and not improved mine regulations have been our salvation in many instances.

Owing to the fact that mine workers of today cannot be depended on to do the safe thing, mine officials and particularly mine foremen and safety inspectors should make every effort to see that the miners in their charge are provided with the safest tools and employ the safest practices possible.

For several weeks, it was my good fortune to be required to check up the results of three different blasting experts, employed by different concerns to demonstrate the use of the different explosives manufactured by their respective firms. Each of these experts were engaged in soliciting the business of a large coal corporation operating some seventy mines.

Applying Expert Knowledge in the Mining of Coal

My observation showed that each expert used the same precautions, employed about the same amount of explosives, and obtained results that were almost identical as to the amount of lump coal broken down and the general results of the shot.

There were many old American miners employed in those mines. When these were asked their opinions concerning the shooting of their places, they naturally resented the idea that any one could get better results than they could themselves. However, my observation convinced me that, in most all of the places, each of the three experts was able to get better results than the old miners who worked the places.

The only difference between the miner and the expert, in the performance of the work, was that the expert took far greater care in preparing his stemming and tamping the hole. Special care was exercised to get all small stones out of the clay, which was then worked in the hands until it had the consistency of putty.

The first dummy was placed gently and pressed firmly back on the charge. Only permissible explosives and electric blasting caps were used and the entire hole was tamped hard to the mouth. Their methods proved safe and the results exceptionally good.

Pikeville, Ky. George Edwards.

Caviling System in England

Choice of working places, by lot, each quarter—Origin of system in North of England—Miners choose their own partners—System gives satisfaction and creates harmony.

IN connection with improving the conditions in coal mining, to which reference has been made by other writers, kindly permit me to mention what is known as the "caviling system" practiced in the North of England. Whether or not it could be applied with equal success in this country would have to be determined by trial. Of one thing, however, I am certain; it insures a square deal for all the miners and is profitable for the operator.

In that system, all the working places in the mine are raffled off four times a year. At the end of each quarter, the miners draw lots, which determines the place where each must work for the next three months. Every man accepts his lot with goodwill. If he has drawn a bad place, he consoles himself that he may do better next quarter.

Origin of the "Caviling System"

As far as I know, the caviling system originated in the North of England. Evidently, its purpose is to have all miners share and share alike. In every mine, there are good and bad places and the invariable problem of a mine foreman is to keep men at work in the poorer places.

In this country, when a man finds that he must work in a place where he can earn a mere existence, he generally prefers quitting. As a result, such places will often stand idle so long that they get in bad condition. The first newcomer that happens along is sure to get one of these places, and the foreman must put it in safe condition before allowing a man to start to work there.

It will frequently happen that a foreman finds that he has under estimated his running expense for the month. Then, in order to prevent a "bawling out" by his superintendent, he prefers to let these places stand idle for a time rather than timber them.

Before next month rolls around, one or more of the places may have caved tight, causing a loss of much coal and

track. It will often happen that an empty car, left standing at the face, is caught by the fall and cannot be recovered. The trouble may not be confined to a single place, as the cave will often shut off the ventilation from adjoining places and require much work and expense before the trouble can be remedied.

The caviling system has the advantage of eliminating these troubles, since the foreman is then bound to give the same care and attention to all places where men are working. There is besides another feature that should be mentioned, as it tends to create harmony. Every miner is permitted to choose his own partner.

When a man is compelled to work, from day to day, alongside of a man with whom he is not on friendly terms, there is sure to be trouble. Neither of the men can do their best work and, before long, one or the other will find some excuse for quitting. In my own experience, on a few occasions, I have been sent to dig coal with a man who was a foreigner and could not speak English well enough for me to understand him. At the best, I can assure you the experience was disagreeable.

In closing, let me say that the caviling system, in England, gave good satisfaction to all concerned. There was harmony among the miners, and the operators derived an unquestioned benefit. I do not know why a similar system could not be worked to the same advantage, in this country.

Frontier, Wyo. WILLIAM ALLAN.

Inquiries Of General Interest

Action of Safety Lamp Flame in Firedamp Mixture

Observed Elongation of Flame Assumed as Due to Increased Velocity of Air Touching the Flame—Flame Lengthened in Effort to Reach Air Required for Combustion

KINDLY permit me to submit for the consideration of *Coal Age* and its readers a question of theory that has engaged my study for some time and which I am anxious to see discussed by others. On numerous occasions, I have propounded the question and my solution of it to firebosses and other mine officials; but have almost invariably received the answer that the lengthening of a lamp flame in the presence of gas is due to the burning of the latter or, as expressed by some, "the pull of the gas."

To my mind, this general and indefinite explanation, if such it may be called, conveys no positive idea and fails to satisfy the inquiring mind. Believing that our knowledge is of little practical value, except as we apply it to determine the causes of observed effects, I have studied to ascertain the cause of the lengthening of the flame of a safety lamp burning in an atmosphere charged with gas. Following is a brief summary of my conclusions:

It is a well known fact that all fluids, liquid or gas, if free to move, travel in the direction of the greater pressure. For example, a ventilating fan may act to increase or to reduce the pressure in the fan drift and, as a result, the air current is moved from the fan or towards it, according to the greater pressure, the ventilating pressure being above that of the atmosphere in the first instance and below that of the atmosphere in the second.

Now, applying this principle to a safety lamp, let us first assume that the lamp is burning in normal air, no gas being present. Naturally, the air in contact with the flame of the lamp is heated and expanded, which causes it to rise. In that condition, the air exerts a lesser downward pressure than at its normal temperature and an inflow of air toward the flame below is the result, the flame maintaining a certain height.

Assume that the lamp is now inserted into an atmosphere charged with gas. This mixture being lighter than normal air, the upward air pressure is still further increased and the downward pressure decreased, with the result that the inflow of air toward the flame is more rapid than in the first instance. This increased velocity naturally forces the flame upward and lengthens it precisely as a flame is lengthened by the action of a blowpipe.

To test this theory by other means I resorted to the following simple experiment. Slowly lower a piece of cardboard over the chimney of a common kerosene house lamp. As the cardboard approaches the top of the chimney, the flow of the heated air rising from the lamp flame is materially impeded, the flame itself is expanded and partially fills the chimney.

My explanation of this phenomenon is that obstructing the flow at the top of the chimney causes the air retained within to become heated to such an extent that its downward pressure is considerably reduced, and the increased velocity (?) of the inflowing air lengthens the flame in a similar manner to that observed in the safety lamp.

Another instance bearing on this theory is the observed expansion of the normal flame of a safety lamp when the latter is carried into a place having a somewhat higher temperature. Most firebosses and other mine officials have observed this action of the lamp flame when entering a close warm place in the mine. The flame of the lamp will gradually expand and smoke the gauze and the glass cylinder. I would explain this effect in the same manner as previously described.

To my mind, whether the lamp flame is at a normal height or has been reduced, in order to observe a cap, the burning of the gas, contained in the air entering the lamp, does not act to increase the height of the flame as so many believe. Assuming a normal lamp flame, the supposition that the burning of the gas in the air lengthens the flame would involve the idea that the gas burns with a visible flame, which we know is not the case. This, to my mind, is sufficient proof that such a theory is wrong.

If my theory is correct; namely, that an observed lengthening of the flame of a safety lamp is caused by an increased velocity of the air supply, owing to a reduced pressure within the lamp, the inference is that a gas lighter than air is present and this is generally assumed to be methane, in mining practice. The result is, as I have known by personal experience, that the lengthening of the flame in a safety lamp has caused the report of the presence of firedamp when that was not the case.

In submitting this question to *Coal Age* and its readers, it is not my intention or desire to detract from the importance and significance of the indication of the lengthening of the flame of a safety lamp. The sole purpose is to get at the true explanation for the phenomenon. My theory may be entirely wrong, but, to my mind, it thoroughly explains the cause of the lengthening of the flame, which may be due to the presence of firedamp or otherwise. I shall be interested in learning how this theory is regarded by others. I. C. PARFITT.

Washington, D. C.

The theory submitted by this correspondent is unique and ingenious; but, in our opinion, is not a satisfactory explanation of the lengthening of the flame of a safety lamp burning in a gas-charged atmosphere. In the mind of the editor, the idea advanced has no warrant to replace the generally accepted theory that a lamp flame, burning in gas-charged air, is lengthened by reason of its effort to reach the air required for complete combustion of the carbonaceous matter forming the body of the flame.

What our correspondent has said with reference to the invisibility of the gas flame proving that it (the gas flame) is not the cause of the observed lengthening of the lamp flame, appears to involve a misconception of the effect of a gas-charged atmosphere surrounding the lamp flame. It is not assumed,

for a moment, that the gas flame combines with the lamp flame to produce the observed lengthening of the latter.

The generally accepted reasoning is that the gas-charged air surrounds the lamp flame with an envelope of burning gas that is, of course, invisible. But as a result, there are two effects: First, the heat of the burning gas increases the temperature and expands the volume of the visible lamp flame. Second, the oxygen that would otherwise reach the lamp flame is partly consumed in the combustion of the gas surrounding it. The natural result of this is that the incandescent carbons of the lamp flame travel further upward before finding oxygen sufficient for their combustion.

The same principle explains the tapering structure of all flame, as it reaches upward in the effort to find sufficient oxygen for the combustion of the carbonaceous material of the oil or other illuminant burned in the lamp. We shall be glad to have the question further discussed by those whose experience and training enable them to give a satisfactory explanation of the phenomenon.

Examination Questions Answered

Miscellaneous Examination Questions

(Answered by Request)

QUESTION—*Explain the effect of barometric pressure, in mines giving off methane (CH_4).*

ANSWER—A falling barometer indicates a decreasing atmospheric pressure. Any considerable decrease in atmospheric pressure means a corresponding expansion of the air contained in abandoned areas within the mine, owing to the relief of the pressure. As a result, air flows out from such abandoned places; and this outflow of air is very apt to be charged with poisonous gases, which are also frequently explosive, or become so when mixed with a larger volume of fresh air in the air current.

Therefore, a fall of barometric pressure is very apt to be accompanied with an increase in the explosive condition of the mine air. Extra precaution is required, at such times, in order to prevent disaster by reason of the ignition of the gas-charged air. The condition is much more dangerous in a dusty mine, where the presence of the dust floating in the air is an added menace to the situation.

QUESTION—*What difference is there, if any, in the quantity of air passing through two splits from a main aircourse, the first split having an opening 4x9 ft. and 4,000 ft. long, and the second split having an opening 6x6 ft. and 5,000 ft long?*

ANSWER—Assuming that the two splits are under equal pressure and the sectional area of each being 36 sq.ft., the quantity of air passing in each split will vary inversely as the square root of the rubbing surface, which in the first airway is $2(4+9)4{,}000 = 104{,}000$ sq.ft.; and in the second airway $2(6+6)5{,}000 = 120{,}000$ sq.ft. In other words, the quantity ratio, in the two splits, is equal to the square root of the inverse ratio of their rubbing surfaces, which gives

$$\frac{Q_1}{Q_2} = \sqrt{\frac{120{,}000}{104{,}000}} = \sqrt{1.1538} = 1.074$$

That is to say, the quantity passing in the first split will be 1.074 times that passing in the second, under the same pressure.

QUESTION—*(a) How would you determine when the coal dust in a mine requires more moisture, in order to render it safe from explosion hazard? (b) Name two or more methods of applying moisture to coal dust in mines.*

ANSWER—(a) To render coal dust immune and safe from explosion hazard, it should be sufficiently moistened to be plastic when compressed in the hand or molded, according to the recommendations of the Federal Bureau of mines.

(b) The means of applying moisture are numerous. Water cars have been used for watering the roads in small mines. Spraying the roads and travelingways, by installing a pipe system throughout the mine, is more efficient. At times, the pipes are perforated with small holes through which the water is sprayed. Again, short lengths of hose are used attaching them to plugs in the pipes. These are arranged at short intervals along the roads and travelingways.

Another system largely used is to humidify the mine air as it enters the mine, using steam for that purpose and raising the temperature of the air by passing it over steam coils, to enable it to take up more moisture. Much of this moisture is deposited in the workings as the air current traverses the mine. The distribution of salt in mine workings has been found very efficient for keeping the dust in a moist condition. A good plan is to mix the salt with the stemming used to tamp the holes in blasting.

QUESTION—*What are the duties of a mine foreman when he arrives at the mine in the morning?*

ANSWER—On his arrival at the mine in the morning, the first duty of the mine foreman is to assure himself that the engineer, firemen and other top hands are in their places and that the ventilating apparatus is working properly. On entering the mine, he must examine and sign the fireboss' report and learn from him the general condition of the mine. The foreman should receive from the fireboss and hold the checks of men working in places where danger has been found. He must arrange to have these dangers removed and the places made safe, as quickly as possible. No one must be allowed to enter such places, however, until the places have been again examined and found safe for work. The foreman should then see that the work of hauling and hoisting coal is proceeding and arrange for any needed supplies of timber, rails and tracking so as to avoid unnecessary delay.

QUESTION—*Compute the horsepower of an engine 18x36 in., with 110 lb. steam pressure.*

ANSWER—The sectional area of the cylinder of this engine is $0.7854 \times 18^2 = 254.47$ sq.in. Operating under a gage pressure of 110 lb. per sq.in. and assuming a two-thirds cutoff, the mean effective steam pressure in the cylinder may be taken as 88 lb. per sq.in.; and the total pressure on the piston is, then, $88 \times 254.47 = 22{,}394$ lb. Again, assuming a piston speed of 600 ft. per min., the indicated horsepower of this engine is $(22{,}394 \times 600) \div 33{,}000 = 407$ hp.

QUESTION—*What weight can be lifted by an 18x36 in. engine, operating under a gage pressure of 110 lb. per sq.in., the engine being direct connected to a 6-ft. drum?*

ANSWER—Estimating the lifting power of the engine under the full steam pressure, gives for the force exerted on the piston $110(0.7854 \times 18^2) = 27{,}991.7$, say 28,000 lb. or 14 tons. This engine having a stroke of 36 in., the length of the crankshaft is 18 in., which is one-half the radius of the drum. Approximately, the moment of the steam pressure, acting at right angles to the crankshaft, is equal to the moment of the load acting on the radius of the drum. Therefore, the lifting power of the engine, in this case, is $(2 \times 18) \div 36 = 1$ ton.

QUESTION—*In a mine giving off 2,250 cu.ft. of marsh gas per minute, the volume of air entering the mine being 70,000 cu.ft. per min., what is the percentage of gas in the air current at the outlet?*

ANSWER—In answering this question, allowance should be made for the change in temperature and volume from the intake or entrance of the mine, where the air is measured, to the outlet where the air is discharged. However, assuming a constant temperature in this case, and ignoring the change of volume due to the release of the ventilating pressure at the outlet, the total volume of air and gas passing out of the mine is 72,250 cu.ft. per min. The percentage of gas in this current is then $(2{,}250 \times 100) \div 72{,}250 = 3.114$ per cent.

What Happened in the Coal Industry in 1922

(Continued from last week)

July *(Continued)*

July 17—Sheriff and five non-union men killed and many wounded in attack of 300 men on Richland Mining Co.'s Clifton Mine at Cliftonville, W. Va. (Vol. 22, No. 3, p. 105).

July 17—Coal shortage seems to have arrived. Average price climbs from $3.64 to $3.89 in a week. Western Kentucky jumps $1 to $6.25. Rail congestion increases. Northwest begins to take freight with stocks lowered by shipments back down the lake and by heavy demand (Vol. 22, No. 3, p. 107).

July 18—Many operators regret President called his futile conference just now for union was on point of surrender (Vol. 22, No. 4, p. 142).

July 18—President Harding wires Governor of 28 coal states to invite operators and miners to go back to work and to guarantee protection to those men willing to work. Governors of 26 states accept, but Gov. Ritchie of Maryland and Gov. Morrison of North Carolina decline (Vol. 22, No. 4, p. 139).

July 19—Campaign of frightfulness in West Virginia unearthed by state officials. Dynamiting of train of miners in Boone county only one evidence of it (Vol. 22, No. 4, p. 144).

July 20—Eleven hundred Pennsylvania troops go on duty throughout Washington, Westmoreland, Somerset, Indiana and Cambria counties (Vol. 22, No. 4, p. 143).

July 20—Pittsburgh operators post "Washington" scale of 1917 to be in effect they say to Jan. 1, 1923. Few go back to work under it (Vol. 22, No. 4, p. 138).

July 20—President Harding replies to Governor Spraul of Pennsylvania that he "may expect selection of a commission. . . . in due time" though its form must differ from that originally planned (Vol. 22, No. 4, p. 140).

July 22—Southwestern Interstate Association urges Lewis and district presidents in its field to enter into district wage negotiations at once in spite of refusals of miners on March 29 and April 10 (Vol. 22, No. 4, p. 140).

July 23—President Ogle of National Coal Association wires President Harding urging appointment of non-partisans fact-finding commission at once (Vol. 22, No. 4, p. 140).

July 24—Attorney-General Daugherty declares as legal the government's plan for distributing cars only to those operators who conform to Hoover fair prices (Vol. 22, No. 4, p. 141).

July 24—Government's tentative plan for price control and regulation of distribution calls for Presidential committee in Washington, and administrative committee of operators, railways, etc., to help carry out plan of distributing cars only to those who conform to Hoover prices and to help carry out I. C. C. preferential coal orders. Attorney-General says plan is legal. Operators go home to choose district committee to serve Presidential committee (Vol. 22, No. 4, p. 141).

July 24—Attorney-General Daugherty after investigation is "unable to say" whether relationship between coal and rail strikes is conspired or inspired (Vol. 22, No. 4, p. 143).

July 24—Operators of Southwestern Interstate District indorse Harding plan for resumption of mining (Vol. 22, No. 5, p. 182).

July 24—Coal prices roll upward jumping in a week from average of $3.89 to $5.56. Western Kentucky hops up $1 a day to $11@$12. Majority of coal, however, stays at Hoover level. Rail paralysis largely responsible for sensational market rise (Vol. 22, No. 4, p. 145).

July 25—White House announces it has offered to miners and operators strike settlement plan containing guarantee of minimum wage and 280 days work annually to miners (Vol. 22, No. 4, p. 141).

July 25—Senator Borah introduces bill for commission of three at $8,000 a year each to report on advisability of nationalizing mines (Vol. 22, No. 5, p. 180).

July 25—Biggest Kentucky mine merger in years unites Log Mountain and Yellow Creek Coal Co.'s with Hignite and Bennett Fork Coal Mining Co.'s and Mingo Coal and Coke Co. (Vol. 22, No. 5, p. 176).

July 26—I. C. C. issues first priority order Service Order 23, as follows: Cars to be supplied (1) for special purposes assigned by Commission, (2) public utilities, U. S. state and city governments, railroads, (3) lake traffic, (4) railroad domestic shipment, (5) all others (Vol. 22, No. 4, p. 141).

July 28—Joint arbitration board restores 1920 scale in Kentucky-Tennessee district (Vol. 22, No. 6, p. 223).

July 28—First organization of Connellsville coal operators is formed as adjunct to government price control committee. It is the Fayette-Greene Coal Operators' Association (Vol. 22, No. 5, p. 179).

July 29—President Farrington of Illinois union district calls state convention to discuss state negotiations (Vol. 22, No. 5, p. 179).

July 29—President Harding induces Borah to stay action on the Senator's coal commission bill (Vol. 22, No. 5, p. 180).

July 29—Injunctions against unions issued by Judge McClintic in West Virginia are upheld by U. S. Circuit Court of Appeals at Richmond, Va. (Vol. 22, No. 5, p. 182).

July 29—Michigan miners refuse to heed Gov. Groesbeck's request that they go back to work (Vol. 22, No. 5, p. 182).

July 30—Generally agreed now that Hoover price agreement has broken down because some fields refuse to subscribe to it (Vol. 22, No. 6, p. 217).

July 30—President Farrington of Illinois miners calls off his state convention saying "too much publicity" killed it (Vol. 22, No. 5, p. 179).

July 31—Coal market reaches peak of 1922 with an average spot price of $6.73 (Vol. 22, No. 5, p. 183).

August

Aug. 1—E. A. Holbrook, assistant director of U. S. Bureau of Mines, becomes dean of Pennsylvania State College school of mines (Vol. 22, No. 7, p. 254).

Aug. 1—Henry B. Spencer, administration member of the President's committee on car distribution, opens Washington offices and begins work (Vol. 22, No. 5, p. 177).

Aug. 1—President Lewis of the miners invites operators of Central Competitive Field to Cleveland Conference Aug. 7. Says miners will not have to take wage cut and that mines will be working in a week or so (Vol. 22, No. 7, p. 257).

Aug. 3—Southern Ohio operators decline to attend Lewis' Cleveland conference of Aug. 7 (Vol. 22, No. 6, p. 219).

Aug. 4—Fuel Distributor Spencer organizes his operators committees in each district directed by Naval officer (Vol. 22, No. 6, p. 213).

Aug. 4—Illinois operators offer their miners last year's scale until March 31, 1923, if they will arbitrate new scale. Farrington says he cannot answer until Cleveland conference is over (Vol. 22, No. 6, p. 215).

Aug. 7—Cleveland conference called by Lewis draws small percentage of Central Competitive Field Tonnage. Adjourns quickly to give new "Crews-Glasgow plan" a chance to bring in more operators. Michael Gallagher of Northeastern Ohio is chairman (Vol. 22, No. 6, p. 220).

Aug. 8—Sections of the nation that feel coal shortage are beginning to appeal loudly to Distributor Spencer. Northwest is loudest of all (Vol. 22, No. 6, p. 217).

Aug. 9—Illinois operators send delegation to Toledo to meet special emissaries from Cleveland Conference. They agree on nothing (Vol. 22, No. 7, p. 255).

Aug. 10—Federal Fuel Committee agrees to see that Lakes shipping gets 250,000 tons of coal per week for Northwest (Vol. 22, No. 7, p. 253).

Aug. 11—Illinois operators in session for four days at Chicago finally decline to go to Cleveland because Lewis will not consider arbitration. They give out President Harding's letter endorsing their proposal that Illinois men resume at old scale (Vol. 22, No. 7, p. 255).

Aug. 11—After four days of treadmilling in Cleveland conference miners eject all operators from outside Central Competitive Field and go on holding futile sessions (Vol. 22, No. 7, p. 257).

Aug. 12—Henry Ford's proposal to man Corbin (Ky.) shops of L. & N. with his men and open up the railroad "bottleneck" for coal traffic is rejected as "unthinkable" by President Maypother of L. & N. (Vol. 22, No. 7, p. 256).

Aug. 12—Operators and miners meet separately at Cleveland. Obviously something is wrong. Lewis and Gallagher issue joint statement saying the conference "is in no sense a four-state" one (Vol. 22, No. 7, p. 258).

Aug. 14—Comparative peace prevails in National Coal Assn. meeting in New York though President Ogle is criticized for dabbling in labor problems as head of the association. (Vol. 22, No. 7, p. 260).

Aug. 14—Cleveland conference takes sudden new turn. T. H. Watkins of Central Pennsylvania is admitted with modified crews. Glasgow plan and Gallagher and S. H. Robbins withdraw (Vol. 22, No. 7, p. 257).

Aug. 15—Coal strike is broken, when Lewis in Cleveland conference signs up individually or by groups about 40,000,000 tons represented. Agreement provides for fall conferences on future methods of negotiations. Many regions decline to sign (Vol. 22, No. 7, p. 257).

Aug. 15—Most Nova Scotia mines closed by strike of miners who refuse to accept settlement made by their officers (Vol. 22, No. 7, p. 259).

Aug. 15—Second week in August sees only 147,000 tons of coal go into Lake carriers instead of 250,000. Hoover says "it is impracticable to continue price control on a voluntary basis" and said it could only be done by law. (Vol. 22, No. 7, p. 260).

Aug. 16—Many West Virginia non-union fields advance pay to levels high enough to keep labor from leaving for union mines (Vol. 22, No. 10, p. 370).

Aug. 17—Anthracite operators and miners at request of President Harding begin negotiations at New York but get nowhere in a week because miners insist upon two-year contract (Vol. 22, No. 9, p. 331).

Aug. 17—First break among northern West Virginia operators comes when Consolidation Coal Co. and 50 others sign Cleveland agreement (Vol. 22, No. 8, p. 298).

Aug. 18—President Harding in message to Congress asking fuel distribution power says of Cleveland strike settlement: "The simple and significant truth was revealed that except for such coal as comes from the non-union districts, the country is at the mercy of the United Mine Workers." (Vol. 22, No. 7, p. 273).

Aug. 18—I.C.C. cancels wartime assigned car rule. (Vol. 22, No. 8, p. 296).

Aug. 20—Nova Scotian miners' district ousts President Robt. Baxter and elects Dan Livingstone. Baxter was charged with "selling out" union in agreement membership repudiated. (Vol. 22, No. 10, p. 368).

Aug. 21—Hoover prices in West Virginia, Kentucky and Tennessee are raised from $3.50 to $4.50. Hoover in message to Gov. Davis of Ohio foreshadows government price control over

union mines as they reopen (Vol. 22, No. 8, p. 292).

Aug. 22—Illinois signs agreement with miners after five days of conference. Terms are those of Cleveland except operators do not agree to take part in Lewis conferences on wage making machinery (Vol. 22, No. 8, p. 297).

Aug. 22—Borah and Winslow bills in Senate and House are reported. Each provides a form of government fact-finding commission (Vol. 22, No. 8, p. 295).

Aug. 22—Indiana operators sign but do not "endorse" Cleveland agreement (Vol. 22, No. 8, p. 298).

Aug. 23—Strictly union part of Central Pennsylvania field sign same contract that Pennsylvania Coal & Coke Co. and Clearfield Coal Corp. signed at Cleveland Aug. 15 (Vol. 22, No. 9, p. 332).

Aug. 23—Connellsville coke region and New River region raise wages to 1920 level to hold labor from going back to union mines (Vol. 22, No. 9, p. 332).

Aug. 23—Southwest signs Cleveland agreement (Vol. 22, No. 9, p. 336).

Aug. 24—Operators in British Columbia and Alberta sign agreement on scale 15 per cent under that of 1921 to resume work Aug. 28 (Vol. 22, No. 9, p. 332).

Aug. 24—Senator Cummins and Rep. Winslow file bills for price control through distribution of cars. Secretary Hoover favors Winslow bill (Vol. 22, No. 9, p. 335).

Aug. 25—British Empire Steel Corp. in Nova Scotia finally settles strike by raising pay 60 cents to $3.25 a day and contract rates 12½ per cent (Vol. 22, No. 10, p. 368).

Aug. 26—About 150 operators of northern West Virginia have ratified Cleveland pact to date (Vol. 22, No. 10, p. 372).

Aug. 27—Francis S. Peabody, operator, dies suddenly at home near Chicago (Vol. 22, No. 9, p. 336).

Aug. 28—Pocahontas field raises scale to 1920 level effective Aug. 15 (Vol. 22, No. 10, p. 370).

Aug. 28—Grand Jury on Herrin case convenes (Vol. 22, No. 9, p. 334).

Aug. 28-29—Special session of New York Legislature passes bill creating office of fuel administrator and giving state certain price control. The act creates revolving fund of ten million dollars for state to buy fuel and sell it to the people (Vol. 22, No. 9, p. 336).

Aug. 29—Anthracite miners and operators resume conference this time at Washington (Vol. 22, No. 10, p. 373).

Aug. 29—I.C.C. amends service order 23 to put Lake coal into Class 1 in priority list (Vol. 22, No. 10, p. 370).

Aug. 29—Pittsburgh Coal Producers' Assn. minus the Pittsburgh Coal Co., signs Cleveland agreement (Vol. 22, No. 10, p. 368).

Aug. 30—Pittsburgh Coal Co. last to succumb, signs Cleveland agreement (Vol. 22, No. 10, p. 368).

Aug. 30—Herrin grand jury indicts Otis Clark, mine union official, and he is arrested as first prisoner in massacre case (Vol. 22, No. 10, p. 372).

Aug. 30—Explosion in No. 4 mine of Canadian Collieries Co. at Cumberland, B. C., kills 15, of whom 12 are orientals, and injures 16. Cause is unknown. (Vol. 22, No. 10, p. 369).

Aug. 31—Anthracite operators say they will sign on miners' terms but only to Sept. 1, 1923, if they get "mandate from the public" (Vol. 22, No. 10, p. 373).

Aug. 31—House passes, 214 to 61, Winslow bill to control coal prices by car control and to aid in coal distribution (Vol. 22, No. 10, p. 370).

September

Sept. 1—Illinois operators' trade associations dissolve and private statistical organizations take their places (Vol. 22, No. 13, p. 504).

Sept. 1—U. S. Steel Corporation advances wages 20 per cent (Vol. 22, No. 9, p. 336).

Sept. 1—Alabama increases wages 20 per cent (Vol. 22, No. 9, p. 332).

Sept. 1—Western Kentucky signs new agreement to run to April, 1923. They worked through the summer on a non-strike agreement with the union (Vol. 22, No. 10, p. 369).

Sept. 2—Anthracite miners and operators in Philadelphia again make tentative agreement to be ratified by miners (Vol. 22, No. 10, p. 373).

Sept. 7—Coronado Coal Co. et als petition U. S. Supreme Court for rehearing on Coronado case (Vol. 22, No. 11, p. 418).

Sept. 7—Senate passes Cummins price control bill, 40 to 7 (Vol. 22, No. 11, p. 421).

Sept. 7—Herrin grand jury indicts 37 more for June 22 massacre (Vol. 22, No. 11, p. 423).

Sept. 8—Herrin grand jury adds 21 more indictments to its list (Vol. 22, No. 11, p. 423).

Sept. 8—Senate passes Borah fact-finding commission bill, without a roll call (Vol. 22, No. 11, p. 421).

Sept. 8—New York State Coal Merchants' Assn. recedes from previous position and votes to support government price control program (Vol. 22, No. 11, p. 422).

Sept. 11—Anthracite mines resume work. Operators and miners sign at noon in Scranton, contract at "war wages" running to Sept. 1, 1923 (Vol. 22, No. 11, p. 425).

Sept. 13—Ohio legislature in special session passes drastic coal act creating fuel administrator office with much price power. State is empowered to seize mines if necessary (Vol. 22, No. 12, p. 460).

Sept. 15—Secretary Hoover holds important conference with leading commercial interests on coal distribution to get co-operation on coming government distribution control (Vol. 22, No. 12, p. 467).

Sept. 15—National Assn. of Purchasing Agents adopts policy of co-operating with Hoover (Vol. 22, No. 14, p. 555).

Sept. 15—C. J. Neal is named fuel administrator for Ohio (Vol. 22, No. 13, p. 507).

Sept. 16—Winslow price control bill passes Senate and goes to President Harding for signature (Vol. 22, No. 12, p. 461).

Sept. 16—"Guilty of treason" is jury's finding at Charlestown, W. Va., against Walter Allen, accused of being one of the marchers on the non-union coal fields of Logan and Mingo counties in September, 1921 (Vol. 22, No. 12, p. 466).

Sept. 19—I.C.C. amends S. O. 23 and 24 with S. O. 25 shifting its policy from priorities on coal cars to a broader priority on coal transportation (Vol. 22, No. 13, p. 507).

Sept. 20—Col. L. E. Tierney, officer in Crozer, Pocahontas, Powhattan Coal & Coke, and other companies, dies at home in Powhattan, W. Va. (Vol. 22, No. 13, p. 507).

Sept. 21—John G. Smith, general manager for the Consolidation Coal Co. at Jenkins, Ky., is killed by fall of slate (Vol. 22, No. 13, p. 510).

Sept. 22—Fact-finding commission bill, a compromise in committee, passes and is enacted into law (Vol. 22, No. 13, p. 503).

Sept. 22—President Harding signs coal distribution bill and appoints Conrod E. Spens fuel distributor (Vol. 22, No. 13, p. 505).

Sept. 23—Herrin grand jury brings in enough more indictments to make total 214 and makes fearless report on massacre of June 22. Attorney for union declares the case is "persecution of labor by capital" (Vol. 22, No. 13, p. 509).

Sept. 27—Fuel Distributor Spens orders daily reports on kind, amount, and price of soft coal shipped and to whom sent. Business men's committee named to assist Spens (Vol. 22, No. 14, p. 558).

Sept. 28—Injunction againt union interference at mines of Bethlehem Mines Corporation is made permanent by Judge Langham (Vol. 22, No. 14, p. 555).

Sept. 30—Mine union wins a point in Herrin defence by getting trial of 8 men charged with murder of Howard Hoffman ordered first. State wanted to prosecute Otis Clark, union official, first (Vol. 22, No. 14, p. 556).

October

Oct. 1—Lake sailors strike but most coal vessels manage to move anyway (Vol. 22, No. 15, p. 602).

Oct. 1—J. D. A. Morrow, secretary, and John Callahan, traffic manager, of the National Coal Assn. resign to open jobbing business (Vol. 22, No. 15, p. 601).

Oct. 1—Western Fuel Corp. of Canada signs 2-year contract with men. Minimum wage is $4.25¼ (Vol. 22, No. 14, p. 560).

Oct. 1—Pennsylvania Fair Practice committee is created with Edgar F. Felton as chairman to help control anthracite prices (Vol. 22, No. 14, p 561).

Oct. 1—U. S. 1921 total bituminous output was 415,921,000 tons, U. S. Geological Survey announces (Vol. 22, No. 14, p. 553).

Oct. 2—H. M. Sipe, of Clarksburg, W. Va., sues union for $50,000 for refusing to sign contract for a mine taken over from Hudson Coal Co., an open shop organization (Vol. 22, No. 16, p. 658).

Oct. 2—Practically every bituminous union district represented at Cleveland miner-operator conference. T. F. Maher is made temporary chairman. Conference adjourns until next day and operators wrangle all afternoon (Vol. 22, No. 14, p. 559).

Oct. 3—Cleveland conference hears pacific speech by John Lewis advising both sides to "bury the hatchet." Operators give up plan of sending separate list of names for fact-finding commission to Washington. Miners give up plan for joint fact-finding commission (Vol. 22, No. 14, p. 559).

Oct. 4—Cleveland conference winds up peacefully. Appoints "reorganization" committee of two miners and two operators from each district to meet Nov. 14 and try to work out future method of negotiation. Miners send 10 names of suggested "fact-finders" to Washington (Vol. 22, No. 15, p. 597).

Oct. 4—Immediately after the "peace conference" in Cleveland miners announce they will demand continuance of existing scale after April 1, 1923, together with all the Indianapolis demands written at union convention (Vol. 22, No. 15, p. 599).

Oct. 4—Fuel Distributor Spens simplifies his order No. 1 so that consignees and car numbers are omitted from daily reports from shippers (Vol. 22, No. 15, p. 599).

Oct. 7—Martial law in Mingo County, W. Va., raised after 15 months following Logan County "march" and attack by union army of 6,000 (Vol. 22, No. 16, p. 640).

Oct. 9—U. S. Supreme Court denies petition for rehearing of Coronado Coal Co. case (Vol. 22, No. 16, p. 646).

Oct. 9—For murder of Sheriff Duvall and five others at Cliftonville mine July 17, 218 union miners go on trial charged with murder, etc. (Vol. 22, No. 16, p. 640).

Oct. 9-14—American Mining Congress at Cleveland discusses various phases of coal in annual convention and exposition (Vol. 22, No. 15, p. 603).

Oct. 10—President appoints to Federal Coal Commission John Hays Hammond, chairman, Thomas Riley Marshall, Clark Howell, Dr. Edward T. Devine, Judge Samuel Alschuler, Charles P. Neill and George Otis Smith (Vol. 22, No. 16, p. 619).

Oct. 10—Ohio's maximum price list goes into effect fixing prices at $3.56 to $4.86 at mines (Vol. 22, No. 15, p. 601).

Oct. 10—Michigan legislature convenes in special session to consider Gov. Groesbeck's plan of price control. Senate excludes wood and oil and cuts off appropriation for administrator (Vol. 22, No. 16, p. 645).

Oct. 14—Smokeless maximum price of $6 a ton agreed to by 80 per cent of operators, Fuel Distributor Spens says (Vol. 22, No. 16, p. 643).

Oct. 15—Consolidation of Indiana Bituminous Coal Operators Assn. and Indiana Coal Producers' Assn. of strip miners effected (Vol. 22, No. 16, p. 657).

Oct. 16—Fuel Administrator's organization begins investigating independent anthracite operators selling above $9.25 (Vol. 22, No. 16, p. 643).

Oct. 18—Federal Coal Commission organizes and decides to invite John Lewis, Alfred Ogle of the National Coal Assn., and S. D. Warriner, a leading anthracite operator, to name advisory committees to aid the commission (Vol. 22, No. 17, p. 681).

Oct. 23—Herrin grand jury completes its work by indicting 48 more men for murder at Lester strip mine June 22 (Vol. 22, No. 17, p. 686).

Oct. 27—Union officially calls off strike in Mingo County, W. Va., and moves many tented miners to union fields. In 28 months of this strike 30 men have been killed, 50 wounded, much property destroyed by fire and dynamite and the effort cost union $2,000,000 (Vol. 22, No. 18, p. 727).

November

Nov. 1—Stocks on hand Sept. 1 were 22,000,000 tons and 28,000,000 tons on Oct. 1 in the hands of commercial consumers, Geological Survey announces (Vol. 22, No. 19, p. 765).

Nov. 2—Northern West Virginia agrees with Fuel Distributor Spens to reduce domestic sizes from $5.50@$5.75 to a maximum of $4.50 (Vol. 22, No. 19, p. 767).

Nov. 4—Railroads offer complete cooperation with Federal Coal Commission (Vol. 22, No. 21, p. 846).

Nov. 5—Citizens of Olyphant, Pa., seize two cars of anthracite belonging to Hudson Coal Co., and use it for schools, claiming Temple Fuel Co. would not fill schools' order. Company protests in vain to state (Vol. 22, No. 21, p. 861).

Nov. 6—Illinois and Indiana producers decline to reduce domestic lump from $5.50 to Hoover level of $4 suggested by Fuel Distributor Spens (Vol. 22, No. 19, p. 767).

Nov. 6—Explosion in Reilly mine at Spangler, Pa., entombs 95 miners (Vol. 22, No. 19, p. 767).

Nov. 10—Kentucky guardsmen are removed from Hopkins County (Vol. 22, No. 21, p. 859).

Nov. 13—Coal shortage in the South causes Fuel Administration to order railroads to supply L. & N. with 4,000 cars at once. Governors of six southern states consider relief methods in Nov. 15 conference (Vol. 22, No. 21, p. 844).

Nov. 13-14—Kohler mine-cave law is attacked before Supreme Court by northeast states' attorneys-general and others, including John W. Davis, former ambassador to England. Main contention is that the law is unconstitutional (Vol. 22, No. 21, p. 846).

Nov. 14-16—Sub-committee of two operators and two miners from each of 15 districts fail in Chicago to agree upon any method of future negotiations. Adjourned to Dec. 6 giving indications that eventually the four-state plan would be re-established. Outlying districts led by Harry N. Taylor of Kansas City and C. H. Jenkins, of Fairmont, proposed plans for national negotiations without success (Vol. 22, No. 21, p. 843-4).

Nov. 15—Strike settlement in San Juan valley of Colorado is finally made, miners to get 1921 scale (Vol. 22, No. 21, p. 859).

Nov. 18—Anthracite operators submit suggestions to U. S. Coal Commission pledging co-operation in collecting data (Vol. 22, No. 21, p. 845-6).

Nov. 20—Retail margins on coal in Ohio are increased an average of 25 cents a ton in cities and 8 cents in towns (Vol. 22, No. 21, p. 846).

Nov. 22—Jury finds Spangler explosion was due to too few firebosses, use of open lights, and bad ventilation (Vol. 22, No. 22, p. 888).

Nov. 22—Runaway trip at Dolomite mine, Dolomite, Ala., causes terriffic dust explosion, killing 86 and injuring 59 besides damaging stope and bottom and burning wood parts of tipple (Vol. 22, No. 21, p. 877).

Nov. 24—Illinois operators instruct their two men on national sub-committee on wage negotiating methods to favor four-state or district plans at Dec. 6 meeting of the sub-committee (Vol. 22, No. 22, p. 890).

Nov. 24—Miners will not accept any wage cut next spring, Ellis Searles, publicitor for U. M. W. of A., tells Business Science Club of Philadelphia (Vol. 22, No. 22, p. 869).

Nov. 25—I.C.C. seems impressed with bulk of evidence submitted to it against assigned car practice for Service Order 26 says such cars "shall be counted against the distributive share alloted to the mines" (Vol. 22, No. 22, p. 886).

Nov. 26—First dynamiting in Connellsville region wrecks two-family house and hurts two men (Vol. 22, No. 23, p. 925).

Nov. 27—U. S. Supreme Court holds Pennsylvania anthracite tax law constitutional (Vol. 22, No. 22, p. 888).

Nov. 28—Both American Mining Congress, Western Pennsylvania coal operators and American Railway Assn., organize special committees to aid federal coal commission (Vol. 22, No. 23, p. 927).

December

Dec. 1—Ohio fuel administration disbands because "The emergency is over" (Vol. 22, No. 23, p. 928).

Dec. 1—John D. Battle becomes traffic manager of the National Coal Assn. (Vol. 22, No. 21, p. 848).

Dec. 4—Indiana operators refuse to check off $4 special assessment for national union (Vol. 22, No. 24, p. 968).

Dec. 5—American Wholesale Coal Assn. men tell the S. Coal Commission of the valuable service the wholesaler renders the industry (Vol. 22, No. 24, p. 966).

Dec. 6—Miners in "reorganization" committees' final session in Chicago reject plan operators had worked out Dec. 4 and 5 for separate district agreements, so the committee's efforts to devise method for future wage negotiation end in failure (Vol. 22, No. 24, p. 963).

Dec. 8—Illinois operators in 5th and 9th districts agree not to sell domestic coal for more than $4.50, Federal Fuel Distributor Spens announces (Vol. 22, No. 24, p. 965).

Dec. 9—John Hessler, Indiana union president, serves notice of strike if $4 assessment for national union is not checked off (Vol. 22, No. 24, p. 968).

Dec. 10—Bituminous coal industry is overdeveloped 30 to 60 per cent, U. S. Coal Commission's studies indicate, according to informal statement (Vol. 22, No. 24, p. 966).

Dec. 11—I.C.C. rescind open top car restrictions and priorities (Vol. 22, No. 24, p. 968).

Dec. 11—U. S. Supreme Court decides Kohler Act—known as "the cave-in law"—is unconstitutional. This act forbade mining under habitations (Vol. 22, No. 24, p. 968).

Dec. 11—I.C.C. dismisses complaints of Bell & Zoller Coal Co. vs. B. & O. Railroad of irregularity in car distribution, deciding against joint mines and limiting car supply to 100 per cent (Vol. 22, No. 25, p. 1005).

Dec. 11—John Hays Hammond tells newspaper men U. S. Coal Commission has no intention of arbitrating the bituminous wage dispute (Vol. 22, No. 24, p. 967).

Dec. 11—Subpenas are issued by U. S. Coal Commission for retail coal dealers to tell of anthracite prices (Vol. 22, No. 24, p. 967).

Dec. 13—United Mine Workers urge U. S. Coal Commission to probe Logan County, W. Va., conditions where the union claims oppression is being visited on unions (Vol. 22, No. 25, p. 1007).

Dec. 13—Indiana operators surrender to union and agree, to check off $4 special assessment for the national union organization (Vol. 22, No. 25, p. 1006).

Dec. 13-15—Coal Mining Institute of America meets at Pittsburgh, Pa. (Vol. 22, No. 25, p. 997).

Dec. 14—Smokeless Operators' Assn. elects R. H. Gross of Boston its president (Vol. 22, No. 25, p. 1004).

Dec. 15—Frank Farrington is announced re-elected to presidency of Illinois miners' union (Vol. 22, No. 25, p. 1009).

Dec. 16—Witnesses during week in Herrin massacre identify all five prisoners on trial for Howard Hoffman's murder June 22 (Vol. 22, No. 25, p. 1004).

Dec. 20—I.C.C. makes tentative report favoring much revision and equalizing of freight rates from coal fields of Rocky Mountain states (Vol. 22, No. 26, p. 1049).

Dec. 26—Falling market is bolstered, as year closes, by railroad incapacity to handle coal traffic and bituminous average price rises in a week from $4.07 to $4.23 (Vol. 22, No. 26, p. 1051).

Average Spot Prices of Bituminous Coal, F.o.b. Mines

(Unit net ton of 2,000l bs.)

Month	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Jan.	$1.46	$1.21	$1.13	$1.53	$4.15	$2.48	$2.57	$2.57	$3.26	$2.26
Feb.	1.22	1.16	1.12	1.40	4.18	2.53	2.49	2.58	2.77	2.20
March	1.17	1.17	1.09	1.27	3.89	2.58	2.47	2.58	2.63	2.12
April	1.17	1.16	1.08	1.24	3.21	2.64	2.43	3.85	2.62	2.25
May	1.15	1.16	1.07	1.21	4.14	2.67	2.38	4.59	2.68	3.11
June	1.14	1.12	1.07	1.26	4.00	2.57	2.40	7.18	2.52	3.31
July	1.18	1.12	1.05	1.22	3.17	2.58	2.47	8.24	2.40	4.67
August	1.22	1.13	1.07	1.30	3.24	2.58	2.76	9.51	2.42	6.13
Sept.	1.23	1.11	1.10	1.57	2.02	2.58	2.91	8.52	2.37	5.07
Oct.	1.29	1.13	1.12	2.26	2.02	2.58	3.09	7.78	2.33	4.48
Nov.	1.31	1.10	1.17	3.87	2.48	2.58	2.57	5.87	2.35	4.11
Dec.	1.26	1.11	1.33	4.01	2.48	2.58	2.58	4.38	2.26	4.04
1st Quarter	1.28	1.18	1.11	1.40	4.07	2.53	2.51	2.58	2.89	2.19
2nd Quarter	1.15	1.15	1.07	1.24	3.78	2.63	2.40	5.20	2.61	2.89
3rd Quarter	1.21	1.12	1.07	1.36	2.81	2.58	2.71	8.76	2.40	5.29
4th Quarter	1.29	1.11	1.21	3.38	2.33	2.58	2.74	6.01	2.31	4.21
Yearly average	1.23	1.14	1.12	1.85	3.25	2.58	2.59	5.64	2.55	3.64

Coal Age Index

Spot Prices July, 1913—June, 1914, As Base

Month	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Jan.	120	100	93	126	343	205	213	212	270	187
Feb.	101	96	92	116	346	209	206	213	229	182
March	97	96	90	105	321	214	204	213	217	175
April	97	96	89	103	265	218	200	318	217	186
May	95	96	89	100	342	221	197	379	222	257
June	95	93	88	104	331	212	198	593	208	274
July	97	93	87	101	262	213	204	681	198	386
August	100	93	88	107	268	213	228	786	200	507
Sept.	102	92	91	130	167	213	241	704	196	419
Oct.	106	93	93	187	167	213	256	643	193	370
Nov.	108	91	97	320	205	213	212	465	194	330
Dec.	104	92	100	332	205	213	213	362	187	334
1st Quarter	106	97	92	116	337	209	208	213	239	181
2nd Quarter	96	95	89	102	313	217	198	430	216	239
3rd Quarter	100	93	89	113	232	213	224	723	198	437
4th Quarter	106	92	97	280	192	213	227	497	191	348
Yearly average	102	94	91	152	269	213	214	466	211	301

Many Strikes Curtail Output of Canadian Mines

Production in 1922 Falls Behind Two Preceding Years—Besides Great Strike There Were Eleven Smaller Ones—Imports from Great Britain for the First Time in Years—874,000 Tons Received

By S. J. Cook*

THE output from Canadian mines during 1922 was approximately 14,210,000 tons, as compared with 15,057,493 tons in 1921, 16,946,764 tons in 1920 and 13,919,096 tons in 1919. The great strike which tied up the United States coal mines for several months was reflected in Canada and resulted in a loss of 1,199,427 working days. Eleven disputes between employees and employers occurred in Canada during the eleven months ending November, nine of which were in Alberta and southeastern British Columbia and the other two in Nova Scotia.

In all, 23,901 men were affected, and of the time lost, 931,960 days were lost in the strike which began on April 1, and 260,034 days' time was lost in the short strikes originating in August. Alberta's output amounted to 5,387,000 tons, a little more than half of which was lignite. Nova Scotia contributed 5,349,000 tons and occupied second place among the coal-producing provinces. British Columbia accounted for 2,936,000 tons, and New Brunswick and Saskatchewan followed with 287,000 tons and 250,000 tons respectively.

Exports of Canadian coal were 1,821,000 tons in 1922, about 1,000,000 tons from the Western provinces and the balance from the maritime provinces, a decrease of about 160,000 tons from 1921. The exports during 1920 were 2,538,000 tons, and in 1919 amounted to about 2,000,000 tons.

For the first time in many years quantities of coal were imported from Great Britain. In all, about 874,000 tons was received, 710,000 tons of which was bituminous and 164,000 tons of which was entered as anthracite. The receipts at customs ports in Quebec of this coal from Great Britain amounted

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COAL MADE AVAILABLE FOR CONSUMPTION IN CANADA IN 1922 BY PROVINCES IN NET TONS

Provinces	Canadian Coal: Output	Canadian Coal: Received from Other Provinces	Canadian Coal: Shipped to Other Provinces	Canadian Coal: Exported	Imported from—: United States	Imported from—: Great Britain	Coal Available for Consumption
Nova Scotia							
Anthracite	.....	.....	.....	.....	23,642	3,965	27,607
Bituminous	5,348,830	61	1,981,384	623,416	6,233	3,267	2,753,591
Totals	5,348,830	61	1,981,384	623,416	29,875	7,232	2,781,198
New Brunswick							
Anthracite	.....	.....	.....	.....	43,444	22,144	65,588
Bituminous	288,656	359,232	63,180	63,901	61,501	25,268	607,576
Totals	288,656	359,232	63,180	63,901	104,945	47,412	673,164
Prince Edward Island							
Anthracite	.....	.....	.....	.....	5,989	.....	5,989
Bituminous	.....	80,422	.....	.....	1,355	.....	81,777
Totals	.....	80,422	.....	.....	7,344	.....	87,766
Quebec							
Anthracite	.....	.....	.....	.....	835,290	137,109	972,399
Bituminous	.....	1,594,458	.....	56,403	1,264,570	674,593	3,477,185
Totals	.....	1,594,458	.....	56,403	2,099,860	811,702	4,449,584
Central Ontario							
Anthracite	.....	.....	.....	.....	1,715,071	900	1,715,971
Bituminous	.....	10,424	.....	.....	8,115,536	6,929	8,132,889
Totals	.....	10,424	.....	.....	9,830,607	7,829	9,848,860
Head of Lakes							
Anthracite	.....	.....	.....	.....	43,816	.....	43,816
Bituminous	.....	635	.....	75	1,722,836	.....	1,723,396
Lignite	.....	19,333	.....	.....	.....	.....	19,333
Totals	.....	19,968	.....	75	1,766,652	.....	1,786,545
Manitoba and Head of Lakes							
Anthracite	.....	10	.....	.....	15,223	.....	15,233
Bituminous	.....	141,409	.....	2,079	70,174	.....	209,504
Lignite	.....	440,254	.....	.....	.....	.....	440,254
Totals	.....	581,673	.....	2,079	85,397	.....	664,991
Manitoba and Head of Lakes							
Anthracite	.....	10	.....	.....	59,039	.....	59,049
Bituminous	.....	142,044	.....	2,154	1,793,010	.....	1,932,900
Lignite	.....	459,587	.....	.....	.....	.....	459,587
Totals	.....	601,641	.....	2,154	1,852,049	.....	2,451,536
Saskatchewan							
Anthracite	.....	796	.....	.....	231	.....	1,027
Bituminous	.....	198,282	.....	5,167	1,404	.....	194,519
Lignite	249,559	1,068,330	97,221	.....	.....	.....	1,220,668
Totals	249,559	1,267,408	97,221	5,167	1,635	.....	1,416,214
Alberta							
Anthracite	41,423	.....	2,034	.....	.....	.....	39,389
Bituminous	2,511,759	15,918	313,303	821	1,130	.....	2,214,683
Lignite	2,834,077	1,064	1,513,654	.....	.....	.....	1,321,487
Totals	5,387,259	16,982	1,828,991	821	1,130	.....	3,575,559
British Columbia and Yukon							
Anthracite	.....	1,228	.....	.....	35	.....	1,263
Bituminous	2,935,579	41,978	84,919	1,069,435	9,899	.....	1,833,102
Lignite	.....	81,861	.....	.....	.....	.....	81,861
Totals	2,935,579	125,067	84,919	1,069,435	9,934	.....	1,916,226
Canada							
Anthracite	41,423	.....	.....	.....	2,682,741	164,118	2,888,282
Bituminous	11,084,824	.....	.....	1,821,277	11,254,638	710,057	21,228,222
Lignite	3,083,636	.....	.....	.....	.....	.....	3,083,636
Totals	14,209,883	.....	.....	1,821,277	13,937,379	874,175	27,200,140

to 812,000 tons during the year, while New Brunswick received 47,000 tons and the balance was equally divided between Ontario and Nova Scotia. Imports of coal from the United States amounted in all to 13,937,000 tons, comprising 11,255,000 tons of bituminous coal and 2,683,000 tons of anthracite. As compared with the records for the preceding year, imports of bituminous coal were 2,300,000 tons lower, and imports of anthracite were 1,885,000 tons less.

For the whole of Canada the apparent consumption, or more properly, the coal made available for consumption in 1922 amounted to 27,200,000 tons, including 21,228,000 tons of bituminous coal, 3,083,000 tons of lignite and 2,888,000 tons of anthracite. The principal coal-consuming province was central Ontario, in which 9,849,000 tons was made available, including 1,716,000 tons of anthracite. In 1921 the same area was supplied with 11,543,000 tons and in 1920 with 13,331,000 tons. For Quebec 4,450,000 tons of coal was made available in 1922, as compared with 4,898,000 tons in 1921 and 5,327,000 tons in 1920.

In 1920 Canada produced 16,900,000 tons, exported 2,500,000 tons, imported 20,800,000 tons, and thus apparently consumed 35,200,000 tons. In 1921, when the output was 15,000,000 tons, the quantity exported amounted to 1,900,000 tons, imports to 18,100,000 tons, and the apparent consumption was 31,100,000 tons. The decline in the consumption of coal in 1921 was in conformity with the prevalent depression in the industrial world. For 1922 the output was 14,200,000 tons, the exports 1,800,000 tons, the imports 13,900,000 tons from the United States and 800,000 tons from Great Britain. The decrease in every item was due to strikes.

U. M. W. Committee Says District 26 Must Withdraw from Red International

By adopting a report of a committee appointed to investigate, the United Mine Workers of America has taken a positive stand against the Red International of Moscow and its attempt to "destroy the American legitimate labor movement and substitute therefor the principles of Bolshevism."

The investigation was made as the result of an inquiry by the district organization of the union in Nova Scotia, otherwise known as District No. 26, as to the right of that district to effect an affiliation with the International of Moscow.

The report of the committee states that the Red International is an organization similar in character to the "One Big Union," which existed in the northwestern provinces of Canada in 1918. Its program and policies are so shaped that it not only sanctions but in fact urges the workers to street uprisings, mob demonstrations, violence, or any other method that it may deem expedient for the accomplishment of its purpose.

Dealing with the question of collective bargaining the committee quotes section 54 of the Red International program and then says:

"It must be apparent to all who read and think that this program is in contravention to the policies, customs, practices and laws of the United Mine Workers of America. The membership of our great organization not only believe in the principle of collective bargaining but also the sanctity of contracts honorably entered into between the representatives of the United Mine Workers of America and the coal operators. In fact this is the rock upon which our union was founded, and in the practice of this policy we have not only made substantial gains in members but we have also strengthened our organization in power and influence."

After stating that the constitution of the United Mine Workers of America excludes from its membership roll and also provides other penalties for those members holding membership in a dual organization not affiliated with the American Federation of Labor, the report states that the Red International is, in the estimation of the American Federation of Labor, a dual organization.

"Therefore," continues the report, "in accordance with the provisions of Sec. 2, Art. 14, those of our members holding membership in the Red International will be required to pay the penalty provided in this section, which reads as follows:

Mine managers, top foremen, operators' commissioners, persons engaged in the sale of intoxicating liquors and members of the Civic Federation shall not be eligible for membership.

Any member accepting membership in the Industrial Workers of the World, the Working Class Union, the One Big Union, or any other dual organization not affiliated with the American Federation of Labor, or membership in the National Chamber of Commerce, or the Ku Klux Klan, shall be expelled from the United Mine Workers of America, and is permanently debarred from holding office in the United Mine Workers of America, and no members of any such organization shall be permitted to have membership in our union unless they forfeit their membership in the dual organization immediately upon securing membership in the United Mine Workers of America. Any member of the United Mine workers of America who accepts office in any dual organization shall be permanently expelled from the United Mine Workers of America, unless reinstated by the International Executive Board."

The committee expresses regret that anywhere working people can be found so woefully deficient in the knowledge of trade unionism that they will blindly follow the false teaching of the propagators of such movements. It recommends that District No. 26 be required to withdraw its application for affiliation with the Red International, and in the event of refusal, that it be suspended, the International organization assuming control of the district affairs.

I. C. C. Issues Service Orders 36 and 37

Because the Government Fuel Yards, Washington, D. C., have been receiving an inadequate supply of coal the Interstate Commerce Commission on Jan. 17 issued Service Order No. 36, effective Jan. 18, directing the assignment of coal cars for consignment to the government yards as follows: Four cars per day for ten consecutive working days by the Pennsylvania R.R. to the Hagevo Mine of the Emerson & Morgan Coal Mining Corporation, Hagevo, Pa., and to the Hughes No. 2 Mine of C. A. Hughes & Co., Cassandra, Pa.; two cars per day for ten consecutive working days by the Pennsylvania R.R. to Pennsylvania Mine No. 1 of the Pennsylvania Coal & Coke Corporation, Portage, Pa., and to Commercial Mine No. 5 of the Commercial Coal Mining Co., Twin Rocks, Pa.; two cars per day for ten consecutive working days by the Johnstown & Stony Creek R.R. and the B. & O. to Thermal No. 4 Mine of the Moxham Coal Co., Johnstown, Pa.; one car per day for ten consecutive working days by the Pennsylvania R.R. to Pennsylvania Mine No. 15 of the Pennsylvania Coal & Coke Corporation, Beaverdale, Pa., and by the B. & O. to the Helen Mine of the Helen Coal Mining Co., Sommerfield, Pa. The cars are to be counted against the allotment of each mine.

On Jan. 19 the commission issued Service Order 37, directing the Peoria & Pekin Union Ry. to continue with reasonable promptness and diligence to interchange freight traffic between the Minneapolis & St. Louis R.R. and connecting carriers at the regularly established interchange points at and in the vicinity of Peoria, Ill. The P. & P. U. had served notice that it would discontinue this service at midnight Jan. 20, because of inability to collect what it considered a reasonable amount from the lines served.

Ford Said to Be Negotiating for Coal Land In Central Pennsylvania

Negotiations are reported under way which, if concluded, will mean that Henry Ford, automobile manufacturer, of Detroit, Mich., will acquire the entire Eastern holdings of Cosgrove & Co. and some of the firm's subsidiary concerns, which include large coal operations in Cambria and Somerset counties, Pennsylvania. Reported efforts of Mr. Ford to acquire coal holdings in the Pittsburgh district and also in Ohio, Kentucky and West Virginia lend strength to the report that he is attempting to get control of large mining interests in the central Pennsylvania field.

The Cambria Steel Co. has made two shipments of forty cars each to Henry Ford. These are the first of an order for 500 new steel coal cars. Apparently it is Mr. Ford's intention to avert such a move as was made necessary last summer during the strike, when he threatened to close down for three months unless fuel was made available.

United States Coal Commission Issues Supplementary Report

The U. S. Coal Commission issued on Jan. 17 an appendix supplementary to its report submitted to Congress Jan. 15. After reviewing the congressional and state investigations of the coal industry resulting from periodical public dissatisfaction, culminating in the act creating the present Coal Commission, the appendix outlines the purposes of the commission and the progress it has made.

Economic investigations now well under way embrace the compilation by C. E. Lesher, editor of *Coal Age*, of data showing (1) increase in the price of coal and how it compares with the price of other commodities, (2) the spread between mine price and delivered price, showing the level of prices at the mine, delivered to carload buyers and delivered to householders.

Compilation of production costs is proceeding under the direction of David L. Wing assisted by James E. Black and H. S. Plews. Wayne P. Ellis is preparing data on transportation costs, while the investigation of the costs of selling coal at wholesale and retail is progressing under the direction of John W. Adams.

"The investigation of profits over a period of ten years," according to the appendix, "is now being organized by Walter Y. Durand, of the Federal Trade Commission."

Labor investigations, proceeding under the direction of Dr. Joseph H. Willits, include inquiry into wage rates, irregularity of employment, absenteeism and labor turnover, strikes and their causes. The study of earnings, which is being conducted by Miss Anne Bezanson, assisted by Miss France Chalufour, embraces gross and net earnings of each employee, days or hours worked by individual workers and time worked by the mine.

With the co-operation of the Census, Miss Marie L. Obenauer is analyzing census statistics in connection with the commission's investigation of living conditions in mining towns.

Mr. Lesher, as engineer in charge of studies relating to the production, transportation and distribution of coal, is well along in his analysis of irregular operation, overdevelopment and waste of coal. In the various phases of this work Mr. Lesher is being assisted by Mr. Walter, Wayne P. Ellis, H. J. German and C. A. Allen.

In connection with its denial of charges that political patronage is being handed out in the way of clerical positions, the President's Coal Commission has issued a personnel statement giving the exact numbers of its employees in the various classifications. It follows: "The commission's staff as at present constituted includes 56 technical employees and 93 non-technical employees. The members of the technical staff include 4 engineers, 38 investigators, 6 assistant investigators, 7 examiners, 1 mineral geographer. The non-technical employees include 1 secretary, 1 chief clerk and disbursing officer, 1 administrative assistant, 1 confidential clerk, 40 statistical clerks, 11 stenographers, 8 typists, 2 comptometer operators, 7 clerks, 3 calculating machine operators, 1 statistical draftsman, 6 operatives, 1 graphotype operator, 2 file clerks, 3 apprentices and 5 messengers. No member of the commission has a private secretary or messenger."

To Test State Law

Washington, Jan. 22.—The U. S. Supreme Court has granted a writ of certiorari in the appeal of the Central Coal & Coke Co. against Jacob Ocepek and has set the case for hearing Feb. 19. This case involves the validity of the Arkansas state law compelling foreign corporations to accept service and trial in any county of the state where suit may be instituted by a resident of the state.

The company, incorporated in Missouri, has mines in Sebastian County, Arkansas. Ocepek, an employee residing in Sebastian County, brought suit for personal injuries in Lawrence County, which is in another federal district than Sebastian County. Pleas of the corporation to transfer the case to the Federal Court on the ground of diverse citizenship were refused by the State Circuit Court and the State Supreme Court, the latter affirming a judgment for $20,000 awarded Ocepek in the lower court. The corporation insists that the case should have been transferred to the Federal Court and tried under federal laws instead of state laws.

Bill to Enlarge Powers of Coal Commission Favorably Reported to House

Representative Winslow, of Massachusetts, chairman of the House Committee on Interstate Commerce, reported favorably from that committee, Jan. 18, a revised bill, No. 13,882, designed to further extend the powers of the United States Coal Commission. This measure, which is intended to amend the act creating the fact-finding commission, is a substitute for the bill introduced in the House, Dec. 9, last, by Representative Winslow, and in the Senate a few days later by Senator Borah. At that time the measure was known as the Borah-Winslow bill.

The provisions contained in the law creating the coal commission are reincorporated and sectionized in the new bill and three new sections, Nos. 9, 10 and 11, have been added. The new sections empower the commission and its authorized representatives to submit written questionnaires to any person, who is required to answer in writing, under oath, within the time specified by the commission or its representative. Under the new sections refusal to answer and return the questionnaire or giving of false testimony, evidence, statements and entries is made an offense for which suitable punishment is provided. In case of refusal to obey subpoenas, to testify or to permit accesss to documentary evidence the commission is authorized to invoke the aid of the federal district courts to compel obedience.

The new sections are as follows:

Sec. 9—The commission or any officer, employee, or agent thereof duly authorized by the commission may prepare and submit to and require to be answered by any person written questions of fact concerning any of the matters which by this Act the commission is empowered or directed to investigate, and such person shall thereupon answer fully and in good faith any and all questions so propounded. Such answers shall be in writing and shall be verified by oath of the persons making them and shall be returned to the commission or its officer or agent within the time which the commission or any officer or agent thereof duly authorized by the commission may prescribe. The oath may be taken before any member of the commission or any officer or agent of the commission by it duly authorized, or before any officer authorized to administer oaths either by the laws of the United States or the laws of the state in which verification is made, but when taken before a notary or other state officer such oath shall be certified under the hand and official seal of such officer.

Sec. 10.—Any person who shall willfully neglect or refuse to attend and testify or depose, or to produce or permit access to any book, account, record, document, correspondence, paper, or other evidence, or to answer any written questions propounded by the commission or any officer or agent thereof, or to return such answers, as herein provided for, and any person who shall willfully give false testimony in respect of any matter or thing under investigation by the commission, or shall willfully make or cause to be made any false entry or statement of fact in any written answer or report called for by the commission or any officer or agent thereof as herein provided for, and any person who shall willfully make or cause to be made any false entry or statement of fact in any book, account, record, document, correspondence, paper, or other evidence, with intent to deceive the commission or any officer or agent thereof, shall be guilty of an offense and upon conviction thereof be punished by a fine of not more than $5,000, or by imprisonment for not more than one year, or by both such fine and imprisonment.

Sec. 11.—In case of disobedience to any subpoena issued by the commission or any member thereof, or of refusal or neglect to testify concerning any matter or thing under investigation by the commission, or of refusal to make written answer to any question propounded by the commission or any officer or agent thereof, or of refusal to permit access to any book, account, record, document, correspondence, paper, or other evidence, by any person, the commission may invoke the aid of the District Court of the United States for the district in which such person resides, in requiring obedience to its process, orders, and requests; and the several District Courts of the United States are hereby invested with jurisdiction in case of such contumacy or refusal to obey the process, orders, and requests of the commission to issue an order requiring compliance therewith. Any failure to obey such order of the court may be punished by the court as a contempt thereof. For the purposes of this section the Supreme Court of the District of Columbia shall be considered a District Court of the United States.

It is understood that Representative Winslow will call up the bill in the House at an early date and endeavor to have it passed as quickly as possible.

EUROPE'S ONE PRAYER appears to be "Forgive us our debts."—Philadelphia *Evening Public Ledger.*

WISH K.K.K. stood for Koal Kar Koming.—*Brooklyn Eagle.*

Union Calls Off Coal Strike at Connellsville

The strike in the Connellsville coke region is at an end. In convention assembled at the Union Hall at New Salem, Pa., Jan. 18, International organization, United Mine Workers, officially notified the delegates of the sixty locals scattered through Fayette County that, so far as benefits were concerned and further active participation, the International union was through.

The news was presented in speeches by International Representative William J. Feeney, John J. Heinz, an international board member; John O'Leary and President Van A. Bittner, of district 5.

The strike which has just come to an end was the greatest in the history of the coke region. Starting April 1, 1922, at first with an incursion of the western end of the field, the walkout spread in a fan-shaped movement to the south, taking in the Masontown or Klondike region almost to a man. From there day by day the infection spread to the north, finally reaching Uniontown proper.

It is estimated that 20,000 miners were idle during the peak of the strike, and of these, it is estimated, more than 16,000 joined the union.

Big Midwest Operator Tells Why He Favors One Year Continuance of Present Scale

An effort in the Middle West to stir operators up against signing a one-year continuance of the present scale of wages and get them to wire the operator delegates at the New York conference last week to refuse "to be stampeded by the Coal Commission" resulted in at least one counter effort on the part of the head of a big operating company which is subsidiary to a railroad. This operator felt that nothing better could be done under the circumstances than sign for one year, as the commission had suggested. He presented his reasons therefor succinctly. At least one of the Middle Western delegates to the conference replied, before going to New York, that he agreed entirely to the proposed one-year plan but that he would rather draw down a strike than sign for two years, as John L. Lewis, president of the union, seemed ready to demand.

The operator in his letter to delegates said that agitators against the one-year continuance of the present contract are wrong in their conclusion that the operators may be frightened into taking action simply because the government fact-finding commission has suggested a renewal of the present agreement for another year.

"As I see it," says the operator, "the operators are interested in satisfying the public demand provided it is not injurious to the coal-mine owners' interests, and I cannot see that any harm whatever could possibly come to the operators by their agreeing to continue the present contract for another year, and my reasons are embodied in the following:

"(1) It would be a good stroke of business policy to do it, because the government's commission has requested it.

"(2) Consumers generally (and they pay the bills) apparently prefer the present high cost rather than have a suspension of the coal mines of the country this year.

"(3) A definite and substantial policy which will satisfy the public and the government that contention with the mine workers is warranted cannot be sustained until the government commission makes its report.

"(4) Contention with the mine workers for lower wages to meet competition of the non-union fields would not, as I see it, be a valid reason, because the non-union operators could, and would, when they so desire, change their rates of wages as circumstances warranted.

"(5) It would, I feel, be folly to allow a strike to occur this year, for which the operators might in part, or wholly, be held responsible.

"(6) If the miners demand that the agreement be extended for two years instead of one, it would, I feel, be good policy to refer the matter to the commission for its decision, saying to the commission that it is not the desire of the operators to extend the present high mining rate and day-wage scale for a longer period than is absolutely necessary and that the demand of the operators for a twelve-month agreement is based upon their judgment that the commission will have made its report in sufficient time to be used in January, 1924, if not earlier.

"It must not be forgotten that public opinion can, and will, bring sufficient pressure to bear, through the press and government representatives, to force their will upon the industry, and we had better have their friendship than their ill will, and the mine owners can rely upon as fair treatment as they are entitled to; more than that they should not expect.

"It would be suicidal to run counter to public opinion and the government's views."

New Kansas Governor Would Kill Industrial Court; "Can't Be Done," says H. J. Allen

Both the Kansas Public Utilities Commission and the Court of Industrial Relations, which has played so important a part in coal mining labor troubles in that state, are doomed if the newly elected Governor Davis, Democrat, has his way. Mr. Davis bitterly attacked the court all through his campaign and in his first message to the Legislature, Jan. 10, he asked the abolition both of the court and of the commission. In their stead he urged legislation to permit the appointment by the Governor of two commissioners. Ex-Governor Henry J. Allen, Governor Davis' immediate predecessor and stanch advocate of the industrial court, said in Chicago the 12th that the Republican Legislature would see to it that the Governor did not touch the industrial court.

On the day of his inauguration Governor Davis received a petition from organized labor, addressed jointly to him and the Legislature, for the abolition of the Court of Industrial Relations and the restoration of the old office of Labor Commissioner, the commissioner to be named by the state Federation of Labor. The latter demand carried with it a request for the restoration of another practice, ended many years ago, of permitting union coal miners to name the State Mine Inspector. There is no question of the support the Governor will receive from Union labor in his move to kill the court, but Kansas is a farm state, where labor can help to swing an election, but where it cannot do the job by itself.

House Move Would Bar Judge Alschuler from Coal Commission; Senate Favors Him

By a substantial majority the committee on Interstate and Foreign Commerce of the House of Representatives has reported out the amendments to the coal commission act eliminating the provisions which would allow Judge Alschuler to serve as a member of the commission. It was pointed out by members of the committee that there is no intention to reflect on Judge Alschuler. The committee feels that it would set a bad precedent to levy on the bench for talent with which to conduct executive functions. Since the judiciary is made up, with few exceptions, of outstanding men the temptation would be great to draft these men into various services, once the way was made easy. Then, too, the committee feels that it is bad for the judiciary itself to have a judge committed to some policy or other when it is certain that he will be called upon to pass judicially on many such cases brought before his court.

The chances are, however, that the matter excluded by the House committee will be restored by the Senate. The Senate hardly could do otherwise now that it has confirmed the nomination of Judge Alschuler. There is no reason, argue some of the members of the upper house, why the public and the government should not have the advantage of the services of any member of the judiciary when he happens to be particularly fitted for an important task.

In this particular instance insistence by the House on the attitude of its committee would rob the President's Coal Commission of one of its strong members. It would remove from the commission a man who has lived with its work for three months. It would be difficult for a substitute to bring himself abreast with the other members. Moreover, Judge Alschuler knows the seamy side of unionism as well as its good features.

Agreement Reached to Renew Wage Contract for One Year

Agreement to renew the existing wage contract for one year from April 1, 1923, was reached by the subcommittee of operators and miners from Illinois, Indiana and eastern Ohio in session at the Waldorf-Astoria, New York, late Tuesday afternoon, Jan. 23. The subcommittee was scheduled to make such a report to the full conference at 10 a.m. on Wednesday and there was not the least doubt that by noon on Jan. 24 a contract would be signed. Thus all possibility of a strike in 1923 is eliminated.

When the session opened on Tuesday, Illinois and Ohio wanted to renew for one year. Indiana moved to amend the motion, substituting two years for one. The amendment was defeated, having only Indiana's support. Indiana then moved to amend by striking out the penalty clause, explaining that they considered the penalty clause a bar to damage suits where loss had been sustained by violation of contract. Illinois and Ohio voted no, and this amendment was lost.

A subcommittee of two, John L. Lewis and Phil Penna, was then appointed to retire and iron out the differences. They retired to another room, where for an hour or more they went over the situation. There is no account of what transpired there but it is understood that Lewis gave assurance of contract enforcement in Indiana, for the result of the meeting was a report to the full subcommittee to accept the one-year contract without change in conditions or wages.

Other districts will now begin the formalities of negotiation, but it is generally understood that all union fields will soon accept the lead of the three-state conference.

With a cut and dried program the United Mine Workers and operators from Illinois, Indiana and eastern Ohio—the old Central Competitive Field minus Pittsburgh—met in New York on Thursday, Jan. 18, at the call of John L. Lewis and Phil Penna, to negotiate a wage contract for the period beginning April 1, 1923. Preliminaries only were dealt with the first day, the conference comprising full delegations from all fields meeting at the Hotel Pennsylvania and going through the formalities of electing officers and selecting a credentials committee.

Western Pennsylvania Group Knock at Door

This credentials committee had a job on its hands at once, for there were a group of operators from western Pennsylvania knocking at the door. These operators, representing so-called independents, are outside the regular organization in the Pittsburgh district and were among those who early signed the Cleveland agreement last August. They were not seated at this conference on the ground that they do not represent the district from which they come. This left Illinois, Indiana and eastern Ohio to participate. Southern Ohio put in no appearance, but has done nothing, it is pointed out, to hinder the proceedings and it is understood will accept the findings of this conference.

When the meeting convened Friday the miners presented their demands in full, as of the February, 1922, convention at Indianapolis. This list included the 6-hour day, the 5-day week, abolition of the penalty clause, as well as no reduction in wages. The operators promptly voted down the demands, and after some further skirmishing the whole matter was referred to a subcommittee of two on each side from each district and the officers of the union and of the meeting. This is as has been customary for some 25 years. The subcommittee and officers are as follows:

Operators—S. H. Robbins and W. S. Haskins, of Ohio; Rice Miller and H. C. Perry, Illinois, and M. L. Gould and P. H. Penna, Indiana.

Miners—Frank Farrington and Harry Fishwick, Illinois; John Hessler and Will Mitch, Indiana; Lee Hall and G. W. Savage, Ohio.

Officers of the Conference—Michael Gallagher, chairman; William Green, secretary, and Walter L. Robinson, assistant secretary.

Officers of the United Mine Workers—John L. Lewis, president; Philip Murray, vice-president.

Saturday the subcommittee began work. No results were announced and the meeting was resumed on Monday at 10 a.m., this time at the Waldorf. Adjournment came at 2 p.m. and another session began on Tuesday morning, with no conclusion reached. The only statements made were perfunctory announcements of progress and emphatic assertions that there would be no strike; that in fact there is not the least possibility of a strike.

It having been predetermined by circumstances on receipt of Mr. Hammond's second telegram to the joint conference at Chicago early this month that there would be no demand from either side for changes in wage rates, all that remained, so it appeared on Saturday, was to decide whether the contract would be for one year, as Mr. Hammond had formally requested, or for two years, as demanded by the union and reported to have been "casually" suggested by Mr. Hammond some two weeks ago.

Question of One or Two Years at Issue

This question of one year or two years occupied a prominent place in the discussions on Friday and Saturday. The union contended for two years and Indiana and Ohio fell in line. The arguments that are understood to have caused these operators to be willing to take on the longer period were that wages in other industries were going up now and that a year from now it might be necessary to give an increase and, more important, that the operators would be at a decided disadvantage were they to try for a new contract in 1924 with a presidential campaign and election going on. It was argued among the operators that the political pressure on them in 1924 to settle without trouble might be so great as to give the union a chance to further advance its cause without opportunity to go into the merits of the questions involved.

Illinois, however, held out for a one-year agreement, feeling that their district, above all others in the meeting, will suffer the most from non-union competition with the present high wage scale renewed. The delegation of operators from that field, as well as from Indiana, has been deluged with propaganda and letters and telegrams from "back home" urging the conferees to demand a wage reduction. The delegation in New York, however, found out the impossibility of any such demand and is going ahead to get the best deal possible in view of the admitted strength of the union and the public declaration of Mr. Hammond for a renewal of present wages. When Illinois held out for a one-year contract, the others agreed, because under the rules of their joint conference the vote must be unanimous on every point and there was no disposition to halt the conference on that score.

On Monday, however, a new element was introduced. One group of operators, understood to have been Indiana, asked John L. Lewis to go on record, if not in the contract, in favor of some method more effective than that now agreed upon for contract enforcement.

Indiana has suffered greatly in recent years from petty strikes. From this cause there has been no redress, the district president having refused to bring them to settlement—afraid, it is commonly believed, that he would lose his job if he interfered. Ohio and Illinois, under Lee Hall and Frank Farrington, have had no such troubles. The policy of John E. Lewis has been that he would exercise his own judgment and will in the matter as to whether he would consider an appeal from the state officers in such matters. It is alleged that in general he has refused to assume jurisdiction. What the Indiana operators sought was some declaration from Mr. Lewis that when a mine was struck and after all proper efforts had been exhausted to find a settlement, he would, on appeal from the operator, arbitrate the case.

Rumors that the operators had sent a delegation to Washington to find out what assurance would be given by the government that no prosecution under the Sherman Law will follow an interstate agreement were strenuously denied.

First Five Herrin Prisoners "Not Guilty"; Remaining Massacre Cases Will Proceed

The first five men charged with murder in connection with the Herrin massacre have been declared not guilty. A jury of one miner and eleven farmers, two of whom are former miners, returned this verdict in the Williamson County Court at Marion, Ill., Jan. 19, after twenty-six hours' deliberation. The five prisoners, four of them union coal miners and the fifth a laborer of Herrin, Ill., had been on trial since Dec. 13, 1922, for the murder of Howard Hoffman, one of the twenty-one non-union men shot and cut to death June 22, 1922, after 48 men besieged in the Lester strip mine near Herrin had surrendered to a mob.

The state's attorneys prosecuting the case had little to say after the verdict was returned except that acquittal in the face of such evidence was due to intimidation of jurors. Considering the sentiment of Williamson County, there is no surprise at the outcome of the case. The region is a United Mine Workers stronghold, and the local authorities not only did not interfere with the massacre but failed to arrest a single man for it. Every obstacle was put in the way of state and government agents who worked up the case during the summer before a grand jury finally was impanelled and returned 416 indictments for murder, conspiracy to murder and conspiracy to riot against 77 men.

"Of course we will proceed to try the rest of the cases," was Attorney General Brundage's only comment. No date has been set, however. The same five men adjudged not guilty of murdering Hoffman are indicted for murder in the case of the deaths of several more of the 21 dead men. Thus none of the five is a free man. They are Otis Clark, union official; Leva Mann, Joe Carneghi, Pete Hiller and Bert Grace. Each will figure in the series of trials that may now ensue before the state gets through prosecuting. It is impossible to get a change of venue so as to move the trials from Williamson County, where the massacre took place, so the remaining trials will be held in Marion.

The battalion of attorneys employed by the United Mine Workers to defend the five prisoners—attorneys paid from the union defence fund, contributed to by at least one member of the jury and by most of the defence witnesses who impeached the damning testimony of the state's witnesses—issued a statement after the verdict was in, pushing to the fore the union propaganda that the prosecution of the whole Herrin case is nothing less than persecution of labor by capital. The statement read thus:

"A jury composed almost totally of Williamson County farmers returned a verdict of not guilty as to all the defendants. The defendants' attorneys, of course, feel happy at the result; happy because this may and ought to be the birth of a new era in industrial disputes in America. The defense was directed against the vicious and unwarranted, brutal and murderous use of a private army of gunmen. If this trial has taught the lesson well that hereafter the weapons of the employers' private army shall not be directed against human beings, then the trial, with all its sacrifices, has not been in vain.

"If only the American public could be advised of the true facts as they fell from the lips and manner of the witnesses upon the stand, no real American would disagree with the verdict rendered by this jury of farmers. It was the only righteous verdict which could have been rendered against an army of invaders."

During the last days of testimony before the case was suddenly put into the hands of the jury, the defence continued its long string of character witnesses, all attempting to impeach the incriminating testimony of the prosecution. They testified that Donald M. Ewing, a newspaper reporter, could not possibly have been at the cemetery in time to offer one of the dying men a drink of water only to be met with the point of Bert Grace's gun. The bodies were removed, they all testified, before the time estimated by Ewing as about the hour when that brutal event took place.

They testified that Dr. O. P. Shipman couldn't possibly have been at the cemetery to see, as he declared he did see, Joe Carneghi, Leva Mann and two other indicted men shoot into the bodies of the six men roped together by their necks. They said he was at or near his office at the time he said the shooting took place. They said he privately confessed he wasn't sure of the identity of a single man in the mob of June 22.

Two or three of those who tried to impeach the doctor's testimony admitted they were miners employed by the union to gather defence evidence. Practically every one of the defence witnesses are miner's union members and admitted they were contributing to the defence fund.

One of the defence witnesses, G. J. Frick, a Marion undertaker and former miner, said he reached the cemetery with his ambulance at 9:25 the morning of the slaughter and waited for the men to die before he took the bodies.

"You mean to say you let the ambulance stand there while men were lying on the ground dying?" quizzed a prosecution attorney.

"I went to a telephone to call Coroner McCown," said Frick.

"And you saw those men there with their throats cut and shot and bleeding and you heard them begging for water, and did nothing for them?"

"They weren't begging for water when I first came there but they were when I came back."

"Did you get any water?"

"No."

The defence appeared to do everything it could to avoid the introduction of evidence such as this about the brutality of June 22, even to the maneuver of waiving argument after State's Attorney Delos Duty had summarized the case. This prevented Attorney General Brundage and others from making any statements to the jury at the wind-up, when the case was turned over to that body.

Bids Opened for 76,100 Tons of Bituminous Coal for Navy Yards and Naval Stations

Bids for supplying 76,100 tons of bituminous or semi-bituminous coal for navy yards and naval stations were opened Jan. 19 by the Bureau of Supplies and Accounts of the Navy Department. The requirements were divided into two classes, one covering 25,900 tons for delivery during February and March, the other covering 50,200 tons for delivery between February and June, inclusive. The bids follow:

400 tons, for delivery to Naval Ammunition Depot, Lake Denmark, N. J., during February and March: Dexter & Carpenter, Inc., New York, $5.04 per ton, f.o.b. mines; Emmons Coal Mining Co., New York, $8.97 per ton; George D. Harris & Co., New York, $8.13 per ton.

1,000 tons, for delivery at Lake Denmark, February to June: Empire Coal Mining Co., Philadelphia, $8.08 per ton; George D. Harris & Co., $7.99 per ton.

10,000 tons, for delivery to Navy Yard, Washington, D. C., during February and March: C. G. Blake & Co., Cincinnati, $8.57 per ton; L. A. Snead Co., Washington, D. C., $8.04 per ton.

17,000 tons, for delivery at Washington, February to June: Chesapeake & Ohio Coal & Coke Co., $5.93 per ton, f.o.b. mines; L. A. Snead Co., $7.74 per ton.

400 tons, for delivery at Bellevue Magazine, D. C., January to June: Emmons Coal Mining Co., $7.32 per ton; L. A. Snead Co., $8.04 per ton.

2,000 tons, for delivery at White Plains, Md., February and March: Dexter & Carpenter, Inc., $8.45 per ton; Emmons Coal Mining Co., $8.09 per ton; L. A. Snead Co., $8.59 per ton.

5,000 tons, for delivery at White Plains, Md., February to June: Emmons Coal Mining Co., $7.86 per ton; Imperial Coal Corporation, New York, $7.61 per ton; L. A. Snead Co., $8.31 per ton.

7,000 tons, for delivery at Naval Academy, Annapolis, Md., February and March: Dexter & Carpenter, Inc., $8.38 per ton, in barges, or $7.88 per ton, rail delivery.

6,500 tons, for delivery at Portsmouth Navy Yard, Norfolk, Va., February and March: C. G. Blake Co., $8.68 per ton; Dexter & Carpenter, Inc., $8.55 per ton; Emmons Coal Mining Co., $9.16 per ton.

12,000 tons, for delivery at Norfolk, February to June: Chesapeake & Ohio Coal & Coke Co., $5.93 per ton.

Midwest Sees Combination Railroad Labor Board and I. C. C. Coming for Coal Industry

The final paragraph of the United States Coal Commission's preliminary report of Jan. 15 clinched it for Midwest coal operators. The commission is going to recommend regulation of coal by commission. The Midwest has expected this. Now it is convinced. The commission is to be a sort of composite of the Railroad Labor Board and the Interstate Commerce Commission with power to restrict the opening of new mines, to restrain miners from striking too impetuously and to exercise a measure of price control. The commission studiously avoids saying so openly, but read the last paragraph of the report, say observers in the Middle West.

That final paragraph reads thus: "The commission believes that the public interest in coal raises fundamental questions of the relation of this industry to the nation and of the degree to which private right must yield to public welfare. It may be that both private property in an inexhaustible resource and labor in a public service industry must submit to certain modifications of their private rights receiving in return certain guarantees and privileges not accorded to purely private business or persons in private employ."

Coal Is a Public Utility, Says Chicago

In other words, according to much individual opinion in Chicago, which is a center of coal operations for Illinois and Indiana, coal is a public utility and should be under government control henceforth. Though coal deposits are nearly inexhaustible, anybody and everybody should not be allowed to produce coal for sale unless they can show that public necessity and convenience demand it. Since coal is a public utility the right of strike and lockout must be curbed materially and prices of coal must not be left to the well-known but often troublesome law of supply and demand any more than the price of gas. But neither should the public be left free to upset the whole coal industry by holding out until coal prices are bumping the bottom and then by pushing into the market madly with disastrous results all around. Purchasing should be steadied and made more uniform in order that production and working time also can be steadied and made uniform.

"Sounds good to me," said one veteran operator. "It has long been apparent that something of this sort is essential in this industry. I'll admit I'm tired to death of this constant labor struggle and this constant struggle over the coal market. Coal is one of the most tiresome and unsatisfactory necessities of life to produce and handle. I'm getting along in years and don't want to fight all the time. I'd rather do business on a business basis. I want a reasonable number of miners working for me at a reasonable wage a reasonable number of days a year. I want the public to have my coal at a reasonable price and I want it to take that coal through a reasonable number of weeks of the year instead of all in the winter. It would be a lot more pleasant for me to take a reasonable profit—yes, a pretty small profit—steadily right along, than to work on this feast-and-famine scheme. If the commission recommends what it appears to be preparing to recommend, I hope Congress and the country carry out those recommendations."

Three other active operators expressed much the same opinion, and they were not veterans worn by the long labor and market struggle either. They were one in banking firmly upon the business judgment and fairness of the commission to produce a solution for some of the principal ills of the industry—a solution that, once put into effect, will stick.

"But," remarked one man wise in the ways of the United Mine Workers, "how do you think a coal board will get along with the union? Can you imagine a tougher nut for any government board to crack? Where is there any labor group dealing with the government that is so unified? Or so bullheaded? Or in the hands of so few men? And, though you might say it's better to deal with the group through a few men than through many, yet you mustn't overlook the fact that the size of the miners' union is expected to be shrunk down and the free and easy power of strike to be curbed. That hits those few men right where they live. The importance of their jobs depends upon their ability to fight the miners' battle unhampered by the government or anybody else. Won't it be a 'backward step' for the union to permit the coal industry to get into the hands of a coal commission which has the power to enforce its rules? The union is not going to take any 'backward step' you know."

"Right there will be the whole trouble with this scheme," contributed another operator who heard the comment. Union labor certainly will rally at Washington when this commission legislation comes up for passage, to see to it that labor has a little more than 50 per cent representation on this commission. The difficulty, as I see it, will be to prevent any government coal board from falling into labor hands."

Many Midwesterners are convinced now that government board control—which some of them call "the McAuliffe plan," because Eugene McAuliffe, former president of the Union Colliery Co., worked out something of the sort for the Coal Commission—is the logical thing to result from the commission's work. Most of them watch for it hopefully.

Some there are who hoot at it. These are mainly operators of a size and experience which lead them to feel that they can care for themselves in all weathers and that the law of supply and demand is sufficient to control at all times. These are strong for a continuance of present conditions, which they think would eventuate in most of the mines of the country falling into the hands of a small number of large and competent ownerships. Once in these hands—a season or two like the one in prospect for 1923 might produce this alignment—war to the death with union labor could go on to its logical end, which is union defeat. For those operators, there is no better way.

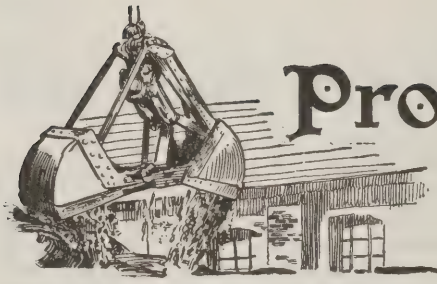
Howat Out of Prison on Parole; Officers Try to Restore Harmony in Kansas

Alexander Howat, deposed president of the Kansas union coal miners, and five other deposed officials who had been, like Howat, serving a sentence of one year for contempt of court in calling a strike, were paroled Jan. 20 by Judge D. H. Woolley at Pittsburg.

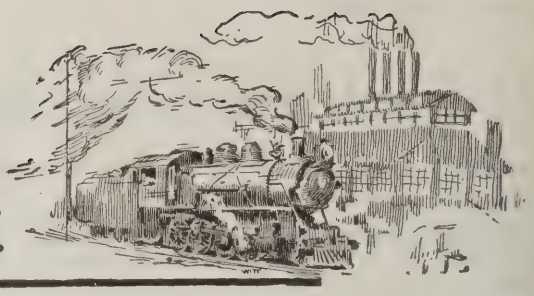
Judge Wooley, who paroled the prisoners from the Crawford County Jail at Girard, said that the applications for release referred only to the sentences for one year, and did not mention the indefinite sentence imposed against the men, requiring their imprisonment until they consented to testify before the Kansas Court of Industrial Relations.

As a first move in harmonizing and solidifying the coal miners of the southeastern Kansas field, the recently elected officers of District 14 have announced suspension of the fine of $15 assessed against miners of the district who failed to quit work when ordered to do so by a district convention June 16, 1922. The dispensation extends to March 1 for all who desire to return to the fold. By the election, a ticket recognized as representing the Howat faction was put into office.

During the strike, unauthorized by international officials, last year, in which Alexander Howat, then president of the district, and John L. Lewis, international president, clashed, the district lost its charter. Autonomy was restored with the assumption of office by new officers the first of this year. The present move is to recruit to the newly recognized organization some 2,000 miners who continued to work last summer and who have refused to pay the fine of $15 in addition to the initiation fee of $10 that is exacted if they would rejoin the union.



Production and the Market



Weekly Review

Reports are general of easiness in all markets. Anthracite is moving quicker to Eastern points but there is dullness in the movement of bituminous coal. Production of soft coal, notwithstanding railroad difficulties, slow buying and illness among the miners in some of the Southern non-union fields, hangs around 11,000,000 tons. *Coal Age* Index of spot bituminous prices decreased 7 points last week and stood at 358 on Jan. 22, with a corresponding average price at the mines of $4.33 as compared with $4.42 the preceding Monday, reflecting the general letdown accompanying the warmer weather and the spread of feeling that there will be no strike on April 1.

With the strike scare removed and the country generally with fair stocks of soft coal, there is nothing in sight save temporary and local car shortages to hold the market up. In another thirty days the stringency caused by the anthracite shortage will have been passed.

Ruhr Shutdown May Boost Demand in America

Many in the coal trade are watching the struggle in the Ruhr in the expectation that a general shutdown of this large coal field, where about 2,000,000 tons a week is produced, will result in a demand for outside coal greater than England can supply. The only other source, of course, is the United States.

High-grade coals are generally under contract and little but lower grades are available on the spot market.

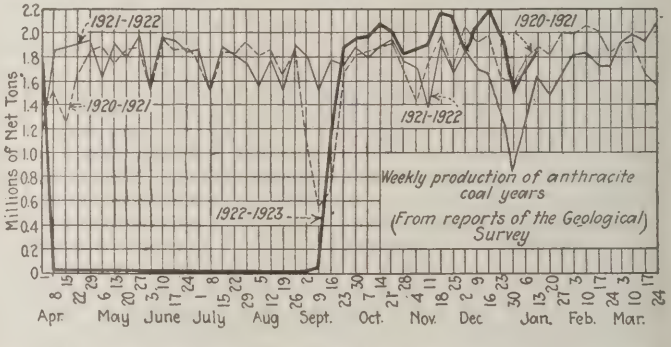
The anthracite situation is much quieter. Production continues to be interfered with by petty strikes over which the union leaders contend they have no control. The steam sizes of anthracite are being quickly absorbed. Buckwheat is easier and quotations indicate that the independent products are not moving as easily as a week back.

"Revised estimates for the week Jan. 8-13 indicate a total output of soft coal, including coal coked, mine fuel and local sales, amounting to 11,172,000 net tons," says the Geological Survey. "The final estimate for the first week of the year is 10,993,000 tons.

"Preliminary reports for the third week in January show 44,736 cars loaded on Monday and a decline of 32,891 cars on Tuesday, and 30,582 on Thursday. The total output for the week Jan. 15-20 is expected to be about 10,900,000 to 11,000,000 tons."

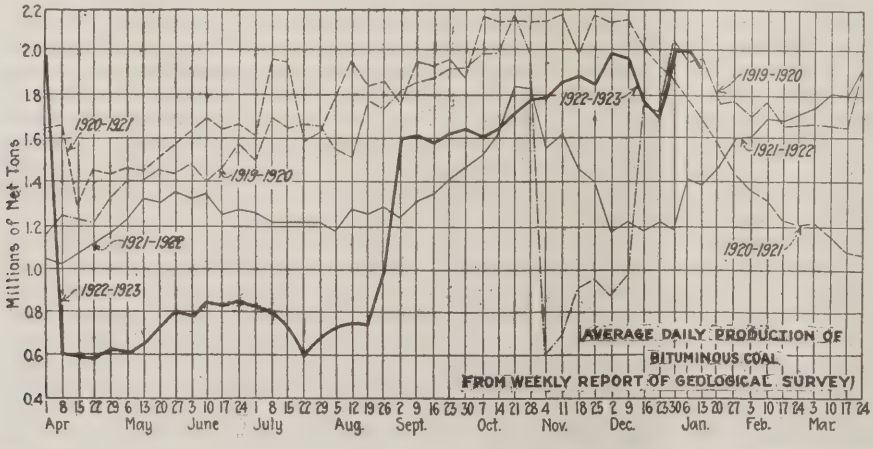
Midwest Situation Easier

A general let-down in coal trade made itself felt throughout the West and Middle West during the past week. Continued warm weather and the increasing spread of certainty that there will be no strike are held responsible. Steam coals and the middle sizes of fuels were all having a hard time to avoid distress on cars and the sinking sensations spread



even to domestic sizes, though the demand for them was fair and the stronger companies of southern Illinois and Indiana managed to maintain their price levels in most cases. There was general prophecy that prices will slump all around by the end of this week.

In Chicago, shippers were compelled to work hard toward the end of the last week to move everything they had in transit. Week car supply in some fields performed the usual feat of saving the situation from absolute collapse of the market. Franklin County screenings had receded to an average of $2.75, which was a small recession, but Central Illinois, always early to show the effects of pressure, slipped 25 or 50c., lowering lump to $4.25, mine run to $3 and



Estimates of Production

(Net Tons)

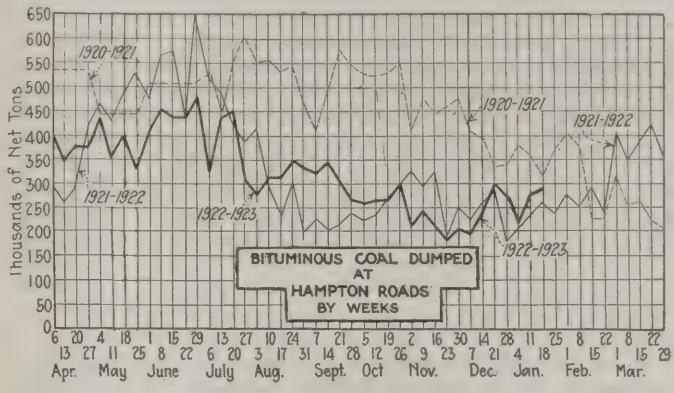
	1921–1922	1922–1923
BITUMINOUS		
Dec. 30	5,961,000	10,171,000
Jan. 6 (*b*)	7,476,000	10,993,000
Jan. 13 (*a*)	8,302,000	11,172,000
Daily average	1,384,000	1,862,000
Calendar year	15,778,000	22,165,000
Daily average cal. year	1,214,000	1,583,000
ANTHRACITE		
Dec. 30	851,000	1,560,000
Jan. 6 (*b*)	1,242,000	1,725,000
Jan. 13 (*a*)	1,643,000	2,113,000
Calendar year	2,885,000	3,838,000
COKE		
Jan. 6 (*b*)	108,000	309,000
Jan. 13 (*a*)	119,000	322,000
Calendar year	227,000	631,000

(*a*) Subject to revision. (*b*) Revised from last report.

screenings to $1.75. Indiana coals showed about the same downward movement. Very little Eastern fuel reached that market. Every man in the coal trade was hoping fervently that Saturday night's thin clouds from the north and west would roll up a storm and bring icy blasts of wind.

In St. Louis conditions were about the same. Trading was mostly in the cheaper coals and nobody showed any desire to buy heavily for storage. Poor car supply was all that kept the Carterville mining field out of a bad slump. Railroad tonnage out of that field remains good, however. The same conditions prevailed in Jackson County and the Duquoin region. The Mt. Olive region, normally a heavy St. Louis shipper, saw its volume to that city slump, but it was able to move a good deal to Chicago. Its car supply was better than the demand required. Standard field mines without railroad contracts averaged between 1½ and 2 days during the past week. All sizes there are in surplus and hard to move.

The price softening noticeable in most Western regions is only beginning to be felt in western Kentucky, where the lower grade fuels have dropped some but where domestic and industrial demand is still strong enough to keep the market right side up. There is no big general movement in any direction, however. Coal movement through Louisville has been poor of late because of the congestion on the Kentucky & Indiana Terminal R.R., which has recently suffered the loss of a number of yard engines condemned for poor condition.



The Northwest has not worried much over the coal situation during the past week. Though dock stocks contain a remarkably small proportion of free coal considering the time of year—there is only 450,000 tons free on the docks at the Head-of-the-lakes to last that region until the re-

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Jan. 23 1922	Jan. 8 1923	Jan. 15 1923	Jan. 22 1923†
Smokeless lump	Columbus	$3.30	$7.25	$7.25	$6.75@$7.75
Smokeless mine run	Columbus	2.15	6.60	6.60	6.50@ 6.75
Smokeless screenings	Columbus	1.50	5.85	5.85	**5.50@ 6.50**
Smokeless lump	Chicago	2.85	7.75	7.75	7.50@ 8.00
Smokeless mine run	Chicago	2.15	6.35	6.35	6.25@ 6.50
Smokeless lump	Cincinnati	2.85	7.50	7.75	*7.00@ 8.00*
Smokeless mine run	Cincinnati	1.90	6.25	6.35	*6.00*
Smokeless screenings	Cincinnati	1.40	6.25	6.10	*6.00*
*Smokeless mine run	Boston	4.70	8.35	8.75	8.50@ 9.00
Clearfield mine run	Boston	1.95	5.10	4.85	*4.50@ 5.00*
Cambria mine run	Boston	2.45	5.60	5.50	*5.00@ 5.50*
Somerset mine run	Boston	1.80	5.35	5.10	*4.75@ 5.25*
Pool 1 (Navy Standard)	New York	3.20	6.35	5.75	5.50@ 6.00
Pool 1 (Navy Standard)	Philadelphia	3.00	6.00	.....	5.50@ 6.00
Pool 1 (Navy Standard)	Baltimore	2.40	6.60	6.10	*5.50*
Pool 9 (Super. Low Vol.)	New York	2.25	5.85	5.25	*5.00@ 5.50*
Pool 9 (Super. Low Vol.)	Philadelphia	2.30	5.75	5.75	*5.40@ 5.75*
Pool 9 (Super. Low Vol.)	Baltimore	2.10	6.10	5.75	*5.00@ 5.25*
Pool 10 (H.Gr.Low Vol.)	New York	2.10	5.35	4.75	*4.25@ 4.75*
Pool 10 (H Gr.Low Vol.)	Philadelphia	2.00	5.25	5.25	*5.10@ 5.30*
Pool 10 (H.Gr.Low Vol.)	Baltimore	1.95	5.60	5.20	*4.25@ 4.50*
Pool 11 (Low Vol.)	New York	1.70	4.35	4.25	*3.25@ 3.50*
Pool 11 (Low Vol.)	Philadelphia	1.70	4.35	4.35	*4.10@ 4.35*
Pool 11 (Low Vol.)	Baltimore	1.70	5.00	4.20	*3.75*
High-Volatile Eastern					
Pool 54-64 (Gas and St.)	New York	1.45	4.00	3.60	*3.25@ 3.50*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	4.30	4.15	*3.50@ 3.80*
Pool 54-64 (Gas and St.)	Baltimore	1.40	4.25	3.85	*3.00@ 3.50*
Pittsburgh sc'd gas	Pittsburgh	2.65	5.25	5.25	*5.25@ 5.50*
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.60	3.35	**3.50**
Pittsburgh slack (Gas)	Pittsburgh	1.75	3.25	3.20	**3.35@ 3.50**
Kanawha lump	Columbus	2.60	6.25	6.25	6.00@ 6.50
Kanawha mine run	Columbus	1.65	3.75	3.75	*3.25@ 3.50*
Kanawha screenings	Columbus	1.15	3.35	3.35	*3.00@ 3.25*
W. Va. lump	Cincinnati	2.50	6.50	6.50	*5.50@ 6.50*
W. Va. Gas mine run	Cincinnati	1.40	3.85	3.75	*3.50*
W. Va. Steam mine run	Cincinnati	.....	3.60	3.35	*2.90@ 3.25*
W. Va. screenings	Cincinnati	1.10	3.35	3.25	*2.75@ 3.25*
Hocking lump	Columbus	2.60	5.25	5.35	*4.75@ 5.50*
Hocking mine run	Columbus	1.90	3.10	3.10	*2.75@ 3.00*
Hocking screenings	Columbus	1.20	2.85	2.75	*2.50@ 2.75*
Pitts. No. 8 lump	Cleveland	3.00	5.10	5.00	**4.75@ 5.50**
Pitts. No. 8 mine run	Cleveland	1.90	3.50	3.40	**3.50@ 3.75**
Pitts. No. 8 screenings	Cleveland	1.65	3.30	3.15	**3.15@ 3.35**
Midwest					
Franklin, Ill. lump	Chicago	3.65	5.35	5.35	5.25@ 5.50
Franklin, Ill. mine run	Chicago	2.35	4.10	3.85	3.75@ 4.00
Franklin, Ill. screenings	Chicago	2.05	2.85	2.70	*2.50@ 2.85*
Central, Ill. lump	Chicago	3.00	4.35	4.35	*4.00@ 4.25*
Central, Ill. mine run	Chicago	2.35	3.50	3.50	*2.75@ 3.00*
Central, Ill. screenings	Chicago	1.70	2.25	2.10	*1.65@ 1.75*
Ind. 4th Vein lump	Chicago	3.25	5.10	5.10	*4.75@ 5.00*
Ind. 4th Vein mine run	Chicago	2.55	3.85	3.60	3.50@ 3.75
Ind. 4th Vein screenings	Chicago	1.85	2.50	2.50	*2.25@ 2.40*
Ind. 5th Vein lump	Chicago	2.95	4.75	4.10	4.00@ 4.25
Ind. 5th Vein mine run	Chicago	2.20	3.60	3.10	3.00@ 3.25
Ind. 5th Vein screenings	Chicago	1.65	2.10	2.25	*1.75@ 1.85*
Standard lump	St. Louis	2.75	4.10	4.10	4.00@ 4.25
Standard mine run	St. Louis	1.95	2.60	2.60	2.50@ 2.75
Standard screenings	St. Louis	1.35	1.85	1.85	1.75@ 2.00
West Ky. lump	Louisville	2.55	4.50	4.35	*4.00@ 4.25*
West Ky. mine run	Louisville	1.80	2.75	2.55	**2.50@ 2.75**
West Ky. screenings	Louisville	1.05	2.10	2.30	2.10@ 2.50
West Ky. lump	Chicago	.....	4.25	4.25	4.00@ 4.50
West Ky. mine run	Chicago	.....	2.75	2.60	*1.75@ 2.00*
South and Southwest					
Big Seam lump	Birmingham	2.75	3.95	3.95	3.45@ 4.45
Big Seam mine run	Birmingham	2.10	2.50	2.35	2.25@ 2.50
Big Seam (washed)	Birmingham	2.15	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	6.25	6.25	6.00@ 6.50
S. E. Ky. mine run	Chicago	.....	3.85	3.85	*3.00@ 3.50*
S. E. Ky. lump	Louisville	2.70	6.60	6.50	6.00@ 7.00
S. E. Ky. mine run	Louisville	1.55	3.75	3.50	*3.00@ 3.25*
S. E. Ky. screenings	Louisville	1.25	3.35	3.25	3.00@ 3.50
S. E. Ky. lump	Cincinnati	2.65	6.50	6.50	*5.25@ 6.00*
S. E. Ky. mine run	Cincinnati	1.45	3.65	3.60	*3.25@ 3.50*
S. E. Ky. screenings	Cincinnati	1.05	3.35	3.10	*2.75@ 3.25*
Kansas lump	Kansas City	4.75	5.50	5.50	5.50
Kansas mine run	Kansas City	4.00	3.75	3.75	3.50@ 3.75
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**. declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	Jan. 15, 1923 Independent	Jan. 15, 1923 Company	Jan. 22, 1923† Independent	Jan. 22, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@ $8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.50	6.15@ 6.20	7.00@ 9.50	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	5.25@ 6.25	4.00@ 4.10	*5.25@ 6.00*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00@ 5.50	4.00	5.00@ 5.50	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	*2.40@ 2.75*	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.65@ 2.00	1.50@ 2.00	*1.50@ 2.50*	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.

opening of navigation—yet prices are not stiffening much because rail coal is coming in steadily and at shading prices and because the weather for several days has been mild.

The shortage of hard coal agitates fewer people every day. Although dock supplies are practically gone and rail anthracite is confined mostly to egg and buckwheat, which are unpopular sizes, yet there is no mob storming the dock gates for the available fuel. Soft weather has had something to do with that, The general turn from hard to soft coal and to coke and briquets for domestic use has further aided to produce this effect. It is now estimated that Duluth and Superior have received about 80 per cent of their normal supply of hard coal. If other communities in the upper country are as well supplied, then the shortage of anthracite is not so painful as it might be. In Wisconsin the State Fuel Commission has not carried out its threat to seize the available anthracite in order to more carefully apportion it.

The West and Southwest also float along easily. The mild weather of the past week has been general. In Utah, with the thermometer running up to 58, domestic demand has softened a good deal and mines have been working recently only about 40 per cent. There is a good industrial call however. Several operations are preparing to turn their whole output into slack as a result.

Because of poor domestic demand Colorado lignite prices varied widely but bituminous in that state held fairly steady with production at about half-speed. Colorado Fuel & Iron Co. mines get good running time in the Walsenburg and Trinidad districts because of the company's big steel contracts which have the Pueblo mills operating steadily now. Domestic demand for coke in Denver has picked up. C.F.&I. domestic lump coal sells at retail for $14 and nut size for $12. Denver Gas & Electric coke is priced at $10.

Around Kansas City the coal market would be shot completely to pieces were it not for the short car supply. Short cold snaps are all that have kept many mines from shutting down cold. Kansas lump sells there for $5.50, mine-run for $3.50@$3.75 and screenings for $2.50. Arkansas semi-anthracite goes at $6 for lump, $3.50@$4 for mine-run and $1.50@$2 for slack.

Conditions in Ohio

The situation in Ohio has been affected by the optimistic reports emanating from the camps of both operators and miners that there is not much danger of a strike April 1. Mild weather conditions put a damper on buying of both domestic and steam coals, which is confined largely to immediate requirements. Reserves in Ohio in steam grades are estimated at from 45 to 60 days. Retail dealers are not heavily stocked. Pocahontas and smokeless grades are hard to get and West Virginia splints, Kentucky and Ohio coals make up the bulk of the tonnage.

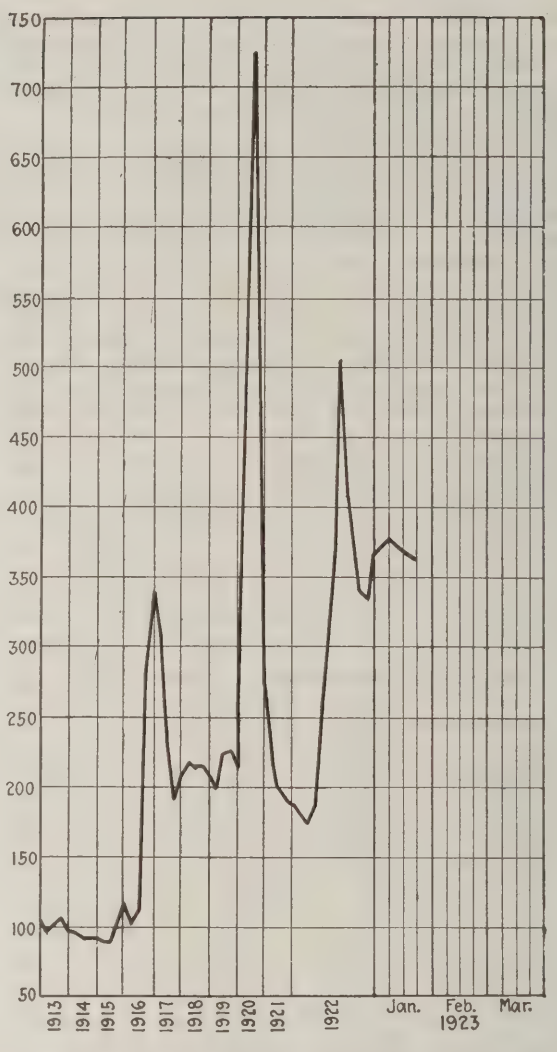
In Cincinnati the fact that the storage piles have not started to build up indicates that all of the river coal is going to consumers. There has been a large number of rejections due to the reductions in values during the past ten days, both by-product and steam coals showing a reduction of 50c. a ton.

New River mines are securing a somewhat better car supply from the Chesapeake & Ohio but the improvement has not been sufficient to add materially to the total production of the district. Few mines are working more than two full days a week. Most of the coal produced is going to Tidewater and Eastern inland points due to the inability to secure equipment for western loading. Gulf production is on a limited scale owing to the inability of the Virginia Ry. to make any headway in materially increasing transportation facilities.

Losses in the Pocahontas region are usually heavy as a result of poor transportation facilities. Mines are shipping about 200,000 tons a week out of a possible production of 600,000 tons.

Mines in the Tug River territory are not getting out more than about 40 per cent of their normal tonnage, much of which is going to Western market.

Operations in the Kanawha region is being interrupted by influenza among the miners, some mines being forced



Coal Age Index 358, Week of Jan. 22, 1923. Average spot price for same period, $4.43. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Six Months July to Dec. 1921	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Week Ended Jan. 6, 1923
U. S. Total	45.6	55.7	43.6	....
Alabama	63.5	64.6	85.2	(a)
Somerset County	55.5	74.9	36.6	(a)
Panhandle, W. Va.	55.3	51.3	57.3	60.3
Westmoreland	54.9	58.8	65.8	58.9
Virginia	54.8	59.9	55.7	55.3
Harlan	53.3	54.8	22.1	18.9
Hazard	51.7	58.4	16.4	16.7
Pocahontas	49.8	60.0	36.6	33.1
Tug River	48.1	63.7	28.8	40.3
Logan	47.6	61.1	26.2	31.3
Cumberland-Piedmont	46.6	50.6	32.0	45.6
Winding Gulf	45.7	64.3	30.4	41.0
Kenova-Thacker	38.2	54.3	42.4	(a)
N. E. Kentucky	32.9	47.7	28.4	30.8
New River	24.3	37.9	31.6	31.6
Oklahoma	63.9	59.6	59.1	55.2
Iowa	57.4	78.4	75.9	88.2
Ohio, Eastern	52.6	46.6	40.8	41.6
Missouri	50.7	66.8	76.3	92.7
Illinois	44.8	54.5	49.9	64.0
Kansas	42.0	54.9	55.9	65.7
Indiana	41.4	53.8	37.7	(a)
Pittsburgh†	41.2	39.8	41.2	53.8
Central Pennsylvania	39.1	50.2	53.4	50.2
Fairmont	35.3	44.0	35.5	44.9
Western Kentucky	32.5	37.7	32.5	(a)
Pittsburgh*	30.4	31.9	56.1	80.3
Kanawha	26.0	13.0	15.6	19.5
Ohio, southern	22.9	24.3	38.2	47.4

* Rail and river mines combined
† Rail mines
(a) No report

to suspend operations for several days at a time. Approximately half of the present production is moving on contract. Steam coal for Western delivery in mine run grade commanded a price of $3.25 to $3.75, with by-product mine ranging about 25c. higher. Splint lump in Western market ranged in price $5.50@$6.

With improved transportation conditions on the Chesapeake & Ohio in northeast Kentucky it has been possible to load more coal but the output of the district is not over 34 per cent, or about 125,000 tons, a week. There is a steady demand for steam coals by industrial concerns who find it necessary to restock. Mine-run brings $3.50@$4, with lump and block at $6@$7.

Influenza interrupts production in the southwest Virginia region, but even with inadequate car supply the output is not averaging above 55 per cent. There is a strong market for all grades, with mine-run bringing about $5.50 a ton.

The bulk of the tonnage from the Northern Panhandle mines is going to Eastern markets. Mine-run grades were quoted $3.50@$4 and prepared coals $5.50@$6.

In some parts of northern West Virginia the price of steam mine-run ranged $3@$3.35, in other sections $3.50@$3.75.

Atlantic Seaboard

There is generally less anxiety on the part of buyers in New England than a fortnight ago. Embargoes against New Haven territory have thrown an extra volume of spot coal all-rail for distribution over other lines, and prices have not hardened to the degree anticipated. Lower temperatures will also tend to increase water power for many of the textiles as well as several of the larger utilities, and this will remove a class of buyers that was prominent early in the month. Increased receipts from Hampton Roads with an occasional cargo from Welsh ports have been another factor in retaining prices about on last week's level. Steam users show less interest in spot coal and are much more inclined to await developments.

Favorable weather along the coast will mean a steady increase in receipts, especially from Hampton Roads, and there is already developing enough additional tonnage from Philadelphia and New York by the water route to make itself soon felt in reduced demands all-rail.

Navy standard coals are distinctly in better supply at the Virginia terminals. While car supply continues notably short on the Southern roads, service is more dependable and there is a somewhat diminished call for prepared coal West. The high range of spot prices, netting well over $6 per net ton at the mines, is another reason for increased volume to Tidewater. Rehandling factors at Boston, Providence and Portland have realized $11 and upward for Pocahontas and New River per gross ton on cars for inland delivery.

As an indication of car shortages on the roads serving Philadelphia it is interesting to notice that once more large users at Philadelphia are arranging for temporary supply by water from Hampton Roads. This movement shows no prospect of involving large tonnages but it has a certain significance. Higher prices at Hampton Roads have also had the effect of inducing more spot buying of selected Pennsylvania grades.

The situation in the North Atlantic market is easier and New York demand is slow. The number of cars at the local terminals remain close to 4,000. Much of the easiness is attributed to the increased shipments of anthracite to the New York market and the falling off in demand for substitutes. There were some cancellations reported principally of the screened coals.

Consumers closely watched the proceedings of the wage conference, although there was a feeling that there would be a settlement.

There was a stiffening of prices at Baltimore following colder weather and another breakdown in car supply.

Anthracite

Estimates of production of anthracite during the week ended Jan. 13 indicated an output of 2,113,000 net tons, an increase of 2.2 per cent in comparison with last week. Of this tonnage, New England received 3 217 cars.

Final returns on anthracite production in December, 1922, indicate a total output of 8,430,000 net tons, says the Geological Survey. This is the largest December production recorded. It was, however, only 45,000 tons more than in November and was 148,000 tons less than in October.

The production of anthracite in 1922 is estimated at 52,485,000 net tons, which is 45 per cent less than the 1921 production and 43 per cent less than the average annual production during the nine years 1913-1921.

Since the strike settlement production has averaged approximately 2,000,000 net tons per week and been at the rate of over 100,000,000 tons per year. Thus the output during the last quarter of 1922 amounted to 48 per cent of the total for the year.

Coke

The settlement of the strike in Connellsville region had no apparent effect on production. About 2,000 men were affected by the action in calling off the strike.

The coal and coke markets remain firm, but there is no unusual demand for either fuel. The acute car situation is giving more support to the market than is the demand. Steam coal is selling at $3 to $3.25 with byproducts at $3.50 and $3.75. There is a steady demand for furnace coke both from the East and furnaces, which is supporting quotations of $8.25 and $8.50, with foundry coke selling at $9.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Jan. 6, 1923	770,303	187,746
Previous week	711,200	173,378
Same date in 1922	599,433	135,522

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Jan. 7, 1923	20,426	5,490	73,285	34,243
Dec. 31, 1922	14,981	3,651	82,927	36,525

National Coal Directors Withhold Comment On Coal Commission Report

Following the quarterly meeting of the board of directors of the National Coal Association at the Waldorf-Astoria, New York City, Jan. 16, the board issued the following statement:

"In reply to requests of newspaper representatives for comment upon the preliminary report of the United States Coal Commission to Congress the board of directors of the National Coal Association states that any deductions made from the report as to the bituminous industry are manifestly premature and unfair to the commission, since the commission itself says that it has not had opportunity, as yet, to conduct such an investigation as would develop the necessary facts. The report is but a preliminary one and, as the commission says, is not intended to be conclusive.

"The commission is conducting an investigation, among other things, into matters relating to what is described as overdevelopment of the bituminous industry and says it will deal with that subject in a further report. The bituminous operators will submit data on this point to the commission.

"It may be stated, in passing, that the attitude of the industry, as expressed in its recent reply to the commission's letter directed to the industry, is that the law of supply and demand, if allowed to work, will adequately adjust any possible problem of overdevelopment. If the public will regularly place its orders for its coal supply, the miners remain at work, and adequate transportation facilities are provided to haul the mine output, no difficulty ever will be experienced in meeting the public necessity for bituminous coal. And when this situation obtains the public will never have any problem as to prices.

"High-price mines operate only when a coal shortage exists. They are unable to compete in the ordinary market. They open up only in emergency. Do away with the emergency through the consistent and regular ordering of coal, spreading it throughout the year, and the coal problem is solved, and to the advantage of the consumer."

Foreign Market And Export News

British Coal Output Resumes Upward Trend; Export Demand Is Active

British coal production in the first week of the year totalled 4,384,000 tons as compared with 3,428,000 tons for the previous week, an increase of 956,000 tons, according to a special cable to *Coal Age*.

Demand for export is active and the output is well sold up for January.

Operators are reported as being rushed with orders from the United States and Canada. France and Italy also are reported as heavy buyers. Much of this activity is attributed to the Ruhr Valley difficulties. Shippers, it is expected, will give preference to old customers.

South America, too, affords heavy business. Forty to fifty steamers are daily awaiting loading turns. East Coast demand is strong with heavy inquiries noted, including German. Prompt business is impracticable owing to the dearth of supplies. Every description is well sold for January.

Operators are in receipt of heavy orders from French railroads and large orders also have been received from German industries, which it is expected will be increased now that mining in the Ruhr Valley has stopped. The outlook for Welsh coal for the year is considered favorable.

Hampton Roads Situation

Business was duller at Hampton Roads, due to slump in demand for coal in the North. Coastwise business fell off to a very noticeable extent, though bunkers were holding well and export business showed little sign of picking up.

Prices had fallen off somewhat, due to the lack of demand and to a coincident increase in the flow of coal to port. This latter feature was particularly noticeable over the Chesapeake & Ohio, which was leading in supplies on hand. The market was firm, however, and a cheerful tone was over all.

The slump in business was regarded as only temporary and shippers were making unusually strong efforts to build up new business based on the feeling that the car supply is showing signs of immediate improvement.

French Domestic Demand Recedes

Owing to the mildness of the weather, the demand for French domestic coals has become much less urgent. All classes of industrial coals of the Nord and Pas-de-Calais are in good demand.

Coke produced at ovens attached to collieries of the Nord and Pas-de-Calais is selling at the following prices, according to destination (sales through the Société des Cokes de Hauts-Fourneaux excepted):

Blast-furnace coke	115—123 fr.
Foundry coke	125—133 fr.

It now seems certain, after the Douai conference, that the miners of the Nord and Pas-de-Calais will defer to the desire of the owners and wait until next April for having their claim of an increase of wages examined again.

France produced in November 2,799,549 metric tons of coal, as against 2,824,488 metric tons in October. devastated mines of the Nord and Pas-de-Calais are included in this total for 728,020 tons. In January, 1922, the output of these collieries was only 580,726 tons.

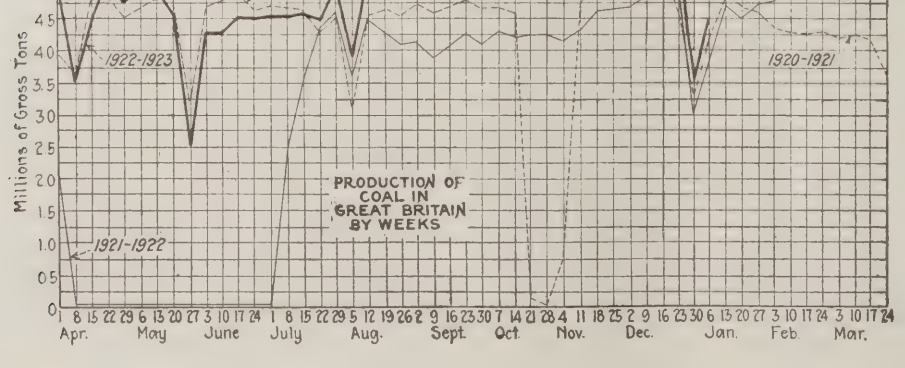
Export Clearances, Week Ended Jan. 18, 1923.

FROM HAMPTON ROADS

For Canada	
Am. Schr. Frances L. Taussig, for Hamilton	1,119
For Cuba	
Br. SS. Berwindale, for Havana	7,651
Nor. SS. Marshall, for Manzanillo	1,213
For Italy	
Ital. SS. Brendon, for Porto Ferrajo	6,361
For West Indies	
Am. SS. Tachira, for Curacao	3,035

FROM PHILADELPHIA

For Porto Rico	Tons
Am. Schr. Rasspeage, for Humacca	.....



German Coal Production Improves

The German coal production in November shows, in spite of the comparatively low number of working days, an improvement compared with the previous month and with the corresponding month of 1921. According to the definite figures this production in 24¼ working days was:

Bituminous coal, 10,456,031; tons brown coal, 11,895,989; coke, 2,529,545; patent fuel: bituminous coal, 490,846; brown coal, 2,391,764.

Of the production of bituminous coal 8,272,479 tons or 80 per cent fall to the share of the Ruhr district, 767,793 tons to that of Upper Silesia, while the rest was supplied by the minor districts. As against November 1921 the production of bituminous coal is short by 1,250,000 tons, while that of brown coal has increased by approximately the same amount. This decline is due to the detachment of Polish Upper Silesia, which produced in that month 2,165,719 tons. The production of coke shows an increase of 180,000 tons against the corresponding month of 1921 and has for the first time surpassed pre-war figures, deducting therefrom the production of the alienated territories. The increase in the production of brown coal briquets amounted in November to 150,000 tons compared with November 1921. An extension of the existing briquetting plants is sorely needed in order to make the growing output of lignite more effective, but the large outlay required makes this almost prohibitive.

According to reports the standard of the November production was maintained the first two weeks in December.

Hampton Roads Pier Situation

	Jan. 11	Jan. 18
N. & W. piers, Lamberts Pt.		
Cars on hand	1,104	723
Tons on hand	74,245	49,647
Tons dumped for week	82,623	123,613
Tonnage waiting	13,000	8,400
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,341	1,522
Tons on hand	75,550	86,160
Tons dumped for week	89,588	62,154
Tonnage waiting	1,850	15,000
C. & O. piers, Newport News		
Cars on hand	1,769	1,821
Tons on hand	95,200	100,775
Tons dumped for week	77,843	72,584
Tonnage waiting	8,240	10,280

Pier and Bunker Prices, Gross Tons

	Jan. 13	Jan. 20†
PIERS		
Pool 9, New York	$8.25@$8.75	*$7.75@$8.25*
Pool 10, New York	7.75@ 8.00	*7.25@ 7.50*
Pool 11, New York	7.25@ 7.50	*6.75@ 7.00*
Pool 9, Philadelphia	8.50@ 9.00	*8.25@ 8.80*
Pool 10, Philadelphia	7.90@ 8.15	*7.45@ 8.00*
Pool 11, Philadelphia	7.30@ 7.65	*7.20@ 7.50*
Pool 1, Hamp. Roads	8.50@ 9.00	*8.50@ 8.75*
Pools 5-6-2 Hamp. Rds.	8 50	8 50
Pool 2, Hamp. Rds.	8.50@ 9.00	*8.50@ 8.75*
BUNKERS		
Pool 9, New York	$8.70@$9.15	*$8.10@$8.60*
Pool 10, New York	8.15@ 8.40	*7.60@ 7.85*
Pool 11, New York	7.70@ 7.90	*7.10@ 7.35*
Pool 9, Philadelphia	8.70@ 9.20	*8.60@ 9.05*
Pool 10, Philadelpnia	8.35@ 8.60	*8.15@ 8.50*
Pool 11, Philadelphia	7.60@ 7.80	**7.70@ 7.85**
Pool 1, Hamp. Rds.	8.75	8.50@ 8.75
Pool 2, Hamp. Rds.	8.75	8.50@ 8.75

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations, by Cable to Coal Age

	Jan. 13	Jan. 20†
Admiralty, large	28s.@ 28s.6d.	**28s.6d.@ 29s.**
Steam, smalls	17s.6d.@ 18s.6d.	**18s.@ 18s.6d.**
Newcastle:		
Best steams	24s.6d.@ 25s.	**26s.**
Best gas	24s.6d.@ 25s.	24s.6d.@ 25s.
Best bunkers	23s.6d.	*23s.6d.@ 23s.6d.*

† Advances over previous week shown in *heavy type*; declines in *italics*.

News Items From Field and Trade

ALABAMA

Four miners were killed in an explosion in Dolomite Mine No. 1 of the Woodward Coal & Iron Co. near Birmingham, Jan. 10. The bodies of Frank Lewis, foreman, and three negroes have been recovered. The body of another negro was reported to be in the entry of the mine where the explosion, believed to be due to gas or accumulated dust, occurred. The mine is near the Woodward company mine where many persons perished in an explosion in November.

The Birmingham district will be included in the itinerary of the fact-finding commission, it is officially announced from Washington. All coal-producing centers will be visited by the commission.

Applicants for positions as mine foremen and firebosses in Alabama mines will appear before the State Board of Examiners on Jan. 22 to 25. Charles H. Nesbitt, chief mine inspector, is chairman of the board.

D. A. Thomas, formerly vice-president and manager of sales of the Montevallo Mining Co., has become associated with the United States Fuel Co. in the capacity of vice-president. William H. Weller, Jr., is president of the company, which has been engaged in a general brokerage and sales agency business for the past several years, the capital stock recently having been increased to $25,000.

COLORADO

Colorado's production for November, 1922, was 1,000,554 tons compared to 835,235 tons of coal during November, 1921. The total production in Colorado from Jan. 1 to Nov. 30, 1922, was 8,841,103 tons, an increase of 354,398 tons over the production of the same period in 1921.

Although Colorado, now largely non-union, suffered less from coal strikes in 1922 than most of the states in the Union, it has been whispered about that **there may be serious trouble ahead in 1923.** All of these whisperings have been circulated following a visit of William Z. Foster, agitator and alleged member of the I. W. W. His unmolested speech on Soviet Russia to a gathering of radicals the last of the old year at the Painters' Hall in Denver gave rise to some worry in view of the fact that he was deported from the state during the coal strike last August. Foster returned to Colorado as soon as Governor William Sweet took office. The Colorado Rangers, active in preventing mine strike disorders last year, have practically dissolved under the new administration.

The Lackawanna Coal Co., of Denver, is taking over a lease on 400 acres of state school coal land east of the MacGregor mine in Routt County between Milner and Oak Creek, according to Horace W. Havens, mineral superintendent of the Colorado State Land Board. The Moffat tunnel activities have caused demand for leases in the Routt County coal district. The McNeil Coal Co., operating the MacGregor mine, is extending its operations by running a slope into a large body of state school coal land to the southwest. Its new lease provides that the slope will enter the school land in two years. This mine has 1,500 ft. to tunnel.

Most of the coal mines in the state are working on an average of **three days a week.** The ten Colorado Fuel & Iron Co. mines at Trinidad are working full time since the opening of the steel rail mills at Pueblo, nearly three weeks ago.

ILLINOIS

W. K. Kavanaugh has resigned as president of the Fifth and Ninth District Coal Operators' Association. He presented his resignation several months ago and it was recently accepted by the board of directors. Mr. Kavanaugh says his retirement was caused by the pressure of private business. The association elected as its president **Dr. C. H. Krause**, vice-president and general manager of the Willis Coal & Mining Co. **O. L. Lumaghi** has been chosen secretary. Dr. Krause has for many years been secretary of the association and in close touch with the conditions surrounding the industry in general.

J. O. Longley has opened a new strip mine on the J. S. Hopkins farm near Roodhouse.

The Gilchris Schuler Co. has options on 1,200 acres of coal lands northwest of Dahinda, a few miles from Galesburg. The land is adjacent to the Santa Fe tracks. The company has drilled 125 ft. and has touched two veins of coal. Drilling will be carried on to a 400-ft. depth. The land is ideally situated for a coal mine, as the river skirts one side of the tract and the railroad another. It is understood that the Santa Fe has been interested in procuring a mine site on its Illinois lines for some time.

The Illinois Coal & Coke Corp., of Chicago, has changed its name to the **Illinois Coal Corp.** It has increased its capital stock from $1,000,000 of no par value to $10,000,000 and classified the shares.

Carl Scholz, now of Charleston, W. Va., was in southern Illinois recently on business. He spent the greater portion of his time at the mine of the Valier Coal Co., Valier, where he was formerly located.

Eugene McAuliffe, until recently president of the Union Colliery Co., was a Chicago visitor early in January, explaining to important coal men and railroaders his plan for better distribution of cars to mines—a plan now getting consideration by the Interstate Commerce Commission.

The output of coal in Illinois in 1922 was 15,000,000 tons below that of 1921, according to the report of the State Department of Mines and Minerals. The 1,133 mines produced 63,276,827 tons last year, as compared with 78,339,082 tons in 1921. The coal strike of last summer was the cause of the decrease. The number of men employed was 98,090 and the average number of days worked was 134. The report showed 159 men were killed in the mines, as against 222 in 1921. There were 3,879 non-fatal accidents. Of the total tonnage mined, approximately 19,000,000 tons was consumed by railroads, about 38,000,000 shipped to market and 319,000 tons used locally.

A reward of $1,000 has been offered by the management of the **Perry County Coal Co. for the arrest of the vandals who damaged the tipple and cages** of their mine at Cobden. The hoisting machinery was started during the night and the cages run up and down until one became lodged in the rigging of the tipple which was considerably damaged. The other cage was forced down to the bottom of the shaft, where it was crushed. A valve on one of the boilers was opened, draining all the water. Fortunately, the fire was low and the boilers did not explode. Efforts also were made to demolish the electric generators, but a disconnected wire frustrated this. The company is at a loss to explain these acts of vandalism, as there has been no trouble at Cobden or at any other of the company's plants.

Announcement has been made that the mine of the Lowden Coal Co. at Pinckneyville, will be opened in the near future. Some time ago the mine was shut down because of failure to meet its payroll, but full settlement has since been made.

The **first coal shipment from the famous Lester strip mine** at Herrin since June 21, last year, was made late in December. The coal was shipped by the Caloric Coal Co., now owner and operating the mine where the Herrin massacre took place June 22, having purchased the strip from the Southern Illinois Coal Co., Chicago, of which W. J. Lester was president. The plant has been somewhat rebuilt, new tracks laid and the shovels, which were dynamited by the strikers last summer, have both been repaired and put into operation.

Extensive drilling operations are now being carried on in the vicinity of Vergennes, Jackson County, by the **Taylor Coal Co.** It is stated that a vein varying from 6 ft. to 8 ft. in thickness is found in the drillings. The deposit is known as the Big Muddy field, being only a few miles north of the Big Muddy coal fields at Murphysboro, now practically worked out. The tract being drilled by the Taylor company is near the Illinois Central and Missouri Pacific roads, and a mine sunk there would have the advantage of being served by both roads.

INDIANA

The Knox Coal Mining Co. has taken over the business of the **Worth-Huskey Coal Co.** and the **Ridge Coal Co.**, both of Chicago, and the **Carl Fletcher Coal Co.**, of Indianapolis. Both the Worth-Huskey Coal Co. and the Carl Fletcher Coal Co. have been sales companies and the Ridge Coal Mining Co. has been operating the Knox mine at Bicknell.

Charges of mulcting the city of Chicago involving Mortimer B. Flynn and the **Pottinger-Flynn Coal Co.**, of Chicago, are now being further investigated by a grand jury which has just discovered that Flynn made an $18,000 payment to Dr. William H. Reid, Commissioner of Public Service, said to have been a campaign contribution for Mayor William Hale Thompson's candidacy for re-election and that the Flynn company was granted by Reid a monopoly on the business of selling coal to Chicago, that only a small portion of it was on contract and the rest at "special rates," and a number of other significant facts. Flynn, who permitted his treasurer to be sentenced to jail rather than show the company's books, is now preparing to open those books to the investigators, for the grand jury probe into financial irregularities in Chicago's school department has widened and deepened astonishingly.

The Dodge Sales & Engineering Co., Mishawaka, which has for the past eight years been operating as the selling subsidiary of the Dodge Manufacturing Co. and Dodge Steel Pulley Corporation, has now been consolidated with the parent company, **Dodge Manufacturing Corporation**, which was organized and began business last July. The Dodge Manufacturing Corporation is the largest manufacturer of power-transmitting appliances in the world and is equipped to furnish stock products such as iron, steel and wood pulleys, pillow blocks, hangers, etc., as well as complete rope drives, flywheels and water wheel harness especially designed and constructed to meet the requirements of every industry. Distribution of Dodge products is made through fourteen branch warehouses in power-using centers, as well as hundreds of representative mill suppliers and jobbers. The Dodge Manufacturing Corporation also controls the Dodge Manufacturing Co., of Canada, Ltd., with head offices and works at Toronto, Ontario, and sales office at Montreal, Que.

A bill introduced in the House of the Indiana Assembly which would make it **unlawful to remove coal from the earth by the strip-mine process, unless refuse material removed from the excavation be filled back and leveled up** to conserve lands and surface for agricultural purposes, **had a short life.** Two days after its introduction action upon it was postponed indefinitely, on recommendation of the committee. The bill provided for a fine of from $500 to $3,000 and imprisonment of not more than one year for violation.

Indiana miners expect at once to begin a drive on the new Legislature in the interest **of re-enactment of a shotfirers' law** which will meet the objections to the law recently held unconstitutional by a decision of the State Supreme Court. The mine workers' organization contends that the contract between the United Mine Workers of America and Indiana operators, in effect until March 31, provides for the employment of shotfirers by the operators, and the miners will insist that this contract be carried out, regardless of the court opinion. According to the miners and operators, the only point involved in the controversy is the expense of maintaining a force of shotfirers. It was contended by friends of the measure at the last Legislature that the employment of special men for this line of work would create a body of experts in the use of explosives, making the work of miners safer.

IOWA

Tony Kauzlariah has purchased the Scott farm near Chariton, and has sunk a slanting shaft 175 ft. in depth and has struck coal at a depth of 100 ft. The shaft is down to the slate and rock. Borings have been made and it is thought the vein will measure not less than 4 ft. In time there may be some large coal mines south and northeast of Chariton as well as at Lucas.

Mine No. 4, at Williamson, near Chariton, broke records for hoisting coal recently when 1,858 tons were hoisted in one day at the rate of more than four tons per minute for the seven and one-half hours. No. 4 mine will soon be one of the foremost mines in Iowa as far as equipment is concerned. There are now being installed three mining machines which will increase the output to a large extent.

KANSAS

A local company has been formed to develop the coal field discovered last spring in Clark County, 16 miles southwest of Bucklin. A syndicate has charge of the work. H. P. McCaustland is trustee. The field is said to cover 20,000 acres of land.

The Tulsa County Coal Co., capital $50,000, has been chartered by B. C. Connor, H. O. Tallman and E. E. Henning They own a large acreage.

Governor Jonathan Davis, newly elected and a Democrat, in his inaugural message to the state Legislature, **declared against the Industrial Court law** of that state, a hobby of his predecessor, Governor Henry Allen. The Industrial Court has played a large part in recent coal history of Kansas.

Relief from the coal-car shortage in the southeastern Kansas field, within a few weeks was predicted by H. H. Brown, superintendent of the St. Louis & San Francisco R.R., testifying before Clyde M. Reed, chairman of the Public Utilities Commission, at Pittsburg. He said government inspectors had kept many locomotives tied up awaiting inspection. The Public Utilities Commission began an investigation of the coal-car situation in Kansas Jan. 3, inspired by complaints by dealers and operators of delayed deliveries as a result of weak transportation. One operator said he had received one car since Oct. 1. Another got 13 in six weeks. It was declared that the car shortage was the worst in history.

KENTUCKY

The Big Sandy field of northeastern Kentucky, in which the Northeastern Kentucky Coal Operators' Association holds sway, showed an **increase of about 500,000 tons production in 1922**, as compared with 1920, although the ratio of output to potential capacity showed a loss of about 3 per cent over 1920, due to the fact that potential capacity had been materially increased. At that the field made a nice showing. A report received from Ashland says in part:

"Out of a potential production of 15,354,175 tons for 1922, 6,056,227 tons were actually produced. In 1920, 5,514,359 tons were produced."

Nearly every coal-carrying road operating in Kentucky has placed **orders for additional coal cars** during the last few months. The B. & O. is placing order for 5,000.

Details of an alleged plan whereby the mines of **the Northeast Coal Co.** near Paintsville **were to be dynamited** and the carrying into execution of this plan with the consequent death of two miners, were revealed when William Spears, one of the men under arrest, turned state's evidence at his examining trial. The explosion in the mines occurred June 27, 1922. About 40 men have been arrested. The motive of the plot against the mines has not been made public.

The Scanlon Thompson Coal Co., capital $20,000, has been chartered by Sallie J. Thompson, C. W. Thompson and J. C. Hanna. The debt limit is $50,000. The company takes over the old Scanlon Coal Co. in Louisville, and will do a retail and wholesale business. It will handle eastern and western Kentucky coal, featuring product of the Jim Thompson Coal Co., Drakesboro, western Kentucky. The company has a good local business, calling for over 100 tons of steam coal daily in addition to its domestic, and has been jobbing six or seven cars a day.

Official result of the **election of officers of the United Mine Workers of District 23** were given out by union officials at Madisonville as follows: President, Lonnie Jackson, Central City; W. D. Duncan, Central City, member international executive board; Wes Ames, Central City, vice-president; H. H. Vincent, secretary-treasurer; auditors, S. J. Watson, Madisonville; J. H. Johnson, Nelson, and Robert Calloway, McHenry; tellers, J. W. Blackburn, McHenry; W. B. Swope, Morton's Gap, and Rich Russell, Providence. R. C. Owen, McHenry, delegate to State Federation of Labor. Eight district board members were elected as follows: W. C. Hobgood, Henderson; L. G. Smith, Drakesboro; R. M. Nance, Providence; James L. Dunlap, Earlington; E. M. Harden, McHenry; John Duncan, Central City; Roy Hobbs, Baskett; Charles Smith, Cleaton.

F. M. Sackett, of the Speed interests, operating a number of Kentucky mines, jobbers' offices and the Byrne & Speed Coal Co., large retailers, with several local yards, was re-elected president of the Louisville Board of Trade on Jan. 10 at the annual meeting. It is his third term as president, he having resigned the first term to enter federal service during the war, as a dollar-a-year man.

Louisville shippers and the coal interests are much pleased with the announcement of the purchase of control of the C. & O. by the Van Sweringen interests of Cleveland. The C. & O. enters Louisville from Lexington over the L. & N., but is a big factor in the Big Sandy coal fields of the state, and it is believed that under the Van Sweringen control and working in conjunction with the Nickel Plate and other lines under the same control the road will show more rapid and better development.

The Chavies mine of the Bermuda Coal Co., at Chavies, was opened recently. This mine is on the L. & N. R.R.

MARYLAND

The Brydon Brothers Coal Co. has been incorporated at Cumberland, with a capital stock of $800,000. The incorporators are Harry G. Fisher, Harold K. Wood and D. Lindley Sloan.

MINNESOTA

The Minnesota State Legislature, which has just convened, will receive a recommendation that **dealers in coal, both wholesale and retail, be licensed** and be required to make monthly reports of their stocks on hand and the prices asked. The purpose is to keep tab on stocks as well as prices and to watch for profiteering.

Although the Fuel Commissioner has retired from his duties, the local committee in Minneapolis, formed to aid in the work, will continue to function.

Carl Jaeger, of St. Paul, president of the Lignite Industries Corporation, has gone to Germany, to approve **machinery for extracting chemicals from lignite in Texas and North Dakota**. The machinery has been ordered for some time and will not be shipped until approved. One lot will go to Greenville, Texas, and the other to some unnamed point in North Dakota. The machines are for refining lignite, extracting byproducts from coal tar as well as producing the coal tar itself.

The United States Chamber of Commerce has been having **a survey** made in these cities as well as elsewhere, **to establish the exact needs of the Northwest** as to coal for next winter.

A South St. Paul dealer who was **convicted of giving short weight** on three sales of coal, was **sentenced to 90 days in jail**, the heaviest sentence ever given for short weight in this state.

MISSOURI

The Kolb Coal Co., of St. Louis, has just purchased some 30-yd. western dump cars and a 6-wheel switch engine for use at its mines for storage purposes.

Robert Collett, for the last few years in the fuel department of the New York Central lines at New York City, assumed the duties of fuel agent of the Frisco system at St. Louis Jan. 15, **succeeding J. C. Bryan**, transferred to the mechanical department in charge of the shops at St. Louis. Mr. Collett was with the Frisco prior to the war under Eugene McAuliffe.

C. C. Wall, of Detroit, has been assigned to St. Louis by the I. C. C., succeeding C. D. Thomas. The business and coal bureaus of the service section are demanding a permanent office at St. Louis.

Articles of incorporation have been filed as follows in the office of Secretary of State Charles U. Becker: **Star Coal Co.**, Kansas City; to mine, prepare for market, transport and sell and deal in coal and other minerals incidentally developed; capital, $50,000 and 1,000 shares no par value; incorporators: S. S. Serat, M. H. Serat, G. B. McPherson. E. R. Dusky and A. F. Evans. **Midland Valley Coal & Material Co.**, Overland; to buy and sell feed of every kind, lime, sand, cement, lumber, iron, steel and all kinds of building and construction material, ice, coal, coke, wood and every kind of fuel and do a general construction and building business; capital, $25,000; incorporators, M. J. Tracy, W. P. Pohrer and M. J. Mohan. **American Ice Co.**, Kansas City; to do a general mercantile business, wholesale and retail or both; to buy and sell coal and wood; manufacture, buy, sell ice, refrigeration and cold storage; capital $25,000; incorporators, H. L. Burk, A. J. Stewart and H. F. Roosa.

NEW YORK

William A. White has resigned from the editorial staff of *Coal Age* and become associated with the Morrow Callahan Coal Co., recently organized, with omces in New York, Pittsburgh and Cincinnati. For the last two and a half years Mr. White has been market editor of *Coal Age*, having joined its staff Aug. 1, 1920. He will be in charge of the paper and pulp-mill department of the Morrow Callahan company, with headquarters in Cincinnati. He has had long experience in the coal trade, having started with his uncle, C. P. White, in the Carnegie Coal & Dock Co., some ten years ago. He also has been engaged in the coal trade in the Northwest, Ohio and the South, and enjoys a wide acquaintanceship in many other parts of the country.



WILLIAM A. WHITE

The Joint Committee on a National Museum of Engineering and Industry appointed by the four Founder Engineering Societies of United Engineering Society, 29 W. 39th Street, New York, is composed of Edward D. Adams and Charles L. Clarke, of the American Institute of Electrical Engineers; Frederic A. Delano and Dr. George F. Kunz, of the American Institute of Mining and Metallurgical Engineers; Clemens Herschel and Nelson P. Lewis, of the American Society of Civil Engineers, and Reginald Pelham Bolton and Holbrook Fitz John Porter, of the American Society of Mechanical Engineers, the latter acting as chairman. This committee in co-operation with the National Museum of the Smithsonian Institution at Washington, D. C., is **formulating a plan for a great National Museum of Engineering and Industry** similar in character to the foreign museums, especially the Science Museum at South Kensington, London, England; Conservatoire des Arts et Metiers at Paris, France, and Deutsches Museum at Munich, Germany. The co-operation has been secured of the Federated American Engineering Societies and of the leading industries. It is expected that every engineer and industry in the country will eventually join in the development of this educational project.

NORTH DAKOTA

Tests of the use of North Dakota lignite for industrial and commercial use are to be made soon. The lignite operators propose an intensive campaign on behalf of their product.

The Legislature of North Dakota set Jan. 16 as a day devoted to an **intensive study of the natural resources of the state**, aside from agriculture, and especially in coal and clay deposits.

OHIO

Robert Farmer, vice-president of Subdistrict No. 5 of the Ohio Division, United Mine Workers, has been acquitted of the charge of first degree murder in connection with the killing of John I. Majors, a non-union miner, at New Lafferty last June.

The Columbus Board of Purchase opened bids Jan. 17 for 7,500 tons of nut, pea and slack for the municipal light plant; 3,500 tons of the same grade of coal for the water works department and 2,000 tons of the same for the garbage-disposal plant. The Boblo Coal Co., Pittsburgh, bid $2.95 f.o.b. mines for the entire tonnage; the New York Coal Co., Columbus, bid $2.75 for 7,500 tons for the light plant; the F. M. Spencer Coal Co., Columbus, bid $2.85 for 3,500 tons, and the Hisylvania Coal Co., Columbus, bid $2.75 for 2,000 tons for the garbage-disposal plant. The contract probably will be awarded soon.

The Monaco Coal Mining Co., of Robyville, has been chartered with a capital of $100,000. Stockholders are Oliver Monaco, Domenick di Rienzo, Jesse Beck, Sicto Ferrusi and Juliette Monaco.

The County Commissioners of Columbus have awarded the contract for 3,500 tons of mine-run for Memorial Hall, the County Infirmary and the Court House to the Colonial Coal & Supply Co., at $5 per ton delivered on the infirmary switch and $5.95 per ton delivered at the Memorial Hall and the Court House. This is Cambridge coal and is $1 per ton more than the bids on Hocking.

The Hisylvania Coal Co., of Columbus, which has been operating mines at Glouster has taken over the selling of the coal produced by the Penn Coal Co., of Crooksville; the Piney Fork Coal Co., of Piney Fork, Jefferson County, and the Panhandle Collieries Co., also of Jefferson County, all of which are controlled by the same interests. Formerly all of the producing companies maintained sales organizations. J. W. Blower is president and E. W. Blower, secretary of the company.

The Cincinnati Coal Mining Co., owner of a coal lease in Athens County, was directed by the Franklin County Common Pleas Court to pay royalties in the sum of $2,575 to the owners of the fee, although no coal had actually been mined in months. This royalty was paid until March, 1920, when the company gave notice that it would not longer be bound by the terms of the lease.

An attachment of $3,149.43 in the hands of H. D. Everett, trading as Western Coal Co., sued out by the plaintiff in the suit of the **Tribbey Coal Co.** vs. the **Kanawha Valley Coal Co.**, was discharged when the defendant filed bond for $8,500 in the U. S. District Court in Cincinnati. District Judge John Weld Peck made an order directing Everett to pay the money in his hands over to the defendant.

OKLAHOMA

The Oak Ridge Coal Co., capital $200,000, has been organized by Vince Davis, Ray Morgan, James Hilling and others to sink a mine at Red Oak.

The distance a machine crew shall move coal cutting machines within a mine without additional pay was established at **900 ft.** by W. L. A. Johnson, commissioner of the Southwestern Coal Operators' Association, and John P. White, former International president of the United Mine Workers, at a conference in Kansas City, Dec. 27. If the distance exceeds 900 ft. the men will be paid for the actual time required to move the machine, at day-wage scale. It was a dispute over this question that resulted in 800 miners in six mines of the Crowe Coal Co. in the Henryetta (Okla.) field walking out Oct. 23. They returned to work Nov. 13, pending a settlement.

PENNSYLVANIA

Consolidation of numerous individual coal interests in Indiana, Jefferson and Armstrong Counties into a corporation capitalized at $100,000, fully subscribed, under the name of the Punxiana Coal & Coke Co., with headquarters in Indiana, Pa., has been accomplished. The new company represents the consolidation of the Rinn, Ritter, Winslow, Sutter, Snyder and Lorenzo interests into a sales agency to market the product of fourteen mines formerly owned and operated by the individual firms. The Punxiana company now has a daily output of more than 3,000 tons. With the completion of present plans the production will be practically doubled. The plans call for the operating of the present operations and the development of new mines. The incorporators are Lafayette F. Sutter, J. Cloyd Rinn, Harry A. Snyder, Dr. Daniel Ritter, W. H. Ritter, C. Kempton Sutton, all of Indiana, and E. H. Winslow, Dr. F. A. Lorenzo and J. H. Ritter, all of Punxsutawney. Dr. Daniel Ritter is president and Harry A. Snyder treasurer of the new company. Mr. Snyder recently resigned as general manager of the Savans Collieries Co. The mines are located on the lines of the B. R. & P., Pennsylvania and B. & O. The new company will control 13,000 acres of unmined coal in the three counties and include the Upper and Lower Freeport, C Prime and Miller veins. There will be a branch office in Punxsutawney under the direction of E. H. Winslow and there will be sales representatives in Eastern cities.

The Western Pennsylvania Division of the National Safety Council is holding a series of winter meetings on the subject of **"Safety in Mining"** with Messrs. A. R. Pollack, J. T. Ryan, W. F. Affelder and Francis Feehan supervising the course, which proves very interesting.

Richard Maize, president of the Coal Mining Institute of America, was a recent Pittsburgh visitor.

Edward T. Devine, of New York, a member of the United States Coal Commission, spent two days in Johnstown recently. While there he met John Brophy, president, and James Marks, vice president, of the U. M. W. He was also in conference with A. B. Crichton, Harry J. Meehan and other operators. He was on his way west, and the object of the visit was to get into personal touch with facts and conditions in the central Pennsylvania field.

Governor Pinchot has named Joseph J. Walsh, a mine inspector of Wilkes-Barre, **as chief of the Department** of Mines to succeed Seward E. Button, Wyoming. The salary is $6,000 a year and the term of the new chief began Jan. 16 with the opening of the new state administration. In announcing the appointment the new Governor said: "Mr. Walsh was selected purely because he is the most efficient and competent mine inspector in Pennsylvania. Politics had no part in his selection and should have none in a case like this where the lives of men are at stake." The new chief of mines was born at Pittston in 1874. He entered the mines as a door boy, attending night school in the meantime. He went to the Mansfield State Normal School for two years and then returned to the mines, working at various occupations. He qualified himself in a knowledge of mining engineering, ventilating engineering and chemical engineering in a correspondence school. Mr. Walsh has recently been mine inspector in the Fourteenth Anthracite district of Pennsylvania, a position he held for eighteen years. During 1908 he established the Mining Vocational School at Nanticoke, and has been its supervising principal. The school was started with twenty students and developed into a general school with 1,300 pupils. He is the author of a book entitled, "Physics and Chemistry of Mining and Mine Ventilation."

The American Coke Corporation, of Pittsburgh has purchased the abandoned Struthers plant of the Struthers Coal & Coke Co., of Cleveland, Ohio, located at Fairbanks, Fayette County. The houses at this plant will be used in connection with the Orient plant of the American Coke Corporation, at Orient, near by, and the equipment that is usable will be moved to the various plants of the American Coke Corporation as needed.

The annual report of the State Workmen's Compensation Bureau for 1922, just issued by Clifford B. Connelley, Commissioner of Labor and Industry, shows **there were 146,255 accident reports received, an increase of 6,058 for the year** as compared with 1921. Compensation incurred last year totaled $10,853,344, the compensation for fatalities being $5,062,490, for personal disability, $2,226,364 and for temporary disability, $3,564,490. The effect of the mine and rail strikes resulted in a decrease in accidents during the summer months in public service and mine reports. In 1921 there were 904 fatal and 49,852 non-fatal accidents in the mines while in 1922 there were 808 fatal and 35,804 non-fatal accidents reported from the mines.

More than $2,000,000 of the estimated $3,250,000 due the state **in anthracite coal taxes for 1921 has been paid into the State Treasury.** Among the recent checks received were about twenty from river coal-dredging companies. These represent about one-half of the companies that reclaim anthracite from the rivers in the eastern part of the State. Some payments were made under protest, the companies contending that they are not mining coal. In all, seventy-five of the 230 companies subject to the tax have paid. The largest single payment has come from the Lehigh Valley Coal Co., whose check was for $285,665.65. Coxe Brothers & Co., Inc., recently paid $68,394.76. Blanks for the reporting of the amounts of anthracite produced and the assessment values of 1922 have been sent out and are returnable by Feb. 1.

The following bituminous coal companies were incorporated at the State Department at Harrisburg recently: **George H. Foster Coal Co.**, mining and producing coal and manufacturing coke, Pittsburgh, capital $25,000; treasurer, E. E. Beardsley, Point Marion. Incorporators: George H. Foster, Pittsburgh; E. E. Beardsley, Point Marion, and H. E. Hackney, Uniontown. **Monyough Coal Co.**, mining coal and manufacturing coke, Pittsburgh, $50,000, W. F. McNaugher, treasurer. Incorporators: W. F. McNaughter, R. E. Moore and A. J. Fersch, Pittsburgh. **Phoenix Coal & Coke Co.**, Pittsburgh, dealing in coal lands and operating them, $10,000, Harold C. Schade, Crafton, treasurer. Incorporators: Harold C. Schade and R. C. Schade, Crafton, and Haven V. Wolf, Wilkinsburg. **Dunlap Coal Co.**, Claysburg, mining, preparing and shipping coal and fireclay, $25,000; Fred S. Dunlap, Claysburg, treasurer. Incorporators; Thomas N. Kurtz, Hollidaysburg; Louis G. Kurtz and Fred S. Dunlap, Claysburg. **George Coal Mining Corporation**, mining, buying, preparing and shipping coal; Hastings, $75,000; George A. Clark, Hastings, treasurer. Incorporators: L. S. Clark, Cherry Tree; George A. Clark and A. S. Slater, Hastings. **Wheaton Coal Co.**, mining, selling and dealing in coal, leasing, buying and selling coal lands; Philadelphia; $30,000; Guy L. Wheaton, Philadelphia, treasurer. Incorporators: Guy L. Wheaton, J. G. Allspach, Jr., Philadelphia, and W. Elbridge Brown, Clearfield. **Burlner Coal Mining Co.**, mining, operating and leasing coal lands; Philadelphia; $50,000; Vance H. Burtner, Osceola Mills, treasurer. Incorporators: Vance H. Burtner, Harriett L. Burtner, Philadelphia, and Joseph W. Mills, Philadelphia. **Broad Top Coal Co.**, mining coal and manufacturing coke, P. O. Six Mile Run, Pa., $250,000; J. Orville Hoover, Woodbury, treasurer. Incorporators: John L. Longnecker, George W. Clouse and G. C. Imler, Woodbury.

RHODE ISLAND

The New England Coal Co., Woonsocket, has recently incorporated under the laws of Rhode Island, to engage in the coal business, with a capital stock of $30,000. The incorporators are Albert A. Hudson, George M. Rex, and Harry E. Davis, all of Woonsocket also.

UTAH

Judge Hansen has **denied motion of coal operators** and lumber dealers **to quash indictments** returned by the district grand jury last autumn, following charges of price fixing. Date for trial has not been set yet. Most of the big companies in both industries are involved.

The Utah Products Co. is the name of a new Utah corporation which has filed articles showing a capital of $100,000. The idea of the promoters is **to get a maximum value out of Utah's coal mines, reduce the price of all fuel in the state**, and incidentally, to solve Salt Lake City's smoke problem. Patent rights covering the whole of the United States have been taken out, although, for the time being at any rate, the activities of the concern will be confined to Utah. The process is the work of years of labor on the part of J. C. Fenton, a former instructor in chemistry at the University of Utah. It is asserted that the coal men were willing to take over the project, but that the exclusive rights they demanded were not granted.

The Spring Canyon Coal Co., operating the Spring Canyon mine in Carbon County, **has been taken over by James B. Smith** and associates, of San Francisco. The company has a capital of $1,000,000. J. William Knight, a resident of Provo, was president and general manager. He will continue to be associated with the company as vice-president. J. A. Stallings will remain as sales agent. James B. Smith acquired an interest in the Knight company a few years ago and has since been selling the coal on the Coast through an organization at San Francisco known as the King Coal Co. The Spring Canyon company was organized in 1912 by "Uncle" Jess Knight, Mr. Knight's father and has been successfully operated.

The Columbia Steel Co. has filed articles of incorporation showing $20,000,000 capital. Plants of the company will be built in Utah County between Provo and Springville. The Pacific Steel Co. also may locate there.

WEST VIRGINIA

The Consolidation Coal Co., of Fairmont, W. Va., announces the appointment of George W. Hay as general manager of their Elkhorn division, which position was left open by the death of John G. Smyth. It will be recalled that Mr. Smyth was killed Sept. 21, 1922, by a fall of slate in a small mine, of which he was part owner, but not the property of the Consolidation Coal Co. Mr. Hay has had charge of the McRoberts operations of the division, and has acted unofficially as general manager up to this time. By promotion H. S. Carpenter has been appointed general superintendent and has charge of the McRoberts operations. John F. Daniels, who formerly was superintendent of 204 and 205 mines, has become assistant general superintendent, and James L. Evans, formerly mine boss of 204 mine, is now superintendent of 204 and 205 mines.

D. A. Reed has been appointed general manager of the West Virginia division of the Consolidation Coal Co., **C. H. Tarleton** being the general manager of that division. Promotion of Mr. Reed has also meant the promotion of five other employees of the company. The office of assistant general manager was created, as of Jan. 1, because of the ever increasing duties devolving upon the general manager of the division. Mr. Reed has been with the company for more than 20 years, having entered its service as a messenger boy. **W. J. Wolf**, who has been associated with the company since 1915, has succeeded Mr. Reed as superintendent of the Monongah mines. **F. H. Brooks**, who entered the service of the company as a trapper boy, has been promoted from the post of superintendent at the Carolina mine to Idamay to succeed Mr. Wolf. Mr. Brooks has been succeeded as superintendent at the Carolina plants by **R. H. Kann**, now superintendent of the Wyatt plant of the company. Mr. Kann entered the service of the company as a miner. **E. B. Courtney** has been promoted from the post of superintendent of mines Nos. 21 and 91 at Gypsy to the position as superintendent at Wyatt, succeeding Mr. Kann. **I. W. Robinson**, who has been with the Consolidation for 20 years, became superintendent of mines 21 and 91 at Gypsy.

Judge J. B. Sommerville, in the Circuit Court of Brooke County, has sentenced **Peter Radakovitch** and **Teddy Arunski**, of Avella, Pa., to serve ten years in the West Virginia penitentiary—the maximum sentence—following their conviction on the charge of conspiracy in connection with the attack on the Cliftonville mines last summer. Appeals will be taken to the Supreme Court of West Virginia. The defendants mentioned above were the first two to be tried on the conspiracy charge. There are more than 200 other miners who will be arraigned on similar charges. It was in the defense of the Cliftonville mine that Sheriff H. H. Duvall, of Brooke County, was killed.

The following West Virginia coal companies have **increased their capital stock** in the amounts named: Pemberton Fuel Co., of Mt. Hope, from $100,000 to $200,000; Prince-Wick Coal Co., of Mt. Hope, from $150,000 to $300,000; J. E. Long Coal Co., of Clarksburg, from $100,000 to $150,000; Tierney Mining Co., of Powhattan, from $15,000 to $450,000; Long Fuel Co., of Clarksburg, from $75,000 to $350,000; Costanzo Coal Mining Co., of Wheeling, from 8,000 shares to 20,000 shares without par value; J. E. Long Coal Mining Co., of Clarksburg, from $25,000 to $100,000; Interstate Fuel Co., of Clarksburg, from $50,000 to $100,000. The Norfolk & Chesapeake Coal Co., of Columbus, Ohio, has been authorized to increase its capital stock from $100,000 to $200,000. The Elk Ridge Coal & Coke Co., of North Fork, has been granted authority to reduce its capital stock from $150,000 to $75,000.

In addition to the usual quarterly dividend of $2 a share, the directors of the **Island Creek Coal Co.**, have declared an extra dividend of $5 a share.

The sum of $250,000 is being expended by the **Ben Franklin Coal Co.** at its Parkersburg docks for the construction of river transportation equipment, which will include thirty-five timber barges to be used in the transportation of coal from the mines of the company at Big Grove Creek, opposite Moundsville.

The Secretary of State of West Virginia has granted authority to the following coal companies to increase their capital stock in the amounts named: **Irona Coal Co.**, of Philadelphia, from $100,000 to $500,000; **Dawson Coal Co.**, of Philadelphia, from $200,000 to $800,000; **Rosemont Coal Co.**, of Philadelphia, from $350,000 to $1,000,000; **Richland Mining Co.**, from $200,000 to $600,000; **Monongah Fuel Co.**, Monongah, W. Va., from $50,000 to $450,000.

The Row Coal Co., of Junior, has filed articles of dissolution with the Secretary of State of West Virginia and has gone out of business.

The Central Coal Mining Co., of Charleston, has acquired 800 acres of coal land along the Ohio, south of Bellaire, and plans to double its present output.

S. A. Moore, of Charleston; J. D. Smith of Hamlin, and others have formed the **Hartford Fuel Co.** at Hartford, with a capital of $100,000.

The Red Jacket Consolidated Coal & Coke Co. at Red Jacket, under the management of William N. Cummins, is planning to develop 12,000 acres of coal land with a daily output of 3,000 tons. H. T. Wilson of Detroit, Mich., is president of the company.

The Wheeling Coal Co. has been incorporated at Wheeling, by Edgar Aaron, A. J. Gilleland and G. A. Blackford.

H. R. Greist, of Ebenburg, Pa., has obtained option on 5,000 acres of coal land in Wood County.

Counsel for the state and for the defense have agreed to **Postpone the trial of C. Frank Keeny**, president of District 17, United Mine Workers, charged with being an accessory to murder. Feb. 19 has been agreed upon as the date when Keeney will be brought to trial.

Attorneys for the defense in the case against **Walter Allen**, convicted of treason, **have filed a bill of exception** in Judge J. M. Woods' court at Martinsburg for certification to the State Supreme Court. Attorneys for the **Rev. J. E. Wilburn** and his son **John Wilburn**, both of whom were convicted for murder, have announced that similar action will be taken as to their clients. **Walter Allen**, who was found guilty of treason, has forfeited his bond and is now a fugitive from justice.

WYOMING

The Peerless Mine of the M. H. Shields Coal Co., at Gillette, recently was opened. It is a new mine on the C. B. & Q. R.R.

The Poposia No. 1 Mine of the Poposia Coal Co., at Lander, was reopened on Dec. 1. It was closed on April 1, the engine and boiler being destroyed by fire during the strike. It is on the C. & N. W. R.R.

CANADA

According to figures just issued the **production of coal for October** of 1922 in Alberta **was the largest for any one month** in the history of the industry in that province. Output up to the end of October last, compared with the same period of the preceding years, was as follows: In 1921 a total of 4,610,301 tons; in 1923 a total of 4,250,824 tons. In the month of October, 1922, a total of $26,752 tons was produced, compared with only 588,291 tons in October of 1921.

The International Fuel Co., Limited, has been organized in Toronto and has been granted a charter authorizing it to engage in a wholesale coal business and to acquire coal mines, etc. The authorized capital is $40,000 and the provisional directors are: G. M. Malone, Albert Mearns and G. Wallis.

A permanent body of government experts to be known as the **Dominion Fuel Board has been created** by an order-in-council at Ottawa. Its members are Charles Camsell, Deputy Minister of Mines; John McLeish, director of the mines branch; B. F. Haanel, chief of the fuel testing division; D. B. Dowling, geologist; J. B. Challies, director of the water-power branch, and F. C. Lynch, superintendent of natural resources' intelligence. The board is authorized "to secure all available data and to consult and co-operate with such individual bodies as they may deem specially qualified to advise upon any particular phase of the work."

The federal government will be asked to establish by law for the miners of Alberta **a minimum scale of wages and six-hour day with a five-day week**, Saturday to be a holiday, following a decision of the Alberta Federation of Labor, at its concluding session held in Medicine Hat, Jan. 12. It is also asked that first-aid stations be established inside the mines.

Imports and exports of coal during the calendar year 1922 are given in a summary just issued by the Dominion Bureau of Statistics. The totals for both are considerably below the average for the preceding three years, as shown in the following figures:

Canadian Coal Exports and Imports
(In Net Tons)

	Calendar Year 1922	3 Yr. Average 1919-21
Anthracite imports	2,692,731	4,817,536
Bituminous imports	12,562,888	13,816,457
Coal exports	1,818,582	2,205,183

The Coderre Cup, a valuable trophy offered by the St. John Ambulance Association for competition by teams of miners in first-aid, has been won this year by No. 1 team of the International Coal & Coke Co., of Coleman, Otta. The next in order was team No. 1 of the Western Fuel Corporation, Nandimo, B. C. The cup, emblematic of the miners' first-aid championship of Canada, is named after the donor, Judge Coderre, formerly Canadian Minister of Mines.

Coming Meetings

Northern West Virginia Coal Operators' Association will meet Feb. 13 at Fairmont, W. Va. Secretary, G. S. Brackett, Fairmont, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

Traffic News

A saving of approximately $1 per ton to retail dealers in interior Iowa points on anthracite shipped is seen in a decision handed down by the I. C. C. whereby the **roads must route such coal into Iowa at Class D rates**. The decision was made following a hearing of the case held last September in Des Moines. The case grew out of the railroads suspending the Class D rates without permission of the I. C. C. This permitted them to charge from 75c. to $1 per ton more on hard coal from Eastern points into Iowa.

The Coal, Coke and Iron Ore Committee, Central Freight Association Territory, announces a public hearing, 10 a.m. Feb. 1 **to consider cancellation of rates** on coke, coke ashes, coke breeze and coke dust, in carloads, to Moline, Rock Island, Ill., Davenport, Iowa, and Omaha, Neb., in connection with C. B. & Q., C. M. & St. P. and C. R. I. & P. Rys., from origin stations in the Clairton, Connellsville and Gallitzin districts, as set out in Penna R.R. tariff AA ICC 1843. The hearing will be held at Room 606, Chamber of Commerce Building, Pittsburgh, Pa.

In a tentative report made by Examiner Fleming, of the Interstate Commerce Commission, a new relationship of coal rates is prescribed on the Louisville & Nashville R.R. from mines in western Kentucky to points in the Northwest.

In Service Order No. 35, issued Jan. 15, the Interstate Commerce Commission instructs the Norfolk & Western Ry. to assign eight cars per day for ten consecutive working days, beginning Jan. 17, at any one of the following mines: Baby, West, Boissevain, Caswell Creek, Cherokee, Lick-Branch-Shamokin, Norfolk-Angle, Rolf, Sagamore Nos. 1 and 2, Delta, Pocahontas Nos. 6, 7 and 8, and Pulaski of the Pocahontas Fuel Co.; Elkridge Mine, of the Elkridge Coal & Coke Co.; Roanoke Mine, Roanoke Coal & Coke Co.; Booth-Bowen Mine, Booth-Bowen Coal & Coke Co. The cars are not to be counted against the distributive share of the mines. The coal is for delivery at the United States Navy Yard at Portsmouth, Va.

Obituary

Edward Savage, aged 83, the last survivor of the historic Blue Rock Mine disaster, died at his home in Crooksville, Ohio, recently. He was one of a number of men imprisoned for 14 days and 13 hours in the Blue Rock Mine and rescuers tunneled through 400 feet of earth and rock to reach them. The men had lived on the contents of two dinner pails, four quarts of water and some sulphur water which had trickled through the rocks.

Death has claimed **Don Carlos Robbins**, well known Utah geologist and adviser to coal companies of the state. He was 71 years of age and was born in Salt Lake City.

William W. Jackson, coal operator, with holdings at Dunshore, Sullivan County, died of apoplexy Jan. 9 at his home in Williamsport, Pa. He lived alone. Two daughters of Memphis, Tenn., and a sister, survive.

Edward J. Robinson, one of the founders of the Globe Coal Co., of Indianapolis, and prominent in business and political circles for many years, died recently from complications following the accidental discharge of a shotgun, the charge entering a knee. At first it was not thought the wound was more than painful, but acute nephritis caused a rapid decline. The widow and one son survive. Mr. Robinson was a Republican candidate for the nomination for Mayor at the last primary, but was defeated.

D. E. Martin, a member of the Martin & Hubbell Coal Company, who had been a resident of Kansas City, Mo., for about 35 years, died at his home in that city. He was sixty years old. A widow survives. Mr. Martin was born in Gallatin, Mo., and was well known throughout the northwestern part of Missouri.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Spragging the Wheels of Justice

STOPPING the Herrin appropriation in the Illinois Legislature was a forlorn hope, but the United Mine Workers' officials in that state attempted it anyway. Flushed with their success thus far in thwarting justice in the Herrin massacre case, and therefore caring less than ever what honest citizens think of them and their organization, they demanded that no appropriation be made. This, of course, would not have halted the prosecution. Ample private funds from business men and citizens of all degrees throughout the state are at the disposal of the Attorney General.

The only hope the miners could have had was merely to hamper the prosecution with riders to the appropriation bill. They would have compelled Attorney General Brundage to declare what he was going to do with every dollar of the $75,000. Would they reveal what they are doing with every dollar of their own $250,000 fund? And they would have required the state to prosecute for murder W. J. Lester, the foolish operator who imported armed guards for his Herrin strip mine. Yet since the very day of the massacre—June 22, 1922—they have done everything in their power to prevent all operation whatsoever of the machinery of justice. They want no more prosecution of that case or any phase of it. Such action is dangerous. What they want for the Herrin massacre is oblivion.

Why Russian Methods?

HOW much does Ellis Searles know about coal mining? But then how much does Heber Blankenhorn?

Mr. Blankenhorn, associated with the Bureau of Industrial Research of New York, is credited with a large responsibility for the "How to Run Coal" pamphlet, recently issued, being the report of the Nationalization Research Committee of the United Mine Workers, signed by John Brophy, C. J. Golden and William Mitch, all true-hearted and honest-to-goodness coal miners.

This nationalization plan, however, seems to have fallen from grace in quarters where it might have occupied high place. It got away to good publicity on the second try and was quite generally scored by the press. It developed no popularity. The cheers in fact were confined to Greenwich Village and those crabbed individuals who derive selfish pleasure in baiting business. The country wants to know more about the controversial points on coal before it jumps to nationalization. This sentiment the officers of the United Mine Workers sense. They privately and publicly concede that those who urge a policy of governmental ownership and operation of coal mines are several generations ahead of the times. Hence why bring down on their heads unnecessary public condemnation for a program that is not now practical; hence their implied repudiation this week of the nationalization program of Mr. Brophy and Mr. Blankenhorn.

The United Mine Workers is taking pains to inform the country that it is not "red," not even faintly tinged with pink. Well and good. It is no discredit to the miners' union that some of its members are so rosily minded. We know people holding "white-collar" jobs, ex-bankers who, having accumulated their pile, can indulge themselves in euphonious declamations of highly altruistic sentiments and others less rich in dollars whose thinking is simply twisted, who are as "liberal" in their thinking, talking and writing as those who wrote and signed "How to Run Coal."

The United Mine Workers has demonstrated it can get what it wants for its members by application of the American method, so why try the Russian?

Central Competitive Field Re-established

ASIDE from the fact that the settlement between the union and the soft-coal operators at New York last week insures peace for the next year, the agreement is chiefly interesting as demonstrating the supremacy of the old school of wage negotiation. For more than a year there has been developing a movement to broaden the scope of the negotiations with the United Mine Workers. From the time that the Central Competitive Field was originated, in the late 90's, until 1917 the machinery was simply and fairly effective. Operators from four states, western Pennslvania, Ohio, Indiana and Illinois, met with the miners' union once every two years. These operator groups had no prior conferences, no agreed program, no common policy. They just came together at the call of the United Mine Workers to negotiate a wage agreement and contract for the ensuing two-year period.

Thus has the old school worked. Thus was the stronghold of the United Mine Workers strengthened. Other coal fields outside the Central Competitive were organized and their wage levels changed in consonance with the central field, but always as a consequence thereof and never independently. So long as wage changes were small this caused no pronounced hardships. It was only when the upward march of wages, beginning in 1917, reached its climax in 1920 that the thin coal areas in and outside the old central field felt the pinch.

The desire of the "outliers" to share in the councils of the old central field is not new. It was strongly manifested and strenuously denied in 1919. It was debated and discarded in the conferences that began in October and ended in New York last week. The past year has been remarkable in that it witnessed the withdrawal of Pittsburgh, one of the old group, with a deliberate policy of aloofness, "of splendid isolation," on the

one hand, and on the other the effort to bring all operators in organized fields into one group in the matter of wage-making policy.

Such an opportunity for a shift in the organization dealing with the miners as was presented by the settlement of 1922 may not come again in many years. The old central field was for the time removed from the stage; all were on an equal footing, every group had signed individually with the union. When, during the meeting in Chicago the first week of January, the effort was made to turn the conference, in which each of the fifteen wage districts of the country was represented, into a scale-making body and the effort lost by the margin of a few votes, the opportunity was lost—the only thing gained from the wreck of the strike of 1922 was thrown away. If the operators from all the organized fields of the country could not get together to discuss wages, then the return to the old Central Competitive Field conference was natural and to have been expected.

The New York agreement of this year reinstated the Central Competitive Field as a basic wage-making body. That there were but three states in the conference had no more effect on this fact than that there were but three in 1906, when Illinois withdrew, for a time. Furthermore, these present three appear to have put themselves in the way of returning at the expiration of the new agreement for the purpose of making the next scale. The old processes have been re-established. With a wage program laid out in advance by the Coal Commission, from which there is no deviation as a result of the New York conference, it would have been as simple for each district to sign alone or for all to join.

The old school triumphed, Pittsburgh, invited to join but refusing, maintains an independence that for another year at least has but limited value. The lone hand in this game is the hardest to play. The outliers, refused admittance, must await another opportunity, meanwhile developing and promoting the idea of better organization among the soft-coal operators in wage making.

Better Track

LITTLE has been written as to better track, but the subject is one that will bear much consideration. Time was when mine traffic was so light and trips ran so slowly that the track was not destroyed by use. That distressing function was left to time and to the corrosion of mine water. With our mine roads as with our highroads, weight and speed are replacing natural forces as the chief destructive elements. While not neglecting to correct the heaving of the bottom, its softening by moisture, the displacement of track by side movement of the clay, the destruction of rail by corroding waters and electrolysis we must not fail also to remember that if we are going to use equipment but little lighter and but little less speedy than that on railroads we must introduce railroad methods.

Unfortunately, operators can make switches and frogs in their own shops and the argument that they can be made in the spare time of men normally engaged in other work favors that practice, but it is questionable whether it is well and safe to rely on such labor for work so important. After all "quantity production lessens costs" and experience in trackwork such as manufacturers have acquired and experiments such as they have made do much to improve the quality of their work. The use of large and adequate forging, cutting and machining equipment and the division of labor practicable in a large shop reduce the labor cost and make the product better. Then again, the equipment is not only better constructed but made of more durable material. So, after all, the manufacturer usually has the better of the argument.

The saving on a home-made switch may be purely illusory, for a single wreck may wipe out the saving on several switches and the force in the blacksmith shop would be reduced if cars were not derailed. It is true that when the men who repair cars are not busy they can manufacture track, but how much better it would be not to have to repair cars so often! If this repair work were reduced it would be possible to reduce the shop force, and no time would be lost. What time is saved by making poor switches is lost by repairing the wrecks which these switches cause.

The Human Element in Car Rating

UNIVERSAL and uniform car-rating rules for coal mines are doomed. After some five years of experience under "C S 31," the rules set by the U. S. Railroad Administration in 1918 applicable to all roads and all bituminous coal mines, the decision has practically been reached to revert to the old practice of rules for each road. Hearings lasting for several weeks were held before the Interstate Commerce Commission late last year in an effort to revise the rules, for C S 31 had been found unsatisfactory both to the railroad and the coal operators. Based on the theory of distributing the available cars during a shortage among the mines in such wise as to give all equal running time, these rules operated to increase the ratings during times of shortage and decrease them during times of surplus. The inflation has been and is increasing, having reached a point where, according to the ratings, the mines have capacity to produce more than 20,000,000 tons per week, an absurd figure.

Under the leadership of the National Coal Association, the operators undertook to revise these war-time rules and yet to preserve their uniformity. After the hearings before the commission were concluded and the matter was referred to the parties at interest for adjustment, the operators abandoned that position and agreed with the railroads in asking the commission for permission to work out rules locally, having set up certain general principles. These principles are found in the rules now in effect, and interject nothing new.

It is clear enough that what is wrong with C S 31 is that there is no policing of its application. The rating for a mine is based solely on the statement of the operator. The apparently simple facts on which he reports are not always easy of ascertainment and are most difficult to check. Wholesale inflation of ratings has resulted. After struggling for months in an effort to devise rules that would work, the effort is abandoned and the industry is about to revert to the old system of letting the railroads rate the mines and check their results.

Putting the matter in another way, it has been found, after some five years' experience, that it is not possible to rate coal mines by rule and formula. It is essential to introduce the human element of judgment, and since the coal operator is the most interested person in his own rating, he is the least competent to rate his mine. The railroad inspector has no interest as between mines save to see that all are treated fairly and uniformly.

Safer and More Economical Methods in Mine Haulage

One-third of All Haulage Fatalities Caused by Wrecks—Use Clamps Not Bolts, to Hold Guard Rails in Place—When to Retrack Development Haulageways—Mistakes in Turnouts That Cause Accidents

By Alphonse F. Brosky*
Pittsburgh, Pa.

SOME years ago an engineer made a computation of the number of cars derailed in the mine at which he was located, and after he had divided that figure by the number of locomotive trips in main or gathering movements—whether made with loads or empties or merely running light—he found that about one car was derailed for every trip made.

He reported this fact to the main executives of the company, adding that if means were taken to repair the then badly laid track and to maintain it in condition after it had been repaired these derailments could be averted. The officials to whom he sent the report were both chagrined and indignant that such a "cub" should have the audacity to tell them how they ought to manage the mine. Both mine superintendents and foreman were as one in scorning the suggestions offered.

Here was an opportunity offered a company to lessen the risk of haulage to which its employees were exposed and at the same time lower its haulage costs by fewer delays all along the line, and yet the officials were so shortsighted that they saw no economy in the proposed change. Fortunately the mine officials today have been "sold" on the idea of better trackage and haulage methods.

Progress Being Made in Improving Roads

Had C. A. Allen stepped into the past to make an investigation similar to the one he is now undertaking for the U. S. Coal Commission on wastes in the coal industry, he would have discovered that several per cent of the total costs of producing coal could have been shaved off had the companies realized as they do today the advantages of well-kept haulageways and correctly functioning rolling stock. More and more are mining men realizing that ways are open in which to better their underground transportation, and thus obtain a better all-around efficiency through a better balanced schedule in the several operations involved in coal production.

A number of factors enter into the problem of successful mining. If an experienced operator were asked what is the order in importance of the two main phases that influence the extraction cost, he would place the system of mining as the most essential and haulage next. A good haulage system is advantageous because: First, it eliminates much of the danger to which the underground workers are exposed on haulageways; second, it insures a continuity in transportation which makes for less idle time during the working day.

It might be well to repeat here a statistical statement which was part of Rush N. Hosler's presidential address before the Coal Mining Institute of America last December, even though it already has appeared in these pages. He said in part that in Pennsylvania bituminous mines "one employee in every 250 engaged in haulage is killed each year and that annually one brakeman and trip rider in every 120 engaged in that work likewise is killed." An analysis of his tables (see *Coal Age* of Dec. 21, 1922, page 997) giving the causes of the fatalities from accidents in the haulage of bituminous coal discloses that 28 per cent of these accidents occurring during the last five years on the outside of the mine and 41 per cent on the inside are due to wrecks.

In most cases these wrecks are not the direct fault of the employees. Faulty rolling stock and trackage usually are responsible. More attention to clearances, more effort to keep the haulage roads clean, more provisions to prevent derailed cars from displacing timber, the employment of trap doors that operate automatically and a due regard for discipline ultimately will reduce these percentages to a normal level. Safety is almost assured where correct haulage methods are practiced, and surely the cost of safety cannot be figured in dollars, because life is priceless. The operator owes his employees a maximum degree of safety and to himself what savings he might effect thereby.

But the economy is as inevitable as safety. For this



FIG. 1—OUTSIDE TRAMWAY LAID WITH 56-LB. STEEL

There is no reason why the surface, or outside, tramway should not be better constructed and maintained than the underground haulage road. Natural conditions favor such a roadway. With a good track the motorman can speed up his trip, clipping perhaps a few minutes off his running time. The side track leads to the slate dump. Even that is substantially built.

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reason the savings due to improvements in haulage methods and equipment can be figured in dollars and cents. Proper haulage methods will eliminate many delays and enable the operator to obtain a steady run throughout the day. This will enable him to increase his production.

Where attention is paid to keeping the equipment in good condition the repair cost will be distributed over a longer period and not be "bunched" as it is when equipment causes a wreck and brings many cars and locomotives to the shop at one time, tears up track and pulls down timbers, roof and wiring. Proper attention to the safe practices in haulage will afford steadier work to all persons employed, and this will result in greater efficiency.

Underground transportation can be bettered in two directions—one, attention to the roadbed and the other a study of the more technical features of the problem, such as may perhaps be dignified as engineering. In



FIG. 3—WELL DITCHED AND DULY CLEANED ROADWAY IN A KENTUCKY MINE

The ditch is on the "tight," or untraveled, side of the road. It not only removes what water might accumulate but assists the crew when the track is to be aligned, for only one side of the roadway need be dug up. A well-drained roadway does not have to be retied frequently. Note the well-trimmed ribs and the arch roof adjoining the overcast.

this article will be considered the simpler—those which may be termed the common-sense—features of the problem.

What are the causes of wrecks on inside haulage roads and outside tramways at bituminous mines? They are many and varied in character. In an effort to arrive at some conclusions regarding this all-important question and in a search for remedies, I have consulted with mining men of four states, consequently the reader need not hesitate to accept the suggestions made for fear that they are merely the ideas of any one person. The suggestions represent the opinions of many men whose assistance was sought.

For safe and economic haulage the track should be well supported and straight to a fault except where curves are necessary to meet changes in direction. Such curves as cannot be avoided should be of long radius. On the main haulages the curves will be so gradual that the motorman will feel assured of safety and so will not cut off any of his power and the only reduction in speed will be that which is the result of the increased friction between wheels and rails and between axles and bearings such as is inevitable when traveling around curves.

If he is not compelled to "feel" his way around a curve then assuredly that curve is properly designed and constructed. The rails should be so well matched that the joints have neither vertical nor horizontal offsets of any magnitude. Then the locomotive and cars will travel quietly except for the inevitable noise of moving parts and rubbing surfaces. The cars will not sway from side to side as the wheel hits irregularly lined joints, nor will the wheels be mounting or dropping at stepped joints. To insure this regularity of track, the rails must be tied together by fishplates firmly bolted and be mounted on ties spaced close enough and ballasted well enough to carry the loads to which they are subjected.

Judgment and not a rule of thumb should be used in selecting the kind and size of ties and in deciding upon their spacing. Sometimes when the spacing seems to be correct the support may be insufficient, due to the condition of the timber. Ties to all appearances sound may be rotted on the bottom, in which case the track is likely to spread or break down at an inopportune moment, failing without warning and causing a serious wreck. There is ample proof, from those who already have thoroughly tried out the plan, that wherever track is to be kept in permanent use, treatment of the ties with wood preservative is both an economy and a safeguard. And here let it be said that only the best ties obtainable should be used. Culls have no place where strong track is desired.

Plate Saves Tie from the Tearing of Spikes

Heavy rail usually is laid underground wherever hauls are long, necessitating heavy and fast trips. The rails should rest on tie plates, especially where the ties have been treated previously with a wood preservative and so are likely to have a life long enough to make it profitable to preserve the timber from the tearing action of the spikes. Large haulage locomotives, weighing from 24 to 30 tons, require not only sufficient support but all that is needed multiplied by a liberal factor of safety.

For all practical purposes rails less in weight than 56 lb. should rest on 5x7 in. ties, and standard railroad ties 7x9 in. should be used where the rails are heavier, especially at curves and cross-overs. No fixed rule has been adopted for the spacing of ties on underground roads. Too often they are set too far apart, with resultant track trouble due to insufficient support.

The track often gets out of line simply because the ties are too few to keep a sufficient grip on the roadbed and spreading is likely to occur if by reason of the sparsity of ties a sufficient number of spikes cannot be driven to hold the rails to gage. It is better always to err in the direction of placing ties too close to each other than to attempt to economize by putting them too far apart. If the track sags the fault should not be placed without investigation on the character of the bottom. It may indicate only that the ties are too few.

If the tracklayers are careless and do not leave enough clearance at the joints before plating and spiking, the rail is likely to buckle. If old track sags and gets out of alignment it may be realigned, the joints may be made tight and ties retamped and conditions may be greatly improved thereby and this without interfering with current operations; but if it buckles, no matter to what extent, there is but one positive remedy and that is to tear up the entire length affected, to jack the crooked rails until they are straight, to shift the ties back into line and to re-lay the track. In many

cases it is an economy in repair cost and a saving in operating time to lay new track and take the old steel to the outside, where it may be straightened and stored for use elsewhere.

The Elkhorn division of the Consolidation Coal Co. maintains a uniform joint clearance of ½ in. in all its mines. A gage of poplar ½ in. thick is furnished all tracklayers for this purpose.

Rails heavy enough to sustain almost rigidly the loads which travel over them should be provided. The growing tendency in mines is toward heavier rail on main haulageways. With the introduction of the electric mine locomotive 40-lb. rail was laid on all major haulage roads so that today only rarely a mine with a production of 1,000 or more tons daily is equipped with lighter rail than this.

In its No. 3 mine the Ford Collieries Co., of Curtisville, Pa., has laid 56-lb. rail on its main haulageways and lays all its curves on radii of 150 to 200 ft., and finds that it pays. In its other mines, until such time as it can make this practice standard, the roads, though provided with curves as easy as those specified for heavy rail, are laid with 56-lb. rail, well braced to the ribs, duly elevated, and laid on 7x9-in. ties.

Heavy Rail for Mine Track Is a Real Economy

This company has found the heavier rail such a profitable investment that all future main-line track will be laid in this manner. Experience has demonstrated clearly to the Ford Collieries Co., that heavy track is really an economy. Rails of 40-lb. weight are apt to spread, especially at curves, whereas 56-lb. rail gives admirable results. This company is only one of many that advocates rails heavier than 40-lb. The jump will be from the rail of 40-lb. weight to that of 56-lb. In fact, not a few companies have been using 70-lb. rails for some time wherever long hauls from the face to the shaft bottom or to daylight necessitates the maximum haulage speed allowed by the law. With the rapid advances in underground transportation, may we not believe that at some future date all the mines with large acreages will be laid with 70-lb. track, and the whole system laid out so as to approach that on our present railroad systems?

Drains as Important in Mine as on Surface

To maintain good track after it is once laid, the entries, wherever water is likely to gather during the wet seasons, must be provided with drainage ditches. In many mines where the roadbed softens and expands when wetted, the management need look no further than this for a cure of its haulage ills. Ordinarily, in a well-drained roadway the waste material of which the road bed is made tamps to a compact mass that gives but little under a passing trip of loads. But when wetted this same material loosens up and heaves, distorting the track and failing to support it properly.

Track shifting can be averted, oftentimes, merely by bracing the rail from the ribs. The number of braces in a unit of distance depends upon the tendency of the track to shift. Two braces to one rail length, staggered to either side, usually is sufficient. One company, on main haulage roads, staggers these braces so that they are placed on 29-ft. centers. However, on curves these braces should be inserted every 8 or 10 ft. It is a wise practice to brace every curve over which locomotives and trips are likely to pass. In any case the braces and ties should not be permitted to project above the level of the roadbed or above the walkway on the clearance side.

Near frogs, guard rails should be used just as frequently in the mine as in standard railroad work. Only too often protection of this sort is looked upon as a needless expense, but this viewpoint is wrong, for the use of guard rails is justified not only by the protection that they give to the traffic passing over the frog but also by the lengthening of the life of the frog itself. If guard rails are used they should be held in position by a suitable guard-rail clamp rather than inefficiently by two bolts, which soon bend back and render the guard rail practically useless.

A company manufacturing track equipment says that the excessive wearing of frog points is the burden of most of the complaints received. Sooner or later any frog point that has become blunted in use is sure to cause a derailment. This company adds that investigation discloses the fact that when complaints as to the premature wearing of frogs arise the frog has not been kept at proper gage, has not been set in accurate alignment or has been subjected to improper wear owing to the fact that the rails adjoining it were not properly supported so as to remain in the same horizontal plane.



FIG. 3—A SORRY BIT OF TRACKWORK

This illustration was taken at a mine capable of loading out a large tonnage. The frog is a No. 3 and the gage 44 in. Fig. 5 shows in greater detail how the frog is joined to the track. A little care would have prevented all these many fatal errors. Too often is "fatal" the right word, but the trackmen do not realize that fact.

One superintendent set his gage at the frog one-half inch tighter than his standard because "he understood that there was an inch difference between the wheel and track gages." Needless to say, his frog points were badly worn in a short time. After being instructed as to the correct way in which to place his frogs he experienced no further difficulty.

The most serious of all wrecks occur on curves where the proper elevation of the rail is not provided. The height to which the outer rail should be elevated is regulated solely by the speed; therefore main-haulage curves must be elevated with regard to that factor. Where the trips pass over the curved rails at ordinary speeds, the rails are not elevated. Indeed, it would be foolish to carry refinements to that nicety.

Frequently on rope hauls neither rail is elevated, and sometimes, though rarely, the wrong or outer track is the one made the higher of the two. A locomotive trip has a component acting away from the center of the curve. This is a centrifugal force which must be counteracted by elevating the outer rail. On the other hand, in rope haulage the rope pulls the cars toward the center of the curve with a force exceeding that tend-

ing to cause them to fly outward, so they are subject to a centripetal force which must be offset by the elevation of the inner rail.

Switches and frogs to a room neck, even though that room will one day become a haulage road, should be torn up as soon as the room is finished, unless indeed only a short period will intervene between the completion of the room and its use as a haulage road. Some are of the opinion that if that period is a year or more, the frog and switch should be torn up, even though they will have to be reinstated at a later date. Others say that if the idle period is only six months the lifting of the frog and switch is justified. If it is of no use during the intervening time why not tear it up immediately? The chances are that it might be advisable in any event to lay a better track at this point later. Frogs and switches are destructive to rolling stock and the fewer there are the better.

Why Run Railroad on Contractors' Track?

When an entry becomes a main haulageway in the true sense of the word, the rails used in development should be lifted and replaced by well-aligned track. A butt entry usually is regarded as being of that character as soon as the first rooms are driven off it. The development track in a main entry is replaced by permanent, well-aligned track whenever other development has advanced to such an extent that the coal being mined is more than can be handled safely on the temporary track of the entry. It is best, working nights and Sundays, to commence retracking the main entries before the rooms are turned, working progressively, of course, toward the advance workings. The permanent track may not really be needed so soon. However, the work should not be started until sufficient advance has been made to permit of the establishment of grades that can be maintained for some distance. All these are factors that must be considered from the very start of an operation, if safe haulage in the future is desired.

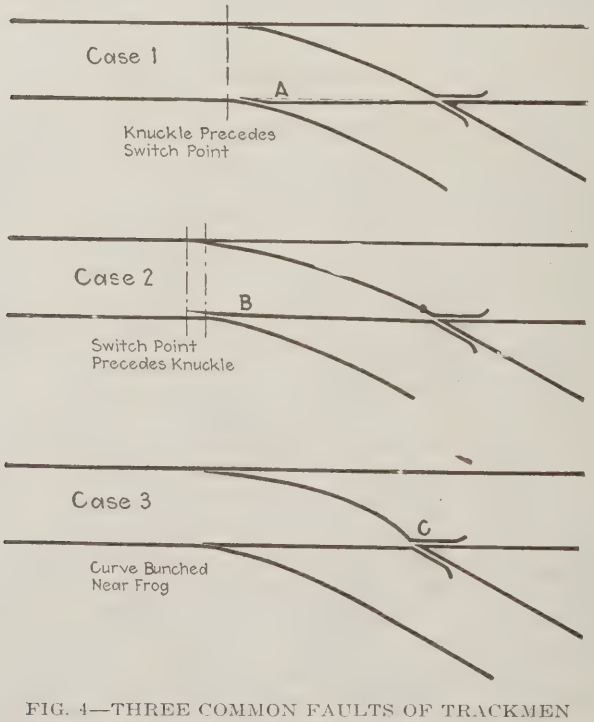


FIG. 4—THREE COMMON FAULTS OF TRACKMEN

The errors in this track have been exaggerated, for a drawing disguises rather than reveals bad switch work when drawn truly and to scale. At *A* the gage of the track is exceeded, at *B* it is tight and at *C* not only is it wide but the turn is also sharp.

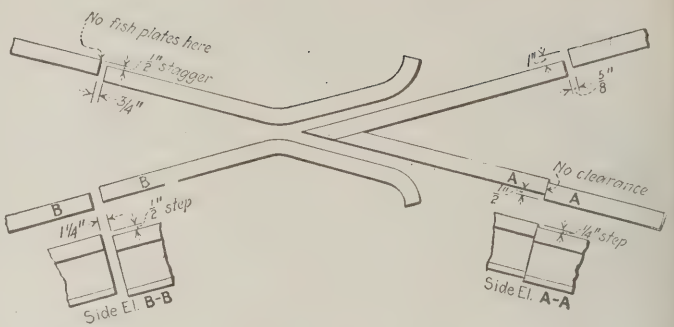


FIG. 5—DIAGRAM OF TRACK WORK IN FIG. 3

Whenever an 8-ton motor passed over this frog it had to climb the stepped joint and the impact was considerable. Similarly the side thrust was severe when the motor took the offsetted joint. The frog base also was not properly supported, nor could it be with both vertical and horizontal offsets. The many tons and the many men passing over this frog would justify an effort to have it truly aligned in every plane.

Switches improperly laid and maintained are the cause of many derailments. Tracklayers sometimes let the knuckle of the rail sit either too close to or too far from the switch point. These mistakes are illustrated in Fig. 4. In Case 1 a motor or wagon traveling on the straight road will hit a point of wide track gage at *A* in passing over the turnout. In Case 2 the track gage is tight and, further, the tracks are so laid that the locomotive or a mine car may split the switch.

Track Gage May Be Faulty Even at Switch

Another mistake frequently is made in laying turnouts. This is the "bunching" of the curve of the turnout near the frog. This, apparently, is the result of not curving the rail before spiking. The mistake usually is discovered but instead of taking up and rectifying the rail, the tracklayer gives more curvature at the end, while one end of the rail is still held down by the spikes. This is illustrated in Case 3 of Fig. 4. The irregular curvature would not be objectionable were the turnout rail installed with a similar curve, but in the case of a circular curve with one end "hooked" as described, the wheels of the mine car or locomotive in passing over the 'hook" change direction too abruptly and rides roughly over the frog, which is soon thrust out of line. Sooner or later such an excessively short turn will lift the rolling stock from the track.

Government Operations at Eska, Alaska

WHEN the Alaska Engineering Commission closed its Eska mine it was not expected that the plant would be started for some time and perhaps not at all. Soon after that a cut in the U. S. Navy appropriation closed Chickaloon and its washery. The commission then decided to purchase its fuel on specifications and moved the laboratory from the cleaning plant to Anchorage and was just getting it ready for analytical work when the Evan Jones mine, adjoining the commission's property, caught fire. The commission's engineers fought the conflagration for a while and then, fuel running short, on Nov. 23 reopened the old Eska mine. The tonnage is picking up. It is now 125 to 150 tons per day. When the spring comes the output may well have been doubled. It will then be time to start the washer so as to have a good store of clean coal for the winter following. Chickaloon is in the region of the Matanuska River, which stream flows into Cook Inlet just where the great Alaska Peninsula roots into the body of Alaska much as a tusk enters the head of an elephant.

Four Ways of Lowering Electric Cables in Shafts*

Cables May Be Installed by Winches Above or Below, by Lashing to Cable and Lowering from Above, by Mounting the Spool Above the Cage and Slowly Lowering the Latter—Dangers and Their Prevention

A SHAFT cable usually is exposed both to mechanical damage and to the corrosive action of the water that falls down the shaft. To protect the cable against falling materials it should be provided with a double armoring. But this, while protecting the cable against falls, is itself subject to corrosion and so needs protection; therefore it should be wound with a double covering of jute, which in turn should be periodically treated throughout the entire length of the cable with pine tar or an equivalent, in order that the jute may be preserved. This should be done every two or perhaps three years, depending upon local conditions.

When a cable is fixed to a shaft wall ample space must be allowed at all points between walls and cable, in order to prevent the latter from being crushed against the wall by falling objects. It should be so attached as to allow it a moderate degree of resilience. Under these conditions it is less likely to be injured by falling bodies.

Shields Keep Out Dirt and Falling Objects

Moreover, the cable cleats should be provided with shields at the top to prevent dirt from accumulating around the cable where it enters the cleats. This shield also serves to deflect falling material by which the cleats might otherwise be injured. Every care should be exercised to prevent the jute from being damaged while being lowered into its place, as may happen if it is allowed to rub against walls or girders . Furthermore in lowering the cable or when placing it by any other method any temporary fastenings to the cable must be made with discretion.

Method 1—Lowering Cable from the Drum of a Steam Capstan or Winch.—This is perhaps the ideal method of getting a cable down a shaft, whether from the point of view of labor or of that of time. With this method the cable end is made fast to the cap of the rope of the winch or capstan and coiled on the drum, after which the end of the cable is fed over a suitable pulley into the shaft. By some other mechanism men are lowered down the shaft in a box at the same speed as that of the cable, which they are thus able to prevent from becoming caught in obstructions. One important consideration, however, must never be overlooked, namely: Is the cable to be lowered so long and heavy that suspending it in the shaft even temporarily from a single point of support will be injurious to it?

Obviously this will depend on the size of the cable and its construction. Thus a cable covered with lead and armored is much heavier than one that is insulated solely by a bituminious covering. To be on the safe side in this respect, it always is advisable to ascertain from the makers whether the cable is of a strength that can be lowered safely in the manner suggested, detailed information being furnished as to the exact method to be pursued. If the cable cannot be lowered in one length, the lower length or lengths must be suspended during the process of lowering, the whole weight hanging and depending meantime on a suitable clamp or socket, to which the winder or capstan rope is attached.

If possible the lower end of the socket should be tapered so that it will be less likely to catch on such obstacles as it may happen to encounter in its passage through the shaft. Having securely fastened a suitable socket to the end of the cable, the capstan rope, assuming that one is used for the purpose, should be attached and the cable carefully coiled on the drum over a bed of sacking or other material, such as will protect the cable from the hard surface of the capstan rope already coiled on the drum and will provide a more or less uniform surface on which to coil the cable.

A suitable pulley must be erected at the top of the shaft, which must be so arranged that a line dropped from the groove overhanging the pit shaft will fall where the cable is to be fixed, but clear of shaft equipment, for by rubbing against such obstructions the cable might damage its jute covering. The groove of the pulley should be large enough for the cable to lie in the base of the groove without being exposed to a crushing side pressure when the weight comes upon it. A layer of soft hemp fastened in the groove will serve as an additional protection. The clamps by which the cable will be permanently supported in the shaft should all be opened before any attempt is made to lower the cable, which should not be allowed to hang from its point of support any longer than is absolutely necessary.

Men Lowered to Keep Cable in Course

Men should be lowered at the same time as the cable to guide the end past any obstacle in its path and also to keep it in the course intended. When a cable has to be lowered in two or more lengths, it is necessary that the lower ones be let down with great caution, especially after the end of the cable which is fastened to the winding or capstan rope enters the shaft.

No matter how ingenious the design of clamp employed for holding the cable may be, it always is possible that it will catch. If this should occur, the descending rope, not being stretched by the weight of the cable, will begin to double on itself. Should the cable then loosen itself in some way, it would fall several feet and a serious accident might occur. Such a sudden load would be sufficient in many cases to strain the cable severely, if not to cause it to break loose.

Such an accident can be avoided if, after it has been ascertained how far the cable can be lowered safely, unattended without going out of its course or meeting with obstructions, the men are raised until they are level with the upper end of the cable and in a position to guide the cap where necessary. After lowering the cable the prearranged distance these men should again be lowered to the end of the cable and preparations made for a further lowering as soon as they have been brought again to the upper end. These operations must be continued until the cable is finally in the desired position.

It always is advisable to have the cable fastened into most of the clamps before the capstan rope is slackened.

*From *Electrical World*.

as by this means the weight will be more or less evenly distributed over the whole length of the cable, which toward its upper end naturally is under a greater stress than are the lower portions. Although in most cases this is not a serious matter, yet in some instances, owing to special circumstances, it may be desirable to relieve the cable of all strain.

To effect this a few of the lower clamps should be fastened and then made to take their share of the weight by lowering the cable a trifle, in order that the weight then hanging will be that of the cable less the lower portion already fastened. This might be repeated two or three times in sections up through the shaft, thus relieving the cable from all strain.

Method 2—Raising Cable from the Shaft Bottom.—This is a convenient method, provided that the cable drum can be taken to the bottom of the shaft. Once there it is placed on a strong bar resting between two substantial supports, so that the drum can rotate. A capstan rope is then lowered and connected by a suitable fastening to the cable end, which is pulled up the shaft and watched by shaft men, who should accompany the ascending cable on top of the cage in order to prevent obstacles from catching it.

Method 3—Lashing Cable to Capstan Rope.—This is method usually advocated by cable manufacturers, because if properly done, it is a fairly safe plan and the cable can be placed without any fear that it will be strained by its own weight. However, much more skill is required, and incidentally much greater patience, and mishaps are more likely to occur than in some other methods of installing.

Cable and Rope Fed Into Shaft at Same Time

In this method a capstan rope is needed as before, but instead of fastening the end of the cable to the rope and suspending it by its end, both cable and rope are fed into the shaft at the same time. The cable is lashed to the capstan rope every few yards, and these attachments serve to support the cable. As just mentioned, much skill is required to make the fastenings between the cable and the rope satisfactory. Unless they are proof against slipping on the rope the cable may pull its spool and everything else with it down into the shaft.

The chief objection to this method is the possibility of the numerous lashings becoming caught here and there in the shaft and thus caused to slide up both cable and rope until long lengths of cable remain unsupported. Furthermore, should the lashings so slide, it will not be without resistance. The jute, in consequence, will become torn and perhaps stripped loose for long distances, thus exposing the cable to the effects of the shaft water. Moreover, one of the objections to this method is the great length of time required to put a cable down a shaft by this method. It would not be wide of the mark to say that from the commencement of operations Methods 1 and 2 can be carried out in less than half the time required for the method that has just been described.

Method 4—Cable Drum Slung on Cage.—The foregoing methods of installing shaft cables obviously are applicable to almost any kind of shaft. A method may be given, however, which can be used where it is not convenient to use a capstan and where rope guides are used.* This method is both effective and rapid. The cable drum is erected between the bridles of the cage. As the cage is gently lowered, the drum, being slowly revolved, is paid off into the clamps in the shaft. Where this is done it usually is necessary to use for the purpose extra long bridles or cage chains so as to leave room in which to erect the drum in the angle between the rope cap and the cage.

To these various considerations it should be added that where a cable is too long to be put down in one length it is necessary to make joints, which should, if possible, be at a heading rather than on the shaft wall, for thereby the joints can be made and permanently kept in a dry place and furthermore the joint can then always be kept where it will be protected from falling material and where overheating or other troubles more readily can be corrected. However, where no heading is available the cable must be joined on the shaft wall, or in some more suitable position if that can be found. In such a case, a vertical type of junction box might be used, but joints of any kind are most objectionable in shafts and should be avoided if possible. At all points below the surface where cables enter or leave the shaft provision should be made to protect them from falling material which might cause injury. Suitable stout wooden coverings should be fixed on the shaft wall and project beyond and surround the cables, which should pass through the covering before bending to enter the heading or other opening.

Shaft cables should be examined by the electrician at least every six months and more frequently where circumstances make frequent inspections desirable. This inspection should be made from the top of the cage by the aid of a good light in order that defects may be easily noticed. The breaking of the jute covering and the accumulation of dirt around cables where they enter clamps are the chief sources of trouble which require attention, but more serious damage always should be anticipated and its presence sought.

*This cannot well be used in American coal mines, where rope guides are seldom if ever used.

Can Peat Be Used to Bind Coal Briquets?

THE readiness with which peat will coke without any binder suggests that it might be used with a coal lacking in agglutinant to give the necessary binding quality. It would be essential that the peat be obtained from bogs readily available to the mine or the market, for it probably would not pay to transport the peat any distance. The Peat Products Corporation has set up a press at its bog at Eaton Rapids, Mich., and at the present time is producing peat briquets for sale. These it is selling in the neighborhood of Grand Rapids, Mich.

The process is exceedingly simple, consisting of passing air-dried peat containing 35 per cent of moisture directly into a Universal press. A. L. Stilllman, in his book on "Briquetting," says: "It is probable that a change in the structure of the peat is caused by the successive linear pressures produced by this press and that the water is thrown from its colloidal condition in somewhat the manner claimed for the Ekenberg process. At all events the peat, which has reached its limit of air drying at 35 per cent, goes after it is in the briquet form, through a secondary drying which is accompanied by setting and hardening. The result is a fuel that is not degraded in shoveling and is as convenient to handle as coal. By reason of its briquetted form and the nature of its combustion it has a heat-radiating power which, for stove or hearth at least, gives the briquet a value far beyond what its B.t.u. content would indicate."



Canada Hopes Peat Will Displace Much Anthracite

Dominion Has Mapped 190,000,000 Tons of Peat Fuel—One Machine Will Produce 100 Tons per Day—Peat Costs $5 per Ton at Plant—Gives Two-Thirds as Much Heat as Anthracite

By E. L. Chicanot
Montreal, Que.

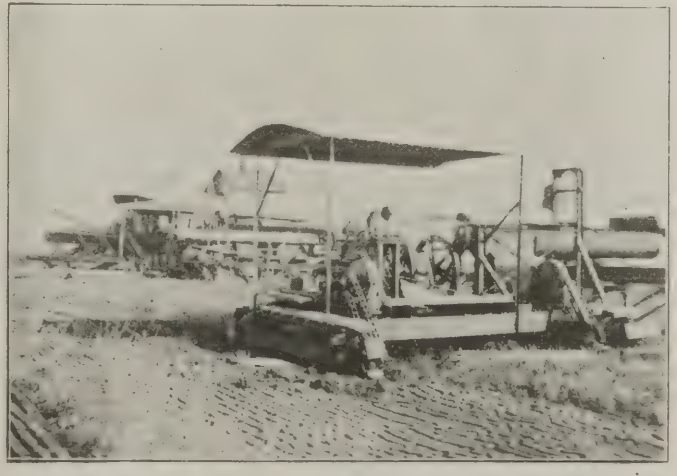
Until the winter of 1921 few Canadians and still fewer residents of other sections of the North American continent were aware that Canada had any peat resources, and if they did know in a vague way of the existence of peat bogs they did not realize that these had any commercial value or that any steps were being taken to exploit them. It was only when the coal shortage hit the country and dealers and consumers were sent scouring in all directions for fuel or a substitute for fuel that it was discovered that due to government foresight, experimentation and development, a supply of peat fuel, limited it is true, but valuable nevertheless, was available.

Though not enough to have any appreciable effect upon the general fuel situation it partly solved the problem for some few consumers. It disclosed the information that, if properly and adequately developed, Canada's peat resources were sufficient to cut out one-fifth of the anthracite imports on which Canada is dependent each year.

The Government of Canada has, however, always foreseen the possibility of such a stoppage in the fuel received from the regular sources in Canada and the United States. Canadian legislators have been always painfully aware that eastern Canada is dependent upon the United States for its fuel supply and that one of the most pressing of national problems was the discovery of a solution of this situation. One of the means taken toward the ultimate removal of the difficulty has been to conduct experiments of a commercial size upon the peat bogs of the Dominion in order to discover whether these peat resources could be turned to economic account and become a rival of anthracite.

The great interior of Canada has been created without supplies of suitable coal but Nature apparently made some provisions nevertheless, for this expansive area abounds in peat bogs that will be permanently available as sources of fuel as soon as the necessary developments are made. These bogs are well distributed throughout the middle provinces and cover in all some 37,000 square miles In many of these areas the peat is particularly well suited for manufacture into fuel for domestic and power purposes, the bogs being conveniently situated as regards transportation facilities and lying not far from industrial communities.

In the Province of Ontario alone there are thirteen bogs estimated to contain 43,000,000 tons of peat and capable of producing 1,800,000 tons of ammonium sulphate and gas power sufficient to generate 40,000 hp. continuously for 100 years. A government board dis-



SPREADER AND EXCAVATOR AT WORK IN PEAT BOG

The spreader is in the foreground. The spreader lays the peat down in a thin layer and with revolving disks cuts the mass into long narrow rows so that the sun can dry it. The water in peat is in the form of a jel: it cannot be squeezed out any more than the water in a jelly.

Note—The headpiece illustrates the Alfred peat bog in Prescott County, eastern Ontario, near the Ottawa River, which forms the Quebec border. The equipment includes the excavator, the conveyor, grinder and spreader. Note the large area over which the peat is spread for drying.



REAR VIEW OF SPREADER WITH CATERPILLAR TRACTOR

The spreader receives the excavated peat from the rear, the product being brought by the conveyor shown in the headpiece and in the illustration of the roller cutter.

covered eighteen bogs in Manitoba and its report stated that the Winnipeg River district contained 1,860,000 tons of peat fuel, if dried so as to contain 25 per cent of moisture. Less than one hundred miles from Montreal there are seven bogs the resources of which run into the billions of tons.

Efforts to utilize Canada's peat bogs commenced more than half a century ago and were continued in the period up to the end of the war in a spasmodic and desultory manner. In the main they were not satisfactory, and the average pre-war output in the entire country was only about 2,600 tons. An investigation by the Dominion Mines Branch determined that this failure was due to the fact that the producers of the commodity did not know how it should be handled and had not availed themselves of the experience and practice of European producers. If the commercial exploitation of Canada's peat deposits had depended upon private companies or individuals there is little doubt that Canada would today be but little nearer alleviating her fuel needs with supplies of peat than she was when the Mines Branch first approached the problem.

Canada's fuel problem was practically the first to occupy the attention of the Bureau of Scientific and Industrial Research when it was formed, and though one method of solution attempted was the utilization of the lignite deposits of southern Saskatchewan by briquetting, thus providing for the Middle West, the other method was the development of Canadian peat bogs. In 1918 the whole question was placed in the hands of a Peat Committee, consisting of four members, who conducted investigations into the peat bogs of the entire Dominion with a view to establishing their utility as a source of fuel.



ROLLER CUTTER MAKES BRICKS FROM STRIPS OF PEAT

By pulling a roller cutter with the sharp edges set at the correct centers athwart the strips laid by the spreader the peat is cut into bricks of the correct size.

To date of the 37,000 square miles of peat in the Dominion 105 bogs have been surveyed with an aggregate area of approximately 224,131 acres. These contain 190,330,170 tons of fuel and 20,588,110 tons of litter. Forty-six of these bogs are in the Province of Ontario. They have a total area of 132,231 acres and contain about 110,109,000 short tons of peat fuel and 518,000 tons of peat litter. During the past year four bogs were surveyed in the province, a total of 11,089 acres being investigated. Three are situated near the cities of Fort William and Port Arthur and the fourth near Verona. All were found to contain peat suitable for fuel.

Both on account of the greater need of the industrial area about it and the favorable nature of the deposits, and the additional fact that the Ontario Government had preliminary investigations already under way in that area, attention was devoted by the Peat Committee to the bogs about Alfred, in Prescott County, Ontario, not far from Ottawa. Experimentation and development has been practically concentrated at that point. When the committee turned its attention to the possibilities of this bog much work had been done already with machinery of a rudimentary character. Peat was about to be shipped in 1914, when the outbreak of the war disorganized markets and traffic and set back development. The Peat Committee immediately and definitely adopted the process of air drying, feeling assured that it was the most efficient and practical way in which to rid the peat of moisture. This made the problem a purely mechanical one and the committee proceeded to attempt its solution as such.

Price for Years Has Been Real Difficulty

In surveying the work that has been accomplished by the committee on the Alfred peat bogs since that time it must be borne in mind that it has this problem to solve and that all efforts were of an experimental and investigatory nature. The fact that fuel could be manufactured from these bogs already had been established; the problem confronting the committee was to devise a system of manufacture that would permit the finished product to compete with imported hard coal. Working with the old plant already on the ground in 1919 3,000 tons of peat fuel was produced, and it found a ready market.

During 1919 a new machine had been designed to remedy faults found in the one preceding and the two operated in competition throughout the year 1920, producing 5,500 tons of manufactured peat. For the product a remarkable demand developed, inquiries coming from New Brunswick and Quebec points. The bulk of the product, however, was consumed in Ottawa and other points contiguous to the manufacture, though some went as far as Three Rivers, Que. A close study was kept upon the two machines throughout the year, with the result that the committee concluded that both could be improved, and accordingly a new machine was designed combining the best points of each of the other two.

The year 1921 was occupied largely in the construc-

tion and erection of the combination plant, so that the year was to a great extent one of continued experimentation and development along other lines than production. In order to keep up a certain proportion of the output one of the condemned plants was continued in operation throughout 1921 and a total of 3,889 tons of peat produced. Of this 1,500 tons was shipped to markets which had already been developed and which, in the previous year, could have absorbed ten times the production. An unfortunate fire of unknown origin consumed practically the entire remainder of the output and put an end to shipping for that year.

The work of the year, however, was of great value, for it demonstrated the value of the new plant, which fully met the expectations of the engineers who had designed it. The machine had a capacity of ten tons per hour and was expected to maintain an output of 100 tons per day of ten hours.

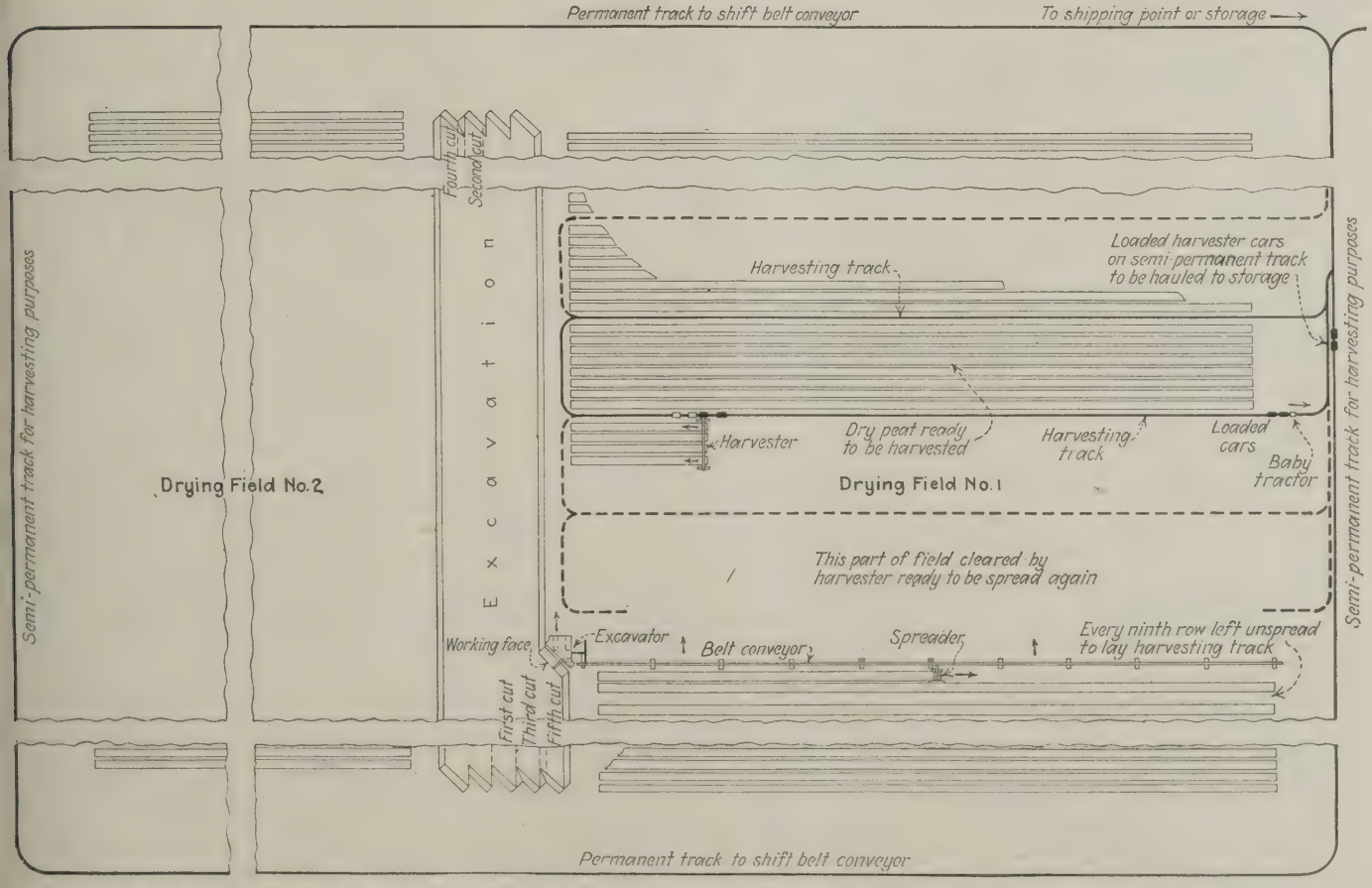
Another achievement of 1921 was the development of a small machine which can be operated by three men, the production of which will average about two tons per hour. The machine thus made and perfected was devised for use on small bogs where it may be used by farming communities to supply their local needs. It may be of value also in finishing up the irregular work on extensive deposits to which the larger machines could not readily adapt themselves. In developing this machine the engineers had Ireland in mind, which is the principal peat-producing country of the world. In that country the annual production runs into millions of tons, all of which is the result of work upon small areas.

In the early part of the year 1922 a new and improved grinder was installed in what was considered an already perfected plant. Delays incident to this curtailed the length of the actual working season. Furthermore, the power equipment of the plant was found insufficient to operate the new grinder at its full capacity, so that the year's production, in even the abbreviated period, does not represent the seasonal capacity of the plant or its possible output. Instead of the capacity output of 100 tons in ten hours an average of 73 tons was turned out over the entire period of operation, though, taking into account the loss of time in getting under way, the production was actually 89 tons per day of ten hours.

Peat Fuel Found Eminently Satisfactory

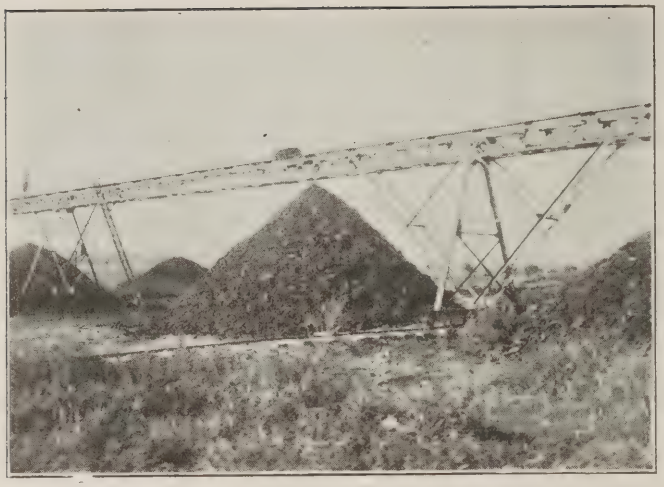
The total production of peat at the Alfred bog in 1922 was 5,000 tons. This was distributed over a wide area in eastern Canada, large consignments going to Montreal, Ottawa, Peterborough and Belleville and landed at these points at prices which made it easy to compete with coal. In every case the peat was sold to customers of 1920 and 1921 who had been eminently satisfied with previous consignments and had placed their demands for the 1922 crop early in the summer. Not a single complaint was received from any consumer of the peat prepared in 1922.

This peat was laid down at the track at Alfred, Ont.,



PLAN OF HARVESTING FIELDS SHOWING EXCAVATING TRENCH, EXCAVATOR, SPREADER AND HARVESTER

The excavator does not work on a face in the same direction as the excavation but on one inclined as shown, at an angle of 45 deg. The peat contains 88 per cent of water and 95½ per cent of that water is removed, for in 100 lb. of natural peat there will be 12 lb. of solid matter and 16 lb. of product where the water content is 25 per cent, or 4 lb. Thus 88 lb. of water has been reduced to 4 lb., or 84 lb. of water out of 88 lb. have been withdrawn, or about 95½ per cent. From a content of 733 per cent as compared with the solid matter in the peat it drops to 33 per cent. This result is obtained by spreading the peat over a large field in long rows of nine. Between each ninth row is laid a temporary harvesting track and on the edge of the field on either side a track that is permanent. The season for drying and therefore cutting peat is only 100 to 120 days long. On the other two sides of the field tracks are maintained for shifting the conveyor from one drying field to the other.



TRESTLE FOR PILING MANUFACTURED BRICKS OF PEAT

It is remarkable how strong these bricks are after drying for from two to four weeks on the ground. There is a cementing material in them which acts when the peat dries. It is not wholly dried, of course. About 25 per cent of water still remains.

at $5 per ton, the difference between this and the prices paid by consumers representing freight rates and dealers' profits. This price covers the entire cost of operation and all overhead—the running of the perfected plant which consists of a combined excavator, grinder, belt conveyor and spreader, the turning of the peat bricks, which is performed by hand, and the trucking to storage or loading for shipment. It is the conclusion of the engineers that at this price the product can be manufactured commercially with a reasonable profit and that the price might even be shaded a trifle if the power problem were adjusted. Indications are that the operation of the Alfred peat bog may be taken over by a private corporation in the present year.

Anthracite has only 1.5 times as much heating value as manufactured peat, the latter being largely free of ash, which in coal may amount to between 10 and 25 per cent. Peat has been mixed successfully with anthracite and this is fortunate for practical usage, for if all Canadian peat bogs were producing they would reduce anthracite importations barely one-fifth.

How a Change in Valves Greatly Lessened Feed-Pump Repairs at Nacmine, Alta.

By J. B. de Hart
Nacmine, Alta.

AT OUR mines at Nacmine, Alta., we have had much trouble with the brass valves in our feed pump, and the method by which we have overcome the difficulty may be of use to others who are experiencing the same trouble.

Fig. 1 shows the seat and valve for a duplex feed pump 7½x4x6½ in. The pump has eight such seats and valves, and they were continually giving trouble. They had to be taken out and faced up in the lathe on an average of once every three weeks, so that we had to keep a spare set always ready.

We redesigned the seats and valves and had them made as shown in Fig. 2. The valve disk and washer are held on by a ¾-in. nut with a ⅛-in. cotter pin through it to prevent its working loose. The nut is not shown in the drawing. The valve is then rubber to brass instead of brass to brass. We had two sets of valves made of the new design so that there would be no delay when they needed repairs.

The first set was put in more than one year ago and has never had to be taken out except for inspection. The disks have never been changed and appear good for another year and the second set has proved itself unnecessary. The quality or the quantity of water the pump has had to handle has not been changed and the valves are working under exactly the same conditions as before.

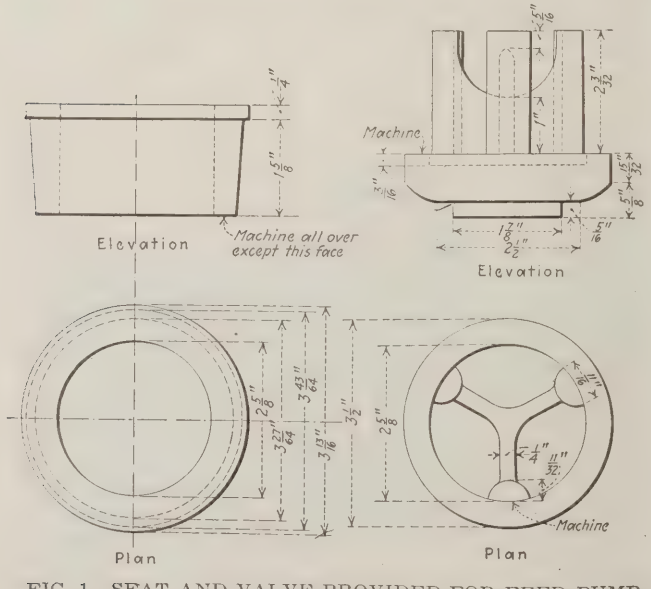


FIG. 1—SEAT AND VALVE PROVIDED FOR FEED PUMP

Valves and seats such as these had to be taken out and faced in a lathe once every three weeks. It will be noted that brass was in contact with brass and the result was not good.

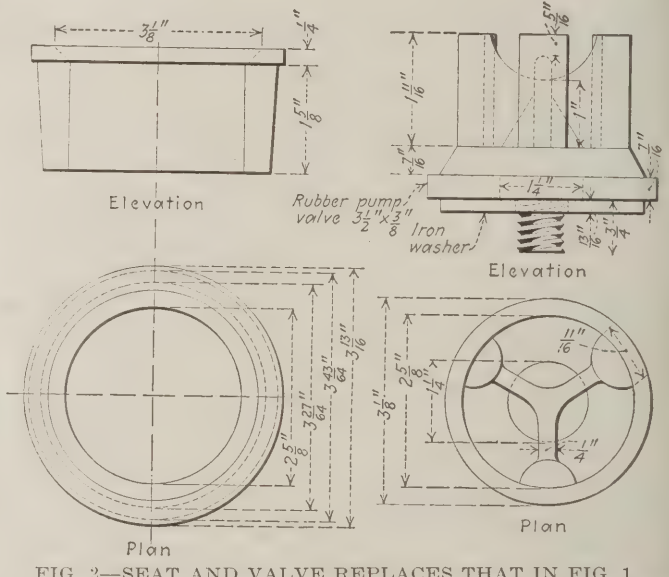
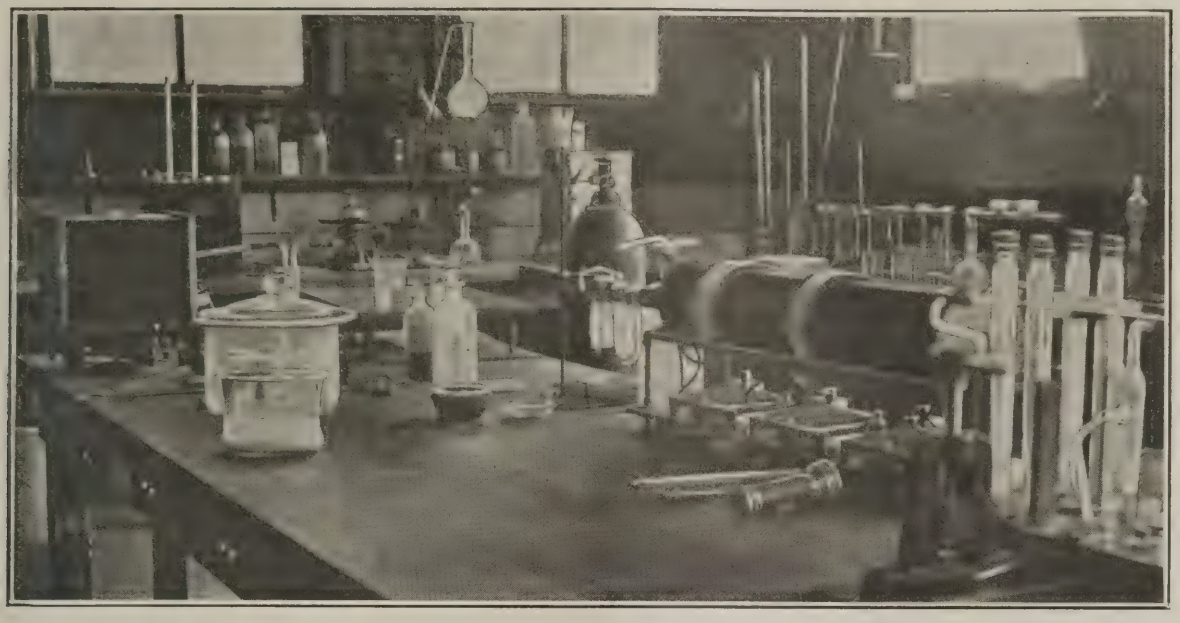


FIG. 2—SEAT AND VALVE REPLACES THAT IN FIG. 1

In this the valve is provided with a rubber disk that is held in place by a washer. The contact is between rubber and brass, and a tight connection is thus attained. After a whole year the seat and the valve are still giving good service and, what is more, have needed no repairs.

No doubt many other pumps have the design of valve shown in Fig. 1 and they probably are giving their owners the same trouble and expense that our's gave. I can assure anyone in this unfortunate predicament that new valves and seats made up as shown in Fig. 2 will entirely overcome the difficulty. This is one of the instances, not infrequent about the mines, where a little common sense and ingenuity applied to design will sometimes work wonders in the way of improved operation.



How Pennsylvania Coal & Coke Corporation Keeps Its Product in Compliance With Severe Specifications

Company Inspectors Visit Mines Unannounced—Mine-Car and Coal-Face Samples Taken and Analyzed Periodically—Records Make It Possible to Trace Back the Contents of Any Car to the Place Where Loaded

DURING the constricted market for coal in 1921 and in the pre-strike period of 1920 important advances were made in the preparation of coal. In the past one occasionally heard the trite remark that "Coal is coal," and some men were indifferent as to the quality of this fuel so long as the price was right. Consumers now are being educated to demand clean coal and no other kind will do. The shrewd buyer would no more think of buying coal without investigating its merit than he would consider buying a high priced animal without looking up its pedigree. He demands a certain grade, and he gets it.

With more mines opened up than are really needed in normal times, manned by too many miners, it is unlikely that the coal demand for any length of time in the present or next generation will ever again exceed the possible output. Keen competition must result—not in price alone but in quality also. For this reason a new era in coal mining and preparation is upon us. The change, though still in its infancy, is marked enough to be readily noticeable.

From now on the operator will have to study extraction from the viewpoint of quality as well as quantity. Hereafter coal will have to be sampled and analyzed and closer watch will have to be kept over preparation above and below ground. And not only that; there will be, hereafter, a closer relation between the operating and the selling departments. The distributing department will act as an adviser to the mining officials, for the men who sell the coal are better informed regarding the demands and needs of their customers than the man in the production department.

Inspections Made by Traveling Experts

The Pennsylvania Coal & Coke Corporation, with operating offices at Cresson, Pa., is obtaining from its mines a more highly merchantable coal by laying greater stress on rigid inspection, on correct mining methods and on the preparation of its coal. The corporation has thirty mines within a radius of 25 miles of Cresson. Four seams are being mined, with an average thickness of 42 in. They are known locally as the B, the C′, the D, and the E seams. The names of the beds are the Lower Kittanning, the Upper Kittanning, the Lower Freeport and the Upper Freeport respectively.

Three coal inspectors are employed to supervise the mining and the preparation of coal. Each man travels from mine to mine, and makes his visits entirely unannounced. In this way the miners and officials at each mine are kept "on their toes" at all times. The length of time between these visits varies from mine to mine.

Note.—Headpiece shows testing laboratory of the Warner Laboratories, where tests of the coal of the Pennsylvania Coal & Coke Corporation are made.

COAL INSPECTOR'S DAILY REPORT

Colliery Date

Number of men cleaning coal:

a. On Picking Tables

b. On Railroad Cars

General Remarks on appearance of coal as shipped:

Miners Found Loading Dirty Coal

Check Number of Miner	Where Working	Remarks on Condition of Working Place

Samples (For Laboratory)

Weight of gross Sample How and when taken Ash %

lb. Sulphur %

Report and Suggestions

Coal Inspector.

FIG. 1—REPORT FORM FILLED IN DAILY BY EACH INSPECTOR

Mines with a reputation for producing clean coal, as disclosed by analyses, are visited less frequently than those which do not maintain their standard so unerringly.

These men are not coal inspectors as we understand the term—they do not merely examine superficially the coal in the mine wagons or the railroad cars. Rather, they combine the functions of company mine inspectors with that of coal-preparation advisers. An inspector spends at least one whole day at the mine at each visit. Arriving in the morning, the forenoon usually is spent on the surface about the tipple.

As all the seams mined in this region outcrop, all the mines are entered through drift openings. The inspector stands on the load side of the tipple and removes a shovelful of coal from each mine car as it passes him. Thus he accumulates a sample that is truly representative of the output of practically the entire mine. This weighs from 1,200 to 2,000 lb. This is crushed and then quartered until a 5-lb. sample is obtained, which is sent to the chemical laboratory for analysis. He also examines the coal in each car as it passes, and, should the coal in any car show enough refuse to indicate that the coal is mined or loaded carelessly, he makes a record of its appearance and of the check number that the car bears.

In the afternoon the inspector goes underground and inspects the working places, in particular those from which he has noted that dirty coal is coming. Arriving at such a place he first makes a careful examination of conditions, studying the roof, the seam and the bottom, and seeking to determine the reason why the coal from this point is below the standard, so as to ascertain whether the carelessness of the miner or the physical condition of the seam is the cause of the impurity. If he believes that the miner is not to blame, he advises him as to the manner in which cleaner coal may be obtained.

Should he suspect the miner of carelessness, he questions the latter with reference to the mining methods employed. The miner is cautioned to be more careful in the future, and the mistakes in his mining or loading methods are explained to him. The offender, moreover, is disciplined in accordance with the clause in the union agreement regarding the loading of dirty coal. If underground regulation does not improve the quality of the coal, then surface preparation is bettered either by placing more men on the picking table or by other means.

The inspectors not only take samples of the run of the mine but sample the coal at the face. This is done in accordance with the standards of the U. S. Bureau of Mines, the coal being removed in three vertical channel cuts, one being taken at each of the ribs and one in the middle of the face. The coal is crushed and quartered until a 5-lb. sample is obtained for analysis.

When the system was first put into effect, representative faces in the several working sections of each mine were sampled and analyzed. As occasion has demanded, further samples have been taken. This becomes necessary whenever the run-of-mine analysis shows too high a percentage of ash and sulphur and a given section is suspected, or whenever a given section has advanced considerably since the last sample was taken.

This system opens up a wide field for a "better coal" movement. As time goes on new ideas will crop up to better it, and a better working basis will be established. At one of the mines the analyses of the coal at the face are recorded on a special map. At another mine the check numbers of the miners are noted on the map opposite their respective working places. It is likely that in the future such graphical records will be prepared and maintained for all the company's mines.

Can Trace Bad Coal to Rooms Producing It

The chemical composition and the character of the beds in the Lower Productive Measures, especially the Freeport seams, are known to vary (sometimes considerably) within the bounds of a single acre. This phenomenon is not conducive to a uniform shipment. One of the purposes of the system is to supply the customer with a coal the heating value, ash-fusing temperature and proximate analysis of which will vary but little. The corporation is familiar with the physical and the chemical character of the coal at the several working places in their mines. Only with this knowledge can the official determine a possible constant in composition and work to attain it. Orders usually are filled to satisfy certain specifications.

Record is kept of the check numbers on the mine cars, the contents of which are loaded into any one railroad car. The record is filed away so that should a complaint be made the loading schedule may be adjusted to remedy any shortcoming. Each check number gives information at once as to the miner, place and coal composition.

Each coal inspector is provided with a form for a daily report which he fills out at the close of the day's run. This form is shown in Fig. 1, and it affords an excellent digest of facts. By comparing the periodic reports of the same mine a definite conclusion may be reached as to whether the output of the mine is uniform, improving or declining in quality. It also affords a means of comparing different mines. The report blank is practically self-explanatory. As may be noted, an opinion as to the efficiency of the coal preparation may be formed by studying the reports. The effect of placing a large or smaller force of men on the picking tables and on the railroad cars is shown by the ash and sulphur percentages which the chemist supplies.

The analyses are made by the Warner Laboratories, located near the operating offices at Cresson, where an experienced graduate chemist runs all the chemical analyses, which are more detailed than those usually made by coal companies. All the determinations are made in accord with the U. S. Bureau of Mines' Standards. Referring to Fig. 2 it will be noticed that a com-

plete record is made of both the method of sampling and the results of analysis. Not only is a proximate analysis made but the sulphur content, the thermal value and the fusing temperature of the ash are ascertained.

A representative analysis of the Lower Kittaning seam, marketed as Webster coal, copied from an analysis and coal sample report chosen at random shows that the ash varies between 6.13 and 6.58 per cent and the sulphur between 1.19 and 1.43 per cent. The heating value ranges between 14,600 and 14,700 B.t.u. The fusing temperature of the ash is 2,600 deg. F. The coal from the other three seams, tradenamed the Pardee coal, has an ash value of 6.32 to 6.61 per cent and a sulphur content of 1.09 to 1.33 per cent. The heat value of this coal is about 14,500 B.t.u.

The coal inspectors' daily reports are filed away, those from each mine being kept in a separate folder. If a complaint is received from a customer, it is filed away in the folder of the mine from which the shipment was made, adjacent to the nearest report either before or after the shipping date. The mine superintendents meet in conference periodically. The records of each mine in individual folder form are conveniently accessible for reference at these times.

The coal inspectors soon develop marked proficiency in their work. Because they specialize on this one phase alone and because of their experiences at a number of mines they become experts in their line and readily determine the cause of dirty coal and are able to suggest a remedy. Neither the mine foreman nor the superintendent has time to accomplish the results attained by the inspectors. An impartial outsider will grasp the situation more readily and bring about the necessary change in methods with more expertness than a man who has given the subject less attention and has had a narrower experience. A system such as this results in better and better coal as the wrinkles in its operation are ironed out.

RECORD AND ANALYSIS OF COAL SAMPLE

1 — Name of Operating Company.....

2 — Name of Selling Company.....

3 — Name of Mine..... (a) Name ..... (b) Kind of Opening

4 — Location..... (a) Distance from..... (b) Nearest R. R. Station, ... (c) Township, ... (d) County, ... (e) State

5 — Coal Bed..... [a] Local Name, or..... [b] Geological Formation

6 — Sample of..... State kind of Coal—Anthracite, Bituminous, Semi-Bituminous, etc.

7 — Taken from ..... Mine, railroad car, mine car, tipple, washery, drill hole, storage pile, etc.

..... Describe fully

8 — Gross weight of sample collected.....Pounds.

9 — Method of collecting gross sample..... Describe fully

10 — Method of obtaining Laboratory sample..... Describe fully

11 — Net weight of Laboratory sample.....Pounds.

12 — Roof..... Kind and Characteristics

13 — Floor..... Kind and Characteristics

14

NO.	SECTION OF BED	FEET	INCHES
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
TOTAL THICKNESS OF BED			
THICKNESS IN SAMPLE			

15

.....Laboratory

Date..... Laboratory File No.....

	AS REC'D	DRY
Moisture		
Vol. Matter		
Fixed Carbon		
Ash		
Sulphur		
B. T. U.		

Fusing Temperature of Ash °F.

.....Chemist

16 — Excluded from Sample—Section Nos.....
NOTE.—Exclude from Mine[or "face"]sample, all partings that are rejected in mine or at tipple, and make record [x] in above table [14]

17 — Collector .....

18 — Date .....

19 — Sample No. ..... Engineering Department File No.

Record to be made in triplicate and all copies forwarded to the Chief Engineer.
Identification tag marked "Pennsylvania Coal & Coke Corporation, Sample No....." to be placed inside container with sample.

FIG. 2—CHEMIST'S REPORT BLANK



Spillertown Sam Dead; Aged 32 Years

Spillertown Sam was in the coal business over twenty-six years. He died on Dec. 24, 1922, at the Peabody company's No. 3 mine, Marion, Ill., at the ripe old age of 32 years. Spillertown Sam enjoyed a life of ease for the past six years on a Peabody Coal Co. pension. The company provided him with a ten-acre field, well wooded to shelter him in the summer time, and a comfortable barn with an attendant to take care of him. While in active service this mule averaged twenty miles per day, year in and year out, underground, hauling coal and never met with an accident serious enough to incapacitate him for work.

Institute to Canvass Subsidence of Mines

WHEN the American Institute of Mining and Metallurgical Engineers meets on Feb. 19 it will take up on the first day the subject of "Ground Movement and Subsidence." In fact this is one of the more important subjects relative to coal mining that will be presented at the 127th meeting. H. N. Eavenson will offer the main subject at 9:30 a.m. on the opening day. Someone will then offer some remarks on subsidence in Southwest coal mines and George S. Rice will speak on the subject of "Problems of Ground Movement and Subsidence," illustrating his article on the screen. J. Parke Channing will present a paper entitled "A Study of Subsidence at Miami, Ariz.," and an address will be delivered on "Ground Movement and Subsidence at the Inspiration Mine."

In the afternoon two papers will be delivered on the breakage of tool steel, its hardness and the relation of heat treatment to both, and the industrial relations section will discuss Americanization, cripples in industry, education, employment, housing and recreation, mental factors in industry, sickness prevention and safety.

To Discuss Standardization of Mine Maps

A meeting of the mining section will be held the next day on "Mining Methods at the Marquette Mine" and on the "Standardization of Mine Maps." At this meeting a report will be made on the classification of mine methods. A coal-mining section will at the same time be addressed by Thomas Fraser and H. F. Yancey, their subject being "Interpretation of Results of Coal-Washing Tests." A. B. Crichton will address the institute on "Mine-Drainage Stream Pollution." Edward O'Toole will give a paper on "Unit Costs in Coal Mining in the Pocahontas Field," using units of labor and material per unit of accomplishment as the means of deriving these unit costs, that being the method of presentation requested by the mining methods committee.

In the afternoon M. W. Ditto will describe the "Design and Operation of the Roberts Coke Oven"; A. R. Powell, "Forms of Sulphur in Coal and their Relation to Blast-Furnace Reactions"; R. A. Sherman and John Blizard, "Combustion in Fuel Beds of Blast-Furnace Cokes"; G. H. J. Perrott and S. F. Kinney, "Combustion of Coke in Blast-Furnace Hearth."

In the afternoon a mining session will be held in which C. E. Barneveld will discuss "Mechanical Loaders at an Underground Mine." In the mining session of the following morning Galen H. Clevenger will speak on Liquid-Oxygen Explosives." A joint session of the committee on industrial relations and the mining section of the National Safety Council will discuss under the chairmanship of B. F. Tillson "Hoisting Ropes and Safety Devices for Mine Shafts."

Session on Mechanical Loaders Underground

In the afternoon another meeting of the same kind will be held under H. F. Lunt's chairmanship. At this will be discussed "Mine-Fire Prevention," "Preparations for Fighting Mine Fires," "Industrial Psychiatry" (Jau Don Ball), "Industrial Relations of Tennessee Copper Co." (J. N. Houser, general manager of company) and "Industrial Community Problems at Brewster" (H. L. Mead, of the American Cyanamid Co.). Concurrently addresses will be made on the "Practical Results Obtained from Psychological Tests at Columbia." (Adam Leroy Jones), "Relations Between the Mining Industry and the Technical College" (F. W. McNair) and "Training of Engineering Students" (E. P. Mathewson).

The social luncheons so much appreciated in former years will be held on all three days with special dinners on the first night for three of the divisions, one of these being the industrial relations committee. These dinners will be followed by a smoker at headquarters. On the second day a dance will be held and on the third the reception to the Italian Ambassador at Washington, Prince Gelasio Caetani, which will be followed by the annual dinner. The business meeting will be held on Tuesday morning, Feb. 20, before the regular business of the day commences.

Proposed Legislation Prohibits Deduction Of Capital Losses Above 12½ Per Cent

DEDUCTION of capital losses in excess of 12½ per cent is precluded by legislation likely to be adopted at this session of Congress. The proposal is to amend the revenue act of 1921 so that a taxpayer may not be allowed a complete deduction of capital losses incurred. Both the revenue acts of 1918 and 1921 have left this gap through which many have escaped from income taxes.

It is pointed out that an injustice is done the taxpayer in that an increment frequently accumulated over a period of many years is taxed at a high surtax rate when the property is converted into cash in a given year. The net profit is arbitrarily attributed to the year in which the sale took place. In addition there was a severe restraint on sales at a profit. Many transfers of property were prevented when the transfer was highly desirable from the standpoint of economic development.

The act of 1921 provided that the tax on capital gains in the case of property acquired and held by the taxpayer for profit or investment for more than two years should be limited to 12½ per cent, but no such limitation was placed on capital losses. The injustice to the government is exemplified by Representative Mills of the Ways and Means Committee as follows:

"The taxpayer may refrain from taking his profits, or, if he does take them, he pays but a 12½ per cent tax, whereas he is at liberty at any time to take advantage of losses that may have been incurred and avail himself of a full deduction from his income. In the case of a man with an income of $350,000 a year, assume that he bought 5,000 shares of stock X in 1917 at par, and that he sells the shares in 1922 for $600,000, showing a profit of $100,000. By reason of this transaction, he would pay, in addition to the tax on his regular income, $12,500 to the government. But assume that instead of selling this stock at a profit he sold it in 1922 at a loss of $100,000. He then would be entitled to deduct the $100,000 from his income of $350,000 and the loss to the government by reason of that deduction would be $58,000."

In many cases, it is stated, only paper losses are involved. Securities may be sold at a price less than that paid for them, thereby setting up a loss which is deductible from income. After thirty days these same securities could be repurchased, or immediate purchase could be made of securities of a similar class and of the same value, which would allow the taxpayer a substantial loss for his income tax purposes, but his real financial position would be the same as before the sale.

Book Reviews

Modern Gas Works Chemistry

GAS-WORKS chemists seemingly are in the same unfortunate position as the mechanical and electrical engineers of coal mines. In "Modern Gasworks Chemistry," Geoffrey Weyman, chief chemist to the Newcastle on Tyne and Gateshead Gas Co., says: "Often enough the chemist is superimposed upon an existing organization and, without definite position or authority, is expected to show a substantial increase in economy. To the qualifications of training and ordered knowledge must be added, therefore, one of tact. The chemist is variously regarded as a nuisance, as a necessary evil to be tolerated as far as may be, as a sort of spy in charge of 'tell-tale' instruments or as an amusing trickster. In the long run he must trust to the result of his work to make his position one of reference by both workman and manager; until from being an excrescence, the laboratory takes its place as the nerve center of the works." If the word "chemist" were replaced by "electrical engineer" and "laboratory" by "switchboard" the statement would be scarcely less apt.

However, we cannot quite agree with Mr. Weyman in his enthusiastic dictum: "Could coal be so treated that the value of the byproducts would allow the gaseous therm to be distributed as cheaply as the therm in the form of raw coal, the increased efficiency with which the former may be used would render carbonization of extreme importance and would go far to stabilize the industrial conditions of this country" [England]. The reviewer may be pardoned surely for saying that the gaseous therm will not displace the therm in raw coal, for the electrical unit already is driving the latter out. Certainly gas is not going to oust electricity for power purposes, in general service, for nothing is so economical or so readily handled as electricity.

Still gas will continue to have its place, and this authoritative book will serve not only the chemist who makes gas but also the mine operator who must fit his product to the needs of those who desire to use it. And here it may be wondered that the author of this volume has so little to say as to clinker. He seems not at all interested in high-temperature fusibility and questions whether in the future the practice may not be to seek a low-temperature clinker that will run and not arch, obtaining this condition by the use of added fluxes. He believes that a clinker could be attained that would run through the fire bars into the ashpit.

He also questions whether it is better in the manufacture of producer gas to use a high fire temperature, completely burning the fuel and forming clinker, or to keep the fire comparatively cool and recover coke from the ashes, and concludes that this is a matter for individual consideration. This is indeed a new light on a problem which has been troubling coal men. Hitherto chemists have been urging that coal be used that, in burning, will leave at high temperatures only ash and not clinker.

The author's chapters deal with Coal, Carbonization, Coke, Maintenance of Heats, Refractory and Insulating Materials, Tar, Ammonia, Oxide Purification, Town Gas, Water Gas, Steam Raising and Water Supply and Lubricants. The treatise contains 184 pages measuring 7x9½ in. It has 42 illustrations and is one of the recent publications of Benn Bros., Ltd., 8 Bouverie St., London, E.C.4.

Unveiling the Romance of Coal Mining

IN A volume of 310 pages Charles R. Gibson has essayed, not without considerable success, to record "The Romance of Coal" and give a "popular account of the origin and nature of coal, the forces and qualities destructive or beneficial which lie latent in it and the great variety of uses to which they may be turned to science, art and industry." To those who are interested in the history of coal mining this book will greatly appeal. Mr. Gibson's qualification for his task is found mostly in his sense of the human interest in the subject he is considering.

A few of his statements are remarkable. For instance, in his chapter on "The Crust of the Earth" he declares that quartz is a silicate of alumina. As he recognizes sand as being coarse quartz he differentiates sandstone from clay and shale by saying that the particles in the latter are finer than those in the former. The reader of this review hardly will need to be told that sand is silica, or quartz, and that fireclay and shale are for the most part silicates of alumina, though fine particles of silica can be found in fireclay as in gannister clays.

Again in the chapter on "The Origin of the Varieties of Coal" he expresses the belief that anthracite has been formed by "great veins of igneous rocks being introduced among the coal beds," which is neither true in general nor happily expressed. He uses the word anthracite loosely, as is the English manner, saying that "its greatest field of labor has been in the Navy, because of its smokelessness," which is not true if the word "anthracite" is used, as he says, to cover coals which contain 93 per cent and upward of carbon. Coal so high in carbon as 93 per cent is indeed almost smokeless but is not used for naval vessels.

He also says that anthracite has little ash, which is true of the British product but is not necessarily true of all. Its freedom of ash where found is adventitious and not a quality to be expected. Anthracite must of necessity have a larger percentage of ash than the bituminous coal from which it has been formed.

The book admirably shows how the workers in the coal fields were the source of nearly all our industrialism, not only furnishing the power but devising and developing the steam engines by which industry operates. There is truly much romance in the industry that created the first railroads, the first steam locomotives and the first steam pumps and which has even today many unusual problems to surmount. Mr. Gibson faithfully and interestingly chronicles that romance. The book is issued by Seeley Service & Co., of London, but is republished by J. B. Lippincott Co., of Philadelphia. The pages measure 5x7¾ in.

TESTS MADE AT THE PITTSBURGH (PA.) experiment station of the Bureau of Mines to determine the nature of gases rising from the fuel beds of different kinds of coke show that the composition differs very little. These tests will be continued to see if the combustibility of coke varies with the size of the pieces.



Problems of Operating Men

Edited by James T. Beard



Dumping Mine Cars by Rotation —Not a New Idea

Priority Claims Refuted — First Installation of Ramsay Patents in Alabama Ore Mines—35-Car Trip Dumped at One Time

SOME time ago, I recall reading an interesting article describing the installation of a skip hoist and rotary dump on the shaft bottom of the Zeigler No. 1 Mine, in Illinois (Vol. 21, p. 871). A brief item that appeared more recently in *Coal Age* (Vol. 22, p. 8), written by Clarence R. Claghorn, reminds me of the claims of priority set forth in the previous article, which it appears was written by E. W. Davidson. In this second reference, Mr. Claghorn makes similar claims of priority for a like installation at Wehrum, Pa.

In his brief article, Mr. Claghorn makes the claim that the Zeigler installation of the rotary dump and other equipment was patented after a similar installation, made underground, at the Wehrum (Pa.) shaft mine of the Lackawanna Coal & Coke Co., in 1903, both installations having been built by the same firm.

Development of Ramsay Rotary Damp and Later Installation at Zeigler, Ill.

During my service as division engineer of the Tennessee Coal, Iron & R.R. Co., in charge of its ore mines, for the years 1898 to 1900, inclusive, I was closely associated with Erskine Ramsay, chief engineer and assistant general manager of the same company. At that time Mr. Ramsay gave much thought to the study and development of the rotary dump.

Probably the first installation of this type of equipment was made at the Smythe Slope, Ore Mine, on Red Mountain, near Birmingham, Ala. That was a multiple five-car rotary dump of Mr. Ramsay's own design. About the same time and for the sake of comparison, he also installed, at the near-by Spring Gap Mine, the first slope, skip hoist in the state. The same was later adopted at many other Red Mountain mines.

Although the pneumatically operated Ramsay dump, at Zeigler, Ill., was not installed until 1917, the patent covering that installation (No. 701,764) was granted to Mr. Ramsay June 3, 1902. Mr. Ramsay had arranged with the Wood Equipment Co., who manufactured for him the earlier installations of this type of equipment, to allow the Car Dumper and Equipment Co., of Chicago, to manufacture and install the plant at Zeigler, Ill. Just here, it should also be observed that the patent covering the Zeigler installation was granted to Mr. Ramsay about a year prior to the application for the Wehrum (Pa.) patent mentioned by Mr. Claghorn.

From the foregoing statements it will be seen that the Zeigler installation is by no means the first rotary dump set up under the Ramsay patents. The idea of dumping material by rotary motion has been under development, now, for nearly a quarter of a century and Mr. Ramsay is one of the well-known pioneers in that development.

The Ramsay, rotary method of dumping an entire trip of cars in a single operation had its earliest practical demonstration, in coal mining, when a multiple, rotary dump about 175 ft. long and handling trips of 18 cars was installed, in 1914, by the H. C. Frick Coke Co., at its Lemont No. 2 mine, near Uniontown, Pa.

Other Installations of Ramsay Multiple Rotary Dumps in Pennsylvania

A little later Edward H. Coxe, then manager of the Tennessee C., I. & R.R. Co. and, now, general manager of Snowden C. & C. Co., installed a 28-car slope dump 275 ft. in length, the largest then in existence. This installation was made by Mr. Coxe, at this company's mines near Brownsville, Pa.

It will not betray any secret, I hope, to state that the H. C. Frick Coke Co. is about to install two Ramsay, rotary dumps, each having a capacity that will enable it to handle a 35-car trip at a single time. Each of these dumps will be nearly 400 ft. in length and located underground. The operation of dumping a full motor trip on its arrival at the station will require but ten seconds.

In this connection, it will be of interest to state that the first single-car, rotary dump, designed to dump one or more cars at a time without uncoupling the cars from each other or from the motor, was installed several years ago and operated, under a Ramsay license, by C. P. Perin, at his new Keokee Mine, Va.

In this type of dump, use was made of a swivel coupling that permitted the cars on the dump to turn over without being uncoupled from the trip. Numerous other dumps of this type have since been installed and are in operation in various parts of the country.

Many Installations of Same Dump in India

The C. P. Perin engineering firm of New York, which for many years has represented the great Tata coal, iron and steel interests of India are now installing a single, rotary, five-car dump made for them by the Ramsay agents, the Car Dumper and Equipment Co. of Chicago.

This dump is designed for a double-track slope, having the hoisting rope attached to the loaded and empty trips, respectively and passing backward and forward through the dump, the two branches of the rope running always in opposite directions. As in gravity-plane haulage, the two trips act in balance and the five cars in each alternate trip will be dumped at one time without the cars being uncoupled from each other or from the hoisting rope.

This installation will duplicate the one installed by the same company, in 1918, at the A. J. Morgan Coal Co.'s Bellaire Mine, in Ohio. I understand that this

novel arrangement is the only one of its kind in the world. The idea marks a great advance from the original swivel coupling of the Koekee Dump of which mention has been made. Previous to that time, the same firm had installed, in India, three other Ramsay dumps.

Pioneer in Mine Equipment

Through my long association with Mr. Ramsay, in the development of his rotary dump adapted to the varying conditions of shaft, slope and drift mines, I do not hesitate to say that he has made notable advances in providing various equipment that reduces the cost of production, by the increased efficiency effected in operation.

The numerous devices designed by Mr. Ramsay include mine cars, brakes, wheels and couplers, besides caging arrangements, individual mine-car samplers and various types of feeders for screens and crushers. His shaking screens date back to the first installation of that kind of equipment ever made at American bituminous mines. Such an installation was made by Mr. Ramsay himself, in 1890, at the Pratt slope, Mine No. 4 of the Tennessee C., I. & R.R. Co. H. A. Turner.

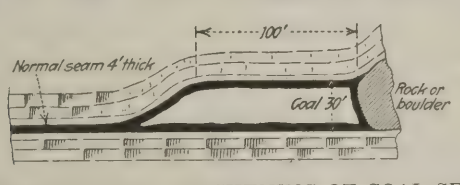
Birmingham, Ala.

Extraordinary Conditions Met in Working Coal Seam

Normal thickness of 4-ft. coal seam increases suddenly to 30 ft.—Conditions much disturbed in coal and roof —Coal entirely cut out by rock—No trace of seam beyond.

EXPERIENCES through which we have recently passed caused me to read the article of I. C. Parfitt entitled "Locating the Coal Beyond a Fault," *Coal Age*, Nov. 16, p. 799, and that of W. H. Luxton, Dec. 28, p. 1042, with the deepest interest.

My hope of finding in these articles the solution of a condition we have met in the working of a normally 4-ft. seam of coal in one of our mines in the southern part of Pike County (Ky.), was doomed to disappointment, however, as the conditions referred to in those articles were of an entirely different nature from those against which we have been striving for some time past.



EXTRAORDINARY THICKENING OF COAL SEAM

Conditions Before Boulder Cuts Out Seam

In a rough way, I have attempted to illustrate, in the accompanying figure, the conditions as we have found them. Previously, the coal, in our seam, had maintained a uniform thickness of 4 ft. and was overlaid with a hard slate top, the bottom being of a like nature. As indicated in the figure, we suddenly observed a rapid increase in the thickness of the coal, which continued till a height of 30 ft. was reached.

This thickening of the seam occurred within a distance of forty or fifty yards. Then, we ran into what appeared to be a huge rock boulder or horseback, which cut out the coal completely. To make the situation more clear I will explain that we have since driven all the places on the left of the main haulage roads and the main headings themselves up to and into this faulted condition.

In our efforts to ascertain the condition existing in the strata beyond, we not only drilled holes up in the roof and down in the floor of the seam; but have been prospecting on the other side of the mountain, about a mile ahead of the present development in the mine. The prospecting showed that what is probably the same seam of coal as that worked in the mine, outcrops about 20 ft. higher, in elevation, on the mountain, where it has a normal thickness of 4 ft.

I shall watch with interest for accounts of similar experiences of others, which I am sure will appear in these columns, together with some practical explanation of such an extraordinary thickening of the coal, before the seam was finally cut out by the rock.

Pikeville, Ky. Superintendent.

Stunt in Timbering Haulage Roads

Opinions vary in regard to the setting of temporary posts—Discussion brings out practical stunt to prevent a wreck on haulage road from dislodging timbers.

THAT post timbers have been set without taking proper care to insure the timber fulfilling its purpose and that this has proved the source of many accidents, will not be questioned by any practical mining man. While this introduces no new doctrine in mine timbering, it is strange to observe that many people hold varying opinions in regard to some of the simplest points in timbering.

I am led to make these remarks after listening to a discussion, by the members of a mining class, on the question of setting post timbers. The discussion developed the fact that some of the men present did not believe that special care was required in the setting of a temporary post. They argued that the arrangement was only temporary and would shortly be replaced by something better.

Temporary Posts Require Care in Setting

In order to bring about a thorough understanding of their viewpoint, every effort was made to explain clearly their meaning. Approaching the question from every angle, however, only brought the reply that "A temporary post is only a makeshift, and the taking of special care in its setting is a waste of time."

It is gratifying to know, however, that the greater number of the men present at that meeting were strongly in favor of setting even temporary posts with the same care that would be taken in the standing of permanent timber.

In support of this opinion, it was stated that "the same protection was expected of a temporary post as of a permanent timber, as long as the former was thought to be required." If that was not the case, it was asked, "Why set the temporary posts at all?"

Discussion Always Develops Good Points

A discussion always brings out some good points and this one, incidentally, led to the mention of a specially good piece of entry timbering, by a motorman whose experience caused him to view the subject of timbering from an angle that mostly interested those who, like

himself, had to haul the coal on the main roads and entries in the mine.

This motorman stated that, on two separate occasions, he had learned that it was possible for a wreck to occur where a branch entry joined the main road and cars were broken to pieces, while not a timber was dislodged by the cars thrown against it.

At that point, the two roads were joined by a long curve that made it necessary to set substantial ten-inch posts on each side of the road. Each heavy post was set in a foothold notched into the bottom. With some extra effort, a rounded bowl-like excavation was cut in the roof.

In the setting of each post four soft cap-boards were driven, above the post from the four points of the compass, north, south, east and west, whereby the post was wedged so firmly that the bump of a car from any direction could not dislodge the timber. All present agreed that the plan was a good one, whenever it was possible to cut the roof to the required bowl shape.

Pikeville, Ky. GEORGE EDWARDS.

Inquiries Of General Interest

Effect of Drawing Pillars on Production of Squeeze

Working the Miller or "B" Seam, in Pennsylvania—General Plan of Mine Outlined—Question of Drawing Pillars Discussed with Respect to Causing Squeeze.

IN THIS district, we are working what is known as the "Miller or B seam" of coal. The coal has an average thickness of about 3½ ft. and is overlaid with a fairly strong roof, and has a cover of about 250 ft. The bottom or floor of the seam is soft and wet, but there is no water in the roof. Throughout the district this coal lies fairly level with some local dips and rises.

The general plan of working adopted in our mine is to drive the main headings three abreast. The cross-entries or what we term the "panel entries" are also driven three abreast and are turned at right angles to the main headings. The room headings, however, are driven on the double-entry system and turned at right angles to the panel entries.

The room headings follow the general rise of the seam, as far as this is practicable. The rooms are turned as the headings advance, there being thirty rooms on each pair of headings. These thirty rooms form a panel and the question on which we desire the opinions of *Coal Age* and its practical readers has reference to the best method of working out a panel, in order to avoid as far as possible the occurrence of a squeeze.

In other words, I want to ask for an expression of practical judgment as to whether there will be less liability to develop a squeeze, by delaying the drawing back of the pillars in each panel of thirty rooms, until the panel is complete and the pillars can all be drawn back at the same time.

The system that has been employed quite generally is to draw back the pillars as quickly as the rooms reach the limit. The argument in favor of this plan is that the timbers and tracking in the rooms are then in good condition; but, owing to the soft, wet bottom, they are not liable to maintain this condition for any length of time. The experience of others in this regard will be greatly appreciated. ROBERT HOLT.

Indian Head, Pa.

In order to give the most intelligent answer to this question one should be thoroughly familiar with the conditions in the district, and know the effect of the soft, wet bottom on the life of the timber and tracking. Also, it is of equal importance to know the effect of drawing the pillars, in the locality in question. These effects can only be determined accurately by practical trial. Some mine water is more destructive of timber than others.

Again, the character of the roof formation in a mine will determine its action in hastening a squeeze. The depth of cover, stated in this case as about 250 ft., does not give sufficient information on which to base an opinion regarding the effect of drawing the pillars in the rooms.

The outstanding features of the information before us are the wet, soft bottom underlying the seam and the fairly strong nature of the roof above. Working under a cover of 250 ft. the roof pressure will be sufficient to force the pillars into this soft bottom. The effect will be all the greater with a fireclay floor owing to the water in the bottom swelling the clay. There is sure to be a tendency of the bottom to heave, in that case, and it can only be in part counteracted by increasing the ratio of pillar to opening, particularly when driving rooms.

For example, assuming the rooms are driven on 40-ft. centers, with a width of 24 ft. and 16-ft. pillars between them, there will invariably result a heaving of the bottom, which may be largely or wholly prevented by driving say 16-ft. rooms with 24-ft. pillars between them.

As stated previously this is a chief feature of the proposition here presented and outweighs, in importance, even the question of drawing back the pillars as the several rooms reach the limit, or delaying the work of robbing the pillars, till the panel is complete. Regarding that question alone and assuming the timber and tracking are not injured by the delay, to an extent that will require their being replaced, there will often be an advantage in drawing back the pillars in a panel at one time. Judging from the data afforded, however, we cannot advise this in the present instance.

Finally, taking everything into consideration, we would suggest turning and driving the rooms forward, in regular order, as the room headings are advanced; and drawing back the pillars as quickly as each room reaches the limit. Care should be taken, however, to keep the line of pillar work fairly straight, to prevent an undue pressure on the end of any pillar.

In the effort to avoid any tendency to squeeze or creep, in the working of this seam, the main points to be borne in mind are keeping the roads well drained and maintaining a sufficient ratio of pillar to opening that will reduce the roof pressure to a safe limit. This can only be determined by trial in the district. The aim should be to work out the coal and allow the roof to settle in the waste as quickly as possible. Large standing areas should be particularly avoided and regularity of work is likewise important.

Examination Questions Answered

West Virginia Mine Foremen's and Firebosses' Examination, Charleston, 1922

(Second-Class, Selected Questions)

QUESTION—*Name and describe the different systems of haulage with which you are familiar and state to what conditions each is best adapted?*

ANSWER—The several systems of mine haulage in use are the following: Mule haulage; different types of rope haulage and locomotive haulage. Mule haulage is used on the main roads, only in small mines, and for gathering the cars at the working faces in larger mines, the mule being better adapted for hauling cars under these conditions.

Rope haulage includes the following: (1) Gravity-plane haulage is where the descending loaded cars partly balance the ascending empties and no power is required to operate the system. (2) Engine-plane haulage is employed where it is necessary to haul the loads up an incline or slope, the engine being located either at the top or bottom of the incline. (3) Endless-rope haulage, is used where the cars are hauled in and out of the mine by means of an endless rope, which passes from the winding drum of the engine back to the tail sheave located at the inby parting, in the mine, and thence returning to the engine at the tipple. Both the loaded and the empty cars are attached by suitable grips, at regular intervals, to the rope that runs continuously. (4) Main-and-tail rope haulage is where two ropes are used to haul trips of cars in and out of the mine. The main rope extends from the winding drum of the engine at the tipple back to the inby parting in the mine where it is attached to the head end of the loaded trip. The tail rope, on the other hand, extends from the winding drum of the engine and, after passing over the tail sheave, at the inby parting, is attached to the rear end of the trip. By means of these ropes, alternate loaded and empty trips are hauled out of and into the mine.

Gravity-plane haulage is adapted to moderate inclines over which the loaded cars are lowered. Engine-plane haulage is adapted to steeper inclines and where the loads must be hoisted. Endless-rope haulage is adapted to large outputs of coal in generally flat seams. Tail-rope haulage is better adapted to undulating seams that are generally flat.

Locomotive haulage is adapted to large outputs in generally flat seams and on moderate grades. The locomotives are operated either by compressed air or electricity. An electrical locomotive may be either one of the trolley type that receives its power from the trolley line or storage batteries carried in the locomotive may supply the power, being recharged as required.

QUESTION—*(a) What is the area and perimeter of an airway 9x12 ft., in section? (b) If the volume of air in this airway is 72,960 cu.ft. per min. what is the velocity of the current?*

ANSWER—(a) The sectional area of the airway is $9 \times 12 = 108$ sq.ft.; the perimeter of the airway is $2(9 + 12) = 42$ ft.

(b) The velocity of the air current, in this airway, is $72{,}960 \div 108 = 675.55$ ft. per min.

QUESTION—*(a) Give the area and perimeter of an airway 6x13 ft., in section. (b) If the airway is 7,000 ft. long what is its rubbing surface?*

ANSWER—(a) The sectional area of this airway is $6 \times 13 = 78$ sq.ft.; and perimeter $2(6 + 13) = 38$ ft.

(b) The airway being 7,000 ft. long, its rubbing surface is $7{,}000 \times 38 = 266{,}000$ sq.ft.

QUESTION—*What condition could arise, in a coal mine that is ventilated according to law and employing 102 men, that would necessitate increasing the amount of air in circulation, without increasing the number of men employed?*

ANSWER—The gaseous condition of the mine air may increase to an extent that would require a larger circulation of air, in order to dilute, render harmless and sweep away the gases generated. It is not sufficient to gage the volume of air in circulation by the number of men employed, alone. The quality of the air, as determined by the percentage of oxygen present, must also be considered. The presence of mine fires existing in the gob or waste areas, in a mine, consume the oxygen of the air and increase the quantity required for the ventilation of the workings.

QUESTION—*(a) What are the effects of windy or blownout shots? (b) What precautions would you take to prevent them?*

ANSWER—(a) A windy shot is one where a portion of the powder forming the charge is blown from the hole and exploded in the air, causing a sharp concussion of the air in the mine workings. In that case, an excessive charge of powder was used, the amount being more than that required to break down the coal.

A blownout shot, though producing more or less the same effect in the mine air, differs from a windy shot by blowing its tamping and not breaking down the coal. In this case also, a portion of the powder is exploded on the air producing the same concussion of the air in the workings.

(b) To prevent the occurrence of a windy shot, the excessive use of powder must be avoided. Experience will generally determine the weight of charge required to perform the work desired. Again to prevent the occurrence of a blownout shot it is necessary to locate the charge in such a position in the coal that the line of least resistance, as measured from the charge to the free surface of the coal, is less than the depth of the hole. The charge must be well tamped, and only permissible powder should be used.

QUESTION—*Specify the conditions which must be fulfilled in order to secure good ventilation in a mine.*

ANSWER—In the first place, the quantity of air in circulation must be at least equal to the requirements of the mining law. Secondly, the volume of air entering the mine must be divided into two or more separate splits, as conditions may require. Each air split is made to ventilate a separate section of the mine and returned to the main air-course, without passing into other sections. The velocity of the air at the working face, in each split, must be sufficient to sweep away the gases that would otherwise accumulate therein. The velocity of the air current at the face should not exceed 6 ft. per second and will often be less to insure the comfort of the workers.

How the Coal-Mining Industry in the Saar Basin is Governed

By C. H. S. Tupholme

NO DESCRIPTION or statement on the conditions or control of the coal mines in the Saar area can be appreciated or is complete without reference to the somewhat hectic history of the neighborhood. This is important because the Saar basin has a political and industrial position which is immensely significant both in France and Germany. The basin had always been French until 1815, when, after Napoleon's defeat at Waterloo, it was given to Germany, the French eastern boundary being pushed west to the Alsace-Lorraine line. Much argument centered round this point after the last war and eventually the rich coal area of the Saar was taken over by France.

A somewhat complex administrative situation exists in the Saar basin owing to the existence of the Saar Governing Commission. This commission owes its existence to a ruling of the League of Nations and operates entirely independently of either the French or the German government. It is indeed invested with the entire governmental authority which would otherwise be exerted by the French or German government, until 1935, when the inhabitants will have the opportunity to decide whether they will assume French or German nationality or will continue to be hybrids under the League of Nations.

Contrary to a somewhat popular idea the Saar Governing Commission has very little indeed to do with the actual administration of the coal-mining industry of the Saar Basin. Its influence is evident, however, in matters directly affecting the industry. For instance, the Saar Governing Commission has made itself actively responsible for the erection of working-class dwellings, many of which will be occupied by the coal miners.

Responsibility for the actual operation of the coal mines in the Saar area rests with the French Mining Administration, which, by the Treaty of Versailles, is invested with certain peculiar rights. Thus, though the 75,000 workers are almost entirely of German extraction the French Mining Administration has the right to circulate French currency to any extent it wishes. Consequently all projects undertaken in the Saar area are financed in francs and materials and labor are paid for in French coinage. But, in spite of this, German marks also are in circulation. The result is obvious: All kinds of peculiar economic and political situations have arisen.

Germans Glad to Receive Pay in Francs

Naturally, the German coal miner in the Saar has no objection to being paid in francs. Compared to his brother in the building trade he is very well off, and the deeper the mark goes into the mire, the greater is the satisfaction of the German coal miner who is paid in francs.

This policy of the introduction of the franc as the official basis of currency in the Saar cuts both ways. With the gradual decline in the value of the mark this policy means that the German industrial operator cannot afford to buy Saar coal. Consequently there has been a marked fall in production under the French system of control. Instead of an output of around 15,000,000 tons per annum, which was the output under German administration in 1913, the present production is under 10,000,000 tons, and it is likely to fall still further if no factor enters to counteract the effect of the fall in the value of the mark.

The government of the Saar Basin coal-mining industry by the French Mining Administration may have its drawbacks from the German point of view, but to an unprejudiced observer there is no cause for complaint. The present administration has raised individual output from 500 to 600 kilos per day and the workers in the mines are contented. The industry, in fact, is in a healthy condition and unemployment is practically nil. Moreover, the Saar is immune from the penalties imposed by the Allies on Germany proper. Consequently the Saar miners are in no way contributing toward German reparations and the finances of the district are in an extremely healthy condition. Likewise the Saar coal industry has, so far, escaped the trade and industrial depression of Britain, America and the rest of the world; it is quite content to be left as it is and conduct its financial transactions under French authority through the medium of the franc.

The transference of the Saar coal-mining industry from Germany to the control of the League of Nations was brought about chiefly through the representations of France, who urged that the wanton destruction by Germany of the great coal fields around Lens and the other northern districts entitled her to reparation in kind. Before the war France was compelled to import coal to satisfy her home requirements, and the destruction of her important coal areas involved, judging by pre-war needs, a loss of around 40 per cent of her total output. In fact so convincing was the French argument at the Versailles Conference that had she substantiated a claim for sovereignty over the Saar Basin this important area would undoubtedly have been turned completely over to France.

The normal industrial conditions in France do not warrant the employment of the total possible output of the Saar Basin. This area covers about forty large mines, and it is estimated that the seams hold now about three billion tons of coal. The Saar industries consumed only 30 per cent of the pre-war output so that a very large quantity was available for export. Of the total exportable surplus of 10,000,000 tons, 2,000,000 tons went to France, 1,000,000 to various destinations in Europe, and the balance to Germany.

The French Administration has endeavored to counteract the effect of the depreciation of the mark by procuring for Saar coal favorable railway rates. To some extent this has been successful. The establishment of publicity bureaus in various industrial centers also has aided.

Fewer Mining Accidents in Great Britain, But U. S. Ratio to Output Is Lower

Coal mines of Great Britain employ about a million men each year, or approximately one-third more than the number employed in the United States, according to W. W. Adams, statistician of the U. S. Bureau of Mines. The yearly output of coal is around 300,000,000 tons, less than half the production in the United States. Fatal accidents vary in number from 1,100 to 1,200 per year; in 1920, the latest year available, the number was 1,103. In the United States the fatalities vary from 2,000 to 2,500 per year. In a day's work the British miner produces less than one-third as much coal as the quantity produced by the American miner in the same length of time.

Differences of conditions in the two countries make it difficult to compare the frequency of mine accidents, but accepting the record as it stands, the British accident rate for every 1,000 men employed varies from 1 to 1.30, while in the United States it is from 3.90 to 4.60 each year. The relative number of accidents due to any given cause in the mines of Great Britain is not materially different from that in the United States; that is to say, about half of all fatal accidents in the British mines result from falls of roof, just as in this country. The accident rate, however, in relation to the number of men employed is consistently below the rate in the United States. In Great Britain three miners produce no more coal in a day than one in this country.

It would be difficult to account completely for the lower rate in the British mines, but among the factors to which the lower rate may doubtless be partly attributed are the experience possessed by the miners in Great Britain, many of the men having been bred to the occupation through several generations; the slower speed with which the men work as indicated by the smaller daily output per man; the use of a common language so that safety instructions may be understood; the less extensive use of machinery, only about 13 per cent of the British coal being undercut by machines as compared with over 50 per cent of the bituminous coal produced in this country; greater caution in timbering at the face, and shale dusting of the mines to reduce the probability of explosions. In Great Britain the use of shale dust is required by law.

Shortage of Shipping Facilities Now Chief Factor in Russian Coal Situation

RUSSIA'S chief source of coal always has been the Donetz Basin, which lies just north of the northeastern projection of the Azov Sea. It is situated in the immediate vicinity of the rich iron ore mines of Krivoi-Rog and also happens to be the only source of production, in all Russia, of metallurgical coke. It has large deposits of anthracite, the output of which in 1913 formed 18.9 per cent of its total production and, according to *Commerce Reports* (issued by the U. S. Department of Commerce), was rapidly mounting from year to year.

Next in importance are the mines of the Ural, which likewise produce a small quantity of anthracite, and the Moscow Basin, which, although centrally located, produces only lignite. Mining of the extensive and easily accessible deposits of black coal of the Kuznetsky Basin and Tsheremkovo, in western Siberia, was only begun, more or less intensively, after the outbreak of the war. Of minor importance are the Turkestan fields and those of Borovichi, in the Novgorod Province, where low-grade soft coal is produced.

In 1919 the total production of coal in Russia was 23 per cent of that of 1916, and in 1920 the proportion was 20.5 per cent. The comparison of the 1920 output of the principal mining districts with the output for 1916 shows the lowest ratio, 16 per cent, for the Donetz Basin. The Ural mines came to 62 per cent of their 1916 yield, Siberia gave 63 per cent, Turkestan 82 per cent, and the Moscow district 87 per cent.

According to Bolshevik official periodicals the comparatively high level of output maintained by the Ural district under the present régime is accounted for by the fact that the Tshelyabinsk lignite mines, at present furnishing over one-half of all the Ural coal, consist principally of surface layers, averaging 28 ft. in thickness, and these are being stripped without any attempt at conservation.

In the Moscow region the coal is found in pockets, and the mining industry is scattered among a large number of small concerns, with more or less primitive equipment. The work of these small plants was not affected by the industrial revolution to as great an extent as mines worked on modern intensive lines.

From 86 per cent of Russia's total output in 1914, the Donetz output dropped to 75 per cent in 1918, 64 per cent in 1919, and 55 per cent in 1920. In the first nine months of 1921 its output averaged 60 per cent of the total. The variations of the Donetz output are traced in the appended chart. The figures in the chart represent gross production, from which the consumption of the mines themselves must be deducted. Production figures are shown in millions of poods (62 poods = 1 gross ton).

Soviet Restores Unified Administration

In July, 1921, a marked change in methods was resorted to by the Soviet Government. Although but few mines were restored to private exploitation, a system of centralized and unified administration was restored in the nationalized mines, with unlimited authority placed in the hands of the chief administrator. The managerial staff and the experts were afforded a liberal remuneration for their services and a proportionate bonus on the tonnage output. Above all, the system of equalized wage payment, in the form chiefly of uniform rations, was discarded and a graduated system of direct output pay, on a sliding scale, introduced in its stead for all hands. The effect of the new

COAL PRODUCTION IN THE DONETZ BASIN



economic system was important and is worthy of some detail, as shown in the following table:

PRODUCTION OF COAL IN DONETZ BASIN AND NUMBER OF LABORERS EMPLOYED IN MINES, JULY-DECEMBER, 1921.

Months	Production in thousands of poods.(a) Black coal	Anthracite	Total	Net	Men employed Hewers	Total
July	9,600	(a)	9,600	500	(b)	107,500
August	9,300	2,000	11,300	3,290	9,000	107,140
September	15,280	3,100	18,380	9,910	9,340	93,640
October	25,600	9,400	35,000	24,700	11,700	97,200
November	29,500	13,500	43,000	24,600	12,900	106,000
December	35,920	17,130	53,050	34,050	14,660	116,300

(a) Sixty-two poods = 1 gross ton. (b) Not reported.

A decline in output, however, occurred in January, the gross production, which had been 53,000,000 poods in December, falling to 38,000,000 poods.

The increase in the production of anthracite during the latter part of 1921 is noteworthy. It formed about 32 per cent of the December production. The percentage of anthracite output to the total coal production of the Donetz Basin during the latter part of the year was: August, 18 per cent; September, 18 per cent; October, 28 per cent; November, 31 per cent; December, 32 per cent.

Additional light is thrown on the above figures of the net output by the fact that 700 coal pits were worked in July, while in November the production was concentrated in 281 pits, with 49 more pits slated for shutdown as soon as available supplies were exhausted. This concentration of work in the best equipped pits was dictated not alone by the scarcity of skilled labor but by the acute shortage of mine props and beams, coal-cutting machines, electric armatures and steel.

Output Per Man Still Below Pre-war Level

The per capita productivity of labor in general, both surface and underground, while greatly increased under the stimulus of the output pay (from 81 poods per month in July to 450 poods in November), still runs far below the pre-war level of 750 poods per month. The proportion of coal hewers to the total personnel was 25 per cent before the war. It was only 8 per cent in August, 1921, but rose to 12 per cent in November.

An important factor in the coal situation at present is the shortage of shipping facilities. Coal is piling up in the Donetz Basin—only 13,700,000 poods were shipped out in October, the November shipments were 16,000,000 poods, and the December shipments about the same. The stocks on hand on Dec. 1, 1921, amounted to 78,600,000 poods—23,400,000 poods of bituminous coal and 55,200,000 poods of anthracite. On Jan. 1, 1922, stocks on hand were 98,200,000 poods—33,100,000 poods of soft coal and 65,100,000 poods of anthracite.

The total output of coal from the Russian fields increased from 1,947,000,000 poods in 1914 to 2,101,000,000 in 1916, since which time, however, there has been a steady decline.

TOTAL PRODUCTION OF RUSSIAN COAL FIELDS

(Millions of Poods)

Districts	1914	1916	1917	1918	1919	1920	First Nine Months of 1921
Donetz Basin	1,684	1,752	1,516	537	325	278	196.8
Ural district	84	92	98	37	44	57	45.12
Moscow district	18	42	45	23	22	37	31.18
Turkestan and Caucasus	13	15	13	6	11	10	(a)4.67
Borovichi	....	....	....	....	....	2	0.67
Eastern Siberia	88	118	113	53	33	30	....
Western Siberia	60	82	94	56	51	52	49.8
Totals	(b)1,947	2,101	1,879	712	486	(c)466	328.24

(a) January to October, inclusive.
(b) Exclusive of Dombrova (Poland) mines, lost by Russia in 1914.
(c) The total for 1920 was reported to mining conference at under 431,700,000 poods (Economic Life No. 287, 1920.

Total production during the first quarter of 1921 was 114,900,000 poods and rose to 141,300,000 poods during the second quarter; in the third quarter, however, the production fell to 72,000,000 poods. The output of the Donetz Basin was principally responsible for this heavy fluctuation, rising from 72,000,000 poods in the first quarter to 85,000,000 poods in the second quarter and declining to 39,000,000 poods in the third quarter.

Owing principally to lack of transport, the stocks of coal in the Donetz Basin were accumulating rapidly—from 790,000 long tons in October, 1921, to 2,000,000 tons on April 1, 1922, representing between 200 and 300 per cent of monthly output as against 10 to 15 per cent in pre-war times. The average monthly output from the Basin for the first quarter was 642,000 tons, as against 855,000 tons in December, and a monthly average in 1916 of 2,355,000 tons. Because of the scarcity of bread, miners were leaving the district. The number of men employed in state-worked mines declined from 118,690 in January (including 14,980 coal hewers) to 94,460 in March (including 10,442 hewers).

Production has been fluctuating from month to month, but on the whole the output of state-worked mines has been receding from the high-water mark set in December, 1921—855,000 gross tons. In May the smaller leased outfits passed under control of the Central Coal Administration of the Donetz Basin.

The total gross production at the state mines of the Donetz for the first seven months of 1922 was as follows: January, 645,160 tons; February, 653,230 tons; March, 637,100 tons; April, 424,190 tons; May, 443,550 tons; June, 512,900 tons; and July, 361,400 tons.

The steady decline in the output of coal is attributed chiefly to the exhaustion of funds and supplies in kind for payment of wages, and consequent migration of skilled labor. The proportion of skilled coal breakers to the rest of the man power in the Donetz Basin declined from 13 per cent of the total number of mine workers in January, 1922, to 9.7 per cent in June, last.

How Many Working Days in a Year?

OF THE 365 days in the year, 52 are Sundays and 7 usually are celebrated as holidays. This leaves a working year of approximately 306 days. The average number of days per year worked in the anthracite collieries during the past ten years amounted, however, to only 260. Thus, out of the possible working time, an average of 46 days annually were lost. A report on idle time prepared by one of the coal companies as the result of study of this problem in its own collieries in the Southern field is pertinent.

During the year 1921 a total of 31½ days were lost, exclusive of Sundays. This lost time is accounted for as follows: The colliery was closed on 7 national holidays; there were 10 days of religious celebrations at various times throughout the year; April 1 is a holiday among the United Mine Workers generally, in commemoration of the granting of the eight-hour day in the soft-coal region. Mitchell Day, Oct. 29, also is celebrated by the mine workers as a holiday. Strikes closed the collieries on two days, due in one case to the appearance of non-union workers in the mines and in the other case to a complaint against retail prices charged employees for their coal. A further loss of 3½ days was occasioned by miscellaneous causes, namely, a snowstorm, a Russian and Polish picnic, Old Home Week celebration, and Election Day. Out of the 31½ days lost, the remaining 7 days of suspension were due to market conditions.

Saints' days and holidays generally mean two days' absence instead of one for foreign workers, according to those familiar with the habits of the people, as such times are occasions for long celebration and feasting. Often, also, the work of the collieries has been crippled to the extent of a day's shutdown when the entire mining force has quit work to attend the funeral of a fellow worker. So many times did this happen at one colliery that an agreement with the grievance committee of the mine workers was reached whereby a delegation was to be sent from the colliery at the expense of the company while the other employees remained at work. In another instance the company paid $150 additional compensation to deceased miners' families in lieu of attendance of former co-workers at the funeral.

COAL AGE INDEX

The indexes to COAL AGE are furnished free to all who ask for them. The index for the last half of 1922 will soon be ready for distribution. A copy can be had by addressing a postcard to the subscription department of COAL AGE.

Coal Commission Plans Study of Coal Storage; Believes Mine Storage Advantageous

By Paul Wooton
Washington Correspondent of *Coal Age*

The President's Coal Commission may take credit for a great diplomatic victory. At the New York meeting the operators and the mine workers, in agreeing to maintain the status quo for one year, did exactly what the commission requested them to do, although it has been revealed since that the commission was prepared to advocate an extension of the existing agreement for two years. Chairman Hammond explained that the commission, on considering all phases of the situation, had reached the conclusion that a two-year agreement would be better than one, since it would allow time for Congress to translate into legislation any recommendations that the commission might make before it would be necessary to reopen wage negotiations. Since only a one-year agreement has been reached, the commission will try to speed up its work so as to have its conclusions in final form at an earlier date than had been expected, thereby making available its recommendation in time for public opinion to crystallize and still give Congress an opportunity to act before April 1, 1924.

Some may contend that the commission in interposing itself into the wage negotiations was playing with fire, but that it had the good fortune to escape burning. Whether or not it simply is a matter of good fortune, it is evident that the public gives the commission credit for having prevented a strike on April 1 and the joint conference of mine workers and operators in its communication sent to the President, the Attorney General and to the commission declared that the action was taken upon the "urge" of the commission.

Had the operators or the mine workers been disposed to do so, they could not have been blamed had they called on the commission for advice as to the legality of an agreement. Other questions might have occurred to them which well might have resulted in an embarrassing situation for the commission. By sheer good fortune this did not happen, and as a result the Coal Commission suddenly has attained an enviable standing in the public esteem. This prestige is expected to increase greatly its power for usefulness.

While some embarrassment might have been entailed in ruling concretely on the legality of such an agreement, it is apparent that the commission regards such an agreement as was reached in New York as violative of the Sherman law in no particular. Had the commission entertained any such doubt, it would not have urged the conferees to reach an agreement. At any rate, Chairman Hammond believes that any danger of indictment is precluded by the fact that the action was taken at the direct request of the commission. In that connection, however, he called attention to the fact that the commission has no power to set aside a law or to give anyone an immunity bath.

The commission seems to have been able to discard the Jonah which has so persistently followed others who have attempted coal mediation. The late F. S. Peabody and the late Franklin K. Lane, flushed with what they thought was a wonderful achievement, were spectacularly humiliated by the war administration in their efforts to compose a bad situation in coal. Fuel Administrator Garfield became the goat of the combination of adverse circumstances.

The Federal Trade Commission tried taking a hand in coal affairs and became involved in a famous quarrel, resulting in its powers being denied by the courts. The Robinson commission gave a big increase in wages to the miners and was grilled by the operators and even by the mine workers. Vacation strikes followed the anthracite ruling in 1920.

Secretary Hoover negotiated a voluntary agreement, without powers or money, which saved the consumers of coal many millions. As a result, he was assailed as abetting profiteers and did not even have the satisfaction of receiving a single expression of thanks from the consumers, whom he benefited so greatly. Fuel Distributor Spencer was criticized bitterly because he could not repeat the miracle of the loaves and the fishes and make twenty cars of coal out of one. The Interstate Commerce Commission has had troubles galore as a result of its priority orders.

In spite of the bad luck which has pursued everyone who has touched coal, it has remained for John Hays Hammond and his associates, all but two of whom are admittedly amateurs so far as any highly specialized knowledge of the coal industry goes, to draw commendations where equally earnest efforts before have drawn only criticism. In discussing the situation after the New York agreement, Chairman Hammond said that one of the immediate results in the public interest would be a decline in coal prices. Had uncertainty as to the outcome of the negotiations continued until in March, much higher prices would have prevailed, he believes.

Mr. Hammond made it clear that the commission is of the opinion that the railroads could contribute greatly to the public good by storing the maximum possible proportion of their requirements during the period of open-top car surplus. From the trend of his remarks, it is apparent that the commission has little patience with the practice of the railroads in commandeering coal. Apparently the commission has in mind a recommendation that no coal be commandeered without permission of the Interstate Commerce Commission, and even then settlement must be made upon the basis of damage done the consignee, when such damage follows confiscation.

Would Encourage Tidewater Movement

Mr. Hammond's remarks also indicate that the commission is attaching great importance to the whole matter of storage, including certain limited storage at the mine, which will give greater flexibility to operation. Another remedial proposition to which the commission attaches importance was revealed to be special inducements to encourage tidewater movement during the period of car plenitude.

The commission had planned to begin public hearings during the latter part of January. It has been found in the informal conference, however, that much more progress is made when the commission has facts at hand with which to check expression made to it by those appearing. For that reason public hearings will be delayed until the fact-finding activities have progressed further. This will tend to prevent speculation on the part of witnesses and will furnish a concrete basis for expressions of opinion.

Among the things which the commission has in mind for early study is the matter of absenteeism, the check-off and the relative advantages and disadvantages of unionized and open-shop operation of mines. More attention now is to be turned to the anthracite situation. Before the time comes for signing the new agreement in the anthracite field, Mr. Hammond promises complete data for the guidance of the conferees. Among the things which the commission expects to study exhaustively is the matter of royalty charges on anthracite lands.

The commission has no intention of considering the advisability of prohibiting anthracite exports. It regards this as falling squarely within the jurisdiction of the Federal Fuel Distributor. In that connection it may be mentioned that the agitation in Congress on the part of certain New England legislators for the cutting off of anthracite shipments to Canada is getting nowhere. An effort to obtain even a committee hearing on the subject has been denied. If the anthracite exported, Secretary Hoover points out, were translated into the power it represents, it would be found that Canada is giving us as much electric power as is represented by anthracite exports. In addition, the Northwest uses some British Columbia coal.

Form Coal Mining Institute at Johnstown To Prevent Mine Accidents

With the primary object of accident prevention in coal mines, nineteen leading coal operators and others interested in accident prevention met in Johnstown, Pa., last week and formed an organization to be known as the Pennsylvania Coal Mining Institute of Johnstown. The institute promises to develop into an important factor in the industrial activities of central Pennsylvania.

D. L. Boyle, general superintendent of the Penelec mines, was elected president; W. A. Swift, of the coal-mine section of the Pennsylvania compensation rating and inspection bureau, vice-president; William Fleming, mine foreman for the Tunnelton Coal Co., of Ferndale, secretary, and Vincent Stanton, of the Mine Safety Appliance Co., of Pittsburgh, treasurer.

Following the election, President Boyle appointed the following committee as a board of directors: Charles Frederick, Pat Fraer, Vincent Stanton, W. E. Martin, J. G. Jones, John Reed, James T. Gatehouse and Ray Joseph. A constitution and by-laws will be formulated by the following committee appointed by President Boyle: J. G. Jones, John Reed, Pat Fraer, Charles Frederick, Vincent Stanton, William Fleming, T. J. Davies, W. A. Swift and D. L. Boyle. It was decided that the nineteen men present be recorded as the charter members of the institute, as well as those who attend the second meeting, which will be held in Johnstown on Feb. 16. With no like institution nearer the central Pennsylvania field than Pittsburgh, the organizers look for big things through the new organization.

Pennsylvania Coal & Coke Corporation to Distribute 40-Per Cent Stock Dividend

A 40-per cent stock dividend was declared Jan. 26 by directors of the Pennsylvania Coal & Coke Corporation, payable to holders of record Feb. 3, 1923. The par value of the stock remains as at present, $50 a share. In addition, the board declared a cash dividend of $1 a share, payable Feb. 10, 1923, to stock of record Feb. 3. The cash dividend will be paid upon both the present and outstanding capital stock and on the additional stock to be issued as a stock dividend.

Several changes in the personnel of the company also were announced. John H. Lang and C. H. Memory resigned from the board, and Fairfax S. Landstreet, Joseph P. Ripley, George H. Walker and C. Law Watkins were added to the board. Fairfax S. Landstreet was elected chairman of directors. Messrs. Landstreet, Walker, Watkins and J. W. Searles were chosen for the executive committee.

Explosives Sales, January-November, 1922 Exceed Those of Preceding Year

Sales of explosives in the United States during November, reported to the U. S. Bureau of Mines by manufacturers representing about 90 per cent of the industry, amounted to 715,144 kegs of black blasting powder, 4,615,944 lb. of permissible explosives, and 17,574,902 lb. of other high explosives.

Sales of black powder represent a gain of 36 per cent over the record for November last year. During the eleven months from January to November, inclusive, 5,440,487 kegs of black powder were sold for use in the United States. This was practically the same as the quantity sold during the first eleven months of 1921, but it represents a loss of 45 per cent from the corresponding months of 1920. The coal-mining industry used 84.6 per cent of the black powder sold during the eleven-month period of 1922.

Sales of "permissibles" represented an increase of 42 per cent over November, 1921. The total quantity sold during the first eleven months was 34,404 321 lb., an increase of about 2 per cent over the corresponding months of 1921 and a reduction of 30 per cent from the eleven-month period of 1920.

The November sales of high explosives other than "permissibles" were 49 per cent more than the sales reported for November last year. During the first eleven months of 1922 sales of high explosives totaled 166,090,464 lb., an increase of 18 per cent from the eleven-month record for 1921, but a reduction of 16 per cent from the corresponding months of 1920. Coal-mining operations used 11.5 per cent of the high explosives sold from January to November, 1922.

Lists State Laws on Coal-Cutting Machines

Coal-cutting machines, according to a recent tabulation of the U. S. Bureau of Mines, are in use in 3,895 mines in the United States. These mines have in use 20,034 machines, 17,875 being operated by electric motors and the remainder by compressed-air motors. On account of the wide use of coal-cutting machines, many states have issued regulations as to their operation and as to safety precautions that should be observed, especially in gaseous mines. A compilation of rules and regulations issued by different states covering coal-cutting machines or trailing cables used with them is given in Serial 2419, "Regulations Safeguarding Coal-Cutting Machines," which may be obtained from the U. S. Bureau of Mines, Washington, D. C.

Retail Food Prices Up 1 Per Cent

There was an increase of 1 per cent in the retail cost of food to the average family in December as compared with November, according to the retail food index issued by the U. S. Department of Labor, through the Bureau of Labor Statistics. The index numbers based on 1913 as 100, were 145 in November, and 147 in December, 1922.

During the month from Nov. 15, 1922, to Dec. 15, 1922, 19 articles on which monthly prices are obtained decreased in price, while eighteen articles increased in price.

For the year period Dec. 15, 1921, to Dec. 15, 1922, the decrease in all articles of food combined was 2 per cent. For the 9-year period Dec. 15, 1913, to Dec. 15, 1922, the increase in all articles of food combined was 41 per cent.

Between Nov. 15, 1922, and Dec. 15, 1922, the average family expenditure for food increased in 41 cities. In eight cities there were decreases, while two cities showed no change over the preceding month.

For the year period Dec. 15, 1921, to Dec. 15, 1922, 44 of the 51 cities showed decreases. There was an increase shown in 7 cities.

Class 1 Railroads Consume 9,260,000 Tons Of Coal in October, at $4.27 per Ton

Class 1 railroads consumed 9,260,000 net tons of coal during October, 1922, as charged to account 394, compared with 8,654,000 tons in October last year, according to a report of the Bureau of Statistics of the Interstate Commerce Commission covering 177 steam roads. For the first ten months of 1922 these roads consumed 76,036,000 tons as compared with 75,873,000 tons during the corresponding period in 1921.

The delivered cost per ton in October was $4.27 or 56c. above that for October, 1921. The per-ton cost for the year to Oct. 31, however, was only $3.98, as compared with $4.19 during the corresponding period of 1921.

Fuel-oil consumption continues to gain. During October 154,638,000 gallons were used, as compared with 133,310,000 gallons in October, 1921. The figures for the first ten months of 1922 and of 1921 were 1,251,925,000 and 1,176,-251,000 gallons respectively.

GREAT THINGS ARE EXPECTED when farmers and labor unions get together. (The accent goes on "when.")—*Philadelphia Evening Public Ledger.*

THE NEXT THING these union leaders will be doing is pointing to the dictionary to prove that wages must be hire. —*Manila Bulletin.*

Ellis Searlés Attacks Mine-Nationalization Plan as Work of "Greenwich Village Coal Miners"

Charging that "Greenwich Village coal miners" were largely responsible for the so-called nationalization plan recently published in pamphlet form by a committee of the United Mine Workers headed by John Brophy, Ellis Searles, editor of the *United Mine Workers' Journal,* issued a statement on Monday, Jan. 29, asserting that the plan was not the plan of the organization but merely the views of the members of the committee. The committee, according to Mr. Searles, was appointed to submit a report to the convention of the United Mine Workers next January. Instead of doing so, the plan was made public prematurely, he declared, at a meeting of radicals in New York City, and published as a booklet entitled "How to Run Coal."

Following the issuance of Mr. Searles' statement, C. J. Golden, of Shamokin, Pa., president of District No. 9 of the United Mine Workers of America, a member of the committee, made public a statement defending the report and at the same time gave out for publication a letter dated Jan. 27, addressed to John L. Lewis, International president of the miners' union, in which he says he was surprised when informed that it was not within the duties of the Nationalization Research Committee to give publicity to the findings of that body and also resigns as a member of that committee.

Mr. Searles' statement which resulted in the controversy follows:

"There appears to be a misunderstanding on the part of newspapers and the public in regard to the plan for the nationalization of coal mines, which was announced at a recent meeting held in New York. Apparently there is a general understanding that the plan is, in fact, the plan of the United Mine Workers of America. This is not correct. The plan as set forth at that meeting by a committee of the miners' union is the plan only of the members of that committee. The report of the committee has not yet been presented to the national convention of the United Mine Workers of America for consideration. What action the convention next January may take on the subject is, of course, unknown. The national convention held in 1921 adopted a resolution indorsing the principle of nationalization of mines and created a committee to study the question with a view to the preparation of a practical and workable plan. But the convention did not commit the union to any particular form or plan of nationalization.

Says Plan Was Proposed at Meeting of Radicals

"Unfortunately, the plan proposed by the committee was prematurely made public at a radical meeting in New York, and this fact has caused the public to believe that the United Mine Workers of America is committed to the particular plan set out in the report. The fact is the outline submitted by the committee was merely a tentative proposition and the committee has not claimed that it is a definite declaration by the union. We are informed that it was, in part, prepared for the committee by some well-known New York radicals who have no connection whatever with the coal-mining industry. While the report may, perhaps, represent the views of these Greenwich Village coal miners, the public should not accept it as a proposal of the United Mine Workers of America unless and until it has been officially affirmed and adopted by the national convention which will be held next January."

Defending the action of the committee in making public the report of the committee, Mr. Golden reported that the "Greenwich Village reds are the same people" who are the "most progressive friends the United Mine Workers have." Mr. Golden, in his statement, says in part:

"I have read the attack by Mr. Searles in which he openly condemns the League for Industrial Democracy, the Nationalization Research Committee and the proposed plan for nationalization of the coal mines made public by the committee as a basis of intelligent discussion.

"Mr. Searles is not a member of the United Mine Workers, knows practically nothing about the mining industry, has not the least conception of what the miners of the country want. He does not remember that four years ago by unanimous vote in the Mine Workers' convention the officers of the Mine Workers were instructed to draft a bill and present it to the United States Congress demanding public ownership of the mines.

"The people of whom he speaks as Greenwich Village reds are the same people who are doing and have done so much for the striking miners throughout our jurisdiction and the most progressive friends the United Mine Workers have.

"It is my opinion by the next convention the United Mine Workers will have smoked out all of the weaklings who have been voting year after year for the idea of nationalization and have no intention of carrying it out to its logical conclusion.

"There is no doubt in my mind that Mr. Searles will get the unanimous applause of the coal operators of the United States and the coal operators should feel proud that they have a champion at the head of the *United Mine Workers' Journal.*"

Mr. Golden's letter to Mr. Lewis says that he was glad to receive his appointment to the Nationalization Research Committee "because your instructions, as I understood them, were entirely in accord with my views as to what this committee ought to do."

After quoting from Mr. Lewis' letter dated Oct. 7, 1921, that "the duties of your committee will be to carry out the instructions of the International convention with reference to this subject matter and to familiarize yourself with the various phases of the problem as they may be encountered, with a view of formulating a detailed practical policy to bring about the nationalization of the coal mines and to aid in the dissemination of information among *our members* and the *public* and the crystallization of sentiment for the attainment of such end," Mr. Golden continues:

Actions Based on Instructions, Says Golden

"Since the receipt of your letter in October, 1921, I have, in co-operation with the other members of the committee, proceeded, upon the basis of these instructions, to carry out the instructions on the subject matter and familiarize myself with various phases of the problem as they may be encountered, with a view to formulating a detailed practical policy to bring about nationalization of the coal mines and to aid in the dissemination of information among our members and the public and the crystallization of sentiment for the attainment of such end.

"Consequently I was very much surprised when, during a recent conference between the International officers and the Nationalization Research Committee, you informed us that in your opinion it was not within the duties of the Nationalization Research Committee to give publicity to the findings of that committee, either within or without the organization, until such findings had been presented to the International convention, even denying the use of the *United Mine Workers' Journal* that we might at least keep the rank and file of our organization in touch with the work of committee.

"I regret very much that this interpretation of your instructions to the committee should come so late—after the committee off and on for the past fifteen months of research work had given the widest publicity upon the understanding stated. Had I understood your letter to mean that membership on the Nationalization Research Committee precluded all discussion or public statements concerning the subject of its research until such time as it could report to a convention, I could not possibly have accepted your appointment. My interest in the subject of nationalization of the coal mines is so keen, my feeling in the matter so deep that

I want every member of the organization to think about it and I want to keep it constantly in the public mind.

"Not only would it be impossible for me to serve in this limited capacity but I find it undesirable to go on under these hamstrung and censored conditions until the convening of the International convention in January, 1924. The only course open to me, therefore, is to tender my resignation from membership upon the Nationalization Research Committee, effective immediately. I am very sorry that this difference of opinion has compelled me to take such action and trust that conduct of the work of the committee to date in no way embarrassed the organization."

Heber Blankenhorn, of the Bureau of Industrial Research, defended the part taken by that organization in the work of the committee by saying that the members of the Bureau of Industrial Research, when requested, were quite willing to furnish to the Nationalization Research Committee of the United Mine Workers such data and analyses as were necessstry for any scientific approach to the problems of a nationalization policy. The committee availed itself of data from other research organizations and from government officials and altogether went at their task in a manner which any open-minded man should applaud.

The committee's requests were informal, Mr. Blankenhorn said, and the data were given, of course, without payment. Likewise informal, he said, were the requests made by officials of the Mine Workers to members of the Bureau last summer asking that they help raise relief for needy strikers. Members of the Bureau, who believed the workers in the old non-union fields were justified in striking, co-operated, as requested, with friends and acquaintances in raising $55,000 in cash donations or loans sent to officials of the United Mine Workers for the strikers in Somerset.

Brookhart Bill Provides for Government Operation of Mines in Emergency

A bill providing for government operation of coal mines during any period of emergency has been introduced in the Senate by Senator Brookhart, of Iowa. The bill authorizes the President to declare when an emergency exists and "to take over the possession, use, control and operation of any mine for such emergency period." The bill goes into some detail as to how "just compensation" is to be awarded the owner and provides penalties for any operator who obstructs inspection of the property or the record or mishandles funds during the period of federal control. Opinion at the Capitol is that the measure will not be taken up for serious consideration and that it has no chance of passage.

The measure provides "that whenever the President finds that an emergency exists because the supply of coal available for national needs is so inadequate as to obstruct or threaten to obstruct the operation of the Government of the United States and of its several departments, the transportation of the mails, the operation and efficiency of the army and navy, the operation of carriers engaged in commerce among the several states and with foreign countries and the orderly flow of such commerce, he is authorized . . . to take over the possession, use, control and operation of any mine for such emergency period or part thereof as he deems advisable.

"Any operator whose mine is under federal control shall be paid from time to time a just compensation for the possession, use, control, and operation of such mine during the period such mine is under federal control, but such just compensation shall not exceed the amount of the net earnings for such period. The President shall fix or cause the commission to fix the amount of such just compensation. . . .

"The President is authorized to carry out agreements entered into prior to federal control between operators and third persons for the purchase or delivery of coal, in so far as such agreements do not unreasonably interfere with the purposes of federal control.

"In order effectually to administer the provisions of this Act, the President may (a) exercise any of the functions vested in him by this Act through such agencies as he may determine, (b) prescribe regulations and issue orders, (c) provide for the maintenance, repair, and alteration of all mines under federal control, (d) employ and fix the compensation of officers and employees necessary to operate any mine under federal control, and (e) authorize such expenditures as he deems necessary properly to exercise all such functions vested in him by this Act.

"Upon recommendation by the President, the Interstate Commerce Commission is authorized to issue such orders for embargoes and priorities in car service, and to take such other suitable measures as will facilitate the transportation and the equitable distribution of coal, and as will best meet the emergency. . . ."

Indianapolis Case Still Lies Under Dust

"There is nothing I can say in regard to the case," L. Ert Slack, Indianapolis, assistant to the Attorney General, said recently with reference to the indictments pending in the federal court against bituminous-coal operators and miners charged with conspiracy to violate the Sherman anti-trust law. Mr. Slack, who has charge of the prosecution of the case under the direction of Attorney General Harry M. Daugherty, was asked about the disposition of the cases, in view of reports from New York that operators in conference with miners have indicated that the Indiana conspiracy case stands in the way of a wage agreement affecting the Central Competitive Field. The indictments were returned by the federal grand jury in March, 1921. The case was vigorously pressed before the grand jury and later before courts in other states where removal proceedings were instituted. About a year ago when final arguments were to be made by Mr. Slack in one or two removal proceedings, he received instructions from the Attorney General to cease activity pending further directions.

Evidence collected by the government largely was in documentary form taken from proceedings of joint conferences and union conventions. At a hearing before Judge A. B. Anderson of the district court, involving the manner in which Attorney General A. Mitchell Palmer had directed the prosecution of the case, evidence was introduced to show that he had sought to delay the trial. This attitude of the Attorney General was responsible for the resignation of Dan W. Simms, of Lafayette, as an assistant district attorney having a part in the prosecution of the cases. Meanwhile the records in the case have accumulated dust in Mr. Slack's office at the Federal Building. Those who were instrumental in developing the evidence say that weeks now would be required to become acquainted again with the evidence so that it could be presented properly at a trial.

Borah Wants Judge Alschuler to Qualify

Elimination from the bill to amend the act creating the United States Coal Commission of a provision designed to permit Judge Samuel Alschuler to qualify as a member of that body is not satisfactory to Senator Borah, chairman of the Senate Committee on Education and Labor, which is handling this legislation in the upper branch of Congress.

When his attention was called to the fact that the House Committee on Interstate and Foreign Commerce had reported the bill with this provision stricken out, Senator Borah declared that he would use his "full influence" with the members of the Senate committee to have it restored.

"All the information I have received indicates that Judge Alschuler is one of the most valuable members of the commission," Senator Borah said. "He has had several months' experience with the commission's work, and to force him to retire at this stage of the proceedings would be wasteful indeed. I do not agree with the expressed views of some members of the House committee that a federal judge should not be a member of this commission."

The bill is on the unanimous consent calender of the House and probably will be reached in its order by Feb. 14. Chairman Winslow, of the House Interstate Commerce Committee, stated that if indications are that the measure cannot be reached by that date he will ask for a special rule for consideration out of order.

Joint Conference Letter to President Reaffirms Wage-Scale Contracts

Following the joint conference between operators from Illinois, Indiana and eastern Ohio and the United Mine Workers in New York, Jan. 18-23, 1923, the following letter, dated New York, Jan. 24, was sent to the U. S. Coal Commission at Washington:

"Acting upon the urge of the United States Coal Commission advanced in the interest of the common welfare as set forth in a message dated Jan. 4, 1923, and addressed by the commission 'to the Operators and Miners Committee on Reorganization,' then meeting in Chicago, Ill. . . . This Joint Conference of miners and operators of Illinois, Indiana and Ohio, as now constituted, hereby reaffirms the wage-scale contracts now existing between the United Mine Workers of America and the coal operators whose interests are represented in this conference, and hereby extends the same for a period of one year from April 1, 1923, in all of their terms, provisions and conditions, and directs the chairman of this joint conference to mail a copy of this resolution to the President of the United States, to the Attorney General and to the United States Coal Commission, that these public authorities may be duly apprised of this action.

For the Operators:	For the Miners:
Rice Miller,	Lee Hall,
N. C. Perry,	G. W. Savage,
P. H. Penna,	John Hessler,
M. Gould,	Wm. Mitch,
S. H. Robbins,	Frank Farrington,
W. H. Haskins.	Harry Fishwick.

Officers of the Joint Conference:	International Officers of the United Mine Workers of America:
Michael Gallagher, Chairman;	John L. Lewis, President;
Wm. Green, Secretary;	Philip Murray, Vice-President
W. L. Robinson, Ass't Sec'y.	Wm. Green, Sec'y-Treas.

Alex is in Again!

It has always been bone dry in Kansas. That makes it more difficult to understand Alex Howat. Kansan though he has been for years, he's a natural-born tender of bars. He's behind 'em again! Conductor Finnegan who made that pithy and classic report to railroad headquarters has nothing on Howat. Alex, in his experiences with the prison bars of Kansas has been "Off-agin-on-agin" so many times it must be going to his head at last, case-hardened bar hound though he is.

His first case was with John L. Lewis, who kicked him out of the miners' union for calling an outlaw strike. His second case was with the Industrial Court of Kansas, which kicked him into jail for the same deed—kicked him into two jails, in fact, one after another. Last spring he walked out of the first one—Cherokee County Jail—on an appeal. He walked as far as the outer jail office, to be exact—when, whuff! Crawford County snatched him across the line into its own jail for violation of an injunction against that strike he had called. He stayed there for 266 days of his 365-day term. Then came 1923, bringing Governor Davis into the Kansas Capitol. A Davis judge released Howat on parole Jan. 20.

"In some ways I'm sorry to leave jail," Howat remarked as he walked out. He got clear outdoors this time. Cherokee County, with 56 days' imprisonment awaiting him, couldn't stand the thought of Alex being out in the cold that way. So it "retch out and fotch him in," as they say. On Jan. 26 a judge of the Cherokee County District Court issued a bench warrant ordering Alex into that county's jail Jan. 30 to finish his first term. So there he is.

But that isn't all. Alex still has 99 days coming to him back there in the Crawford County jail, whence he exuded on parole Jan. 20. The trouble is, the Kansas Attorney General declares the parole is not valid. Even though Governor Davis thinks the Industrial Court, which Howat offended, is nothing but a bag of gas and the law creating that court is unconstitutional, and even though the Davis-appointed judge freed Alex, the Attorney General says Alex must go back for those 99 days plus. The "plus" indicates still another term in the Crawford County jail over and above the 99 days. In the sentence which sent him to Crawford County it was provided that if Alex wasn't willing to testify before the Kansas Industrial Court when his year in jail for contempt was ended, then Alex should stay right in jail until he was willing.

And so it's "out-agin-in-agin" but not "gone agin" for Alex, the deposed president of Kansas union miners. If he goes back to Crawford County to 'tend bars there until he is willing to tell the Kansas Industrial Court about that strike—now almost forgotten—he may 'tend bars the rest of his natural life. Alex is no Barkis.

Bituminous-Coal Mines Shut Down Between Aug. 7 and Oct. 21, 1922

The extent to which bituminous-coal mines that report weekly to the Geological Survey were shut down during the last three weeks of the coal strike of 1922, and in the weeks immediately following is shown in the appended table, compiled by the U. S. Bureau of Labor Statistics from Survey records. Only commercial mines of some size are included, which in normal times represent from 55 to 60 per cent of the total mine capacity. Although the plants reporting are not completely identical each week, the figures probably present a fairly accurate picture of the trend of operating time.

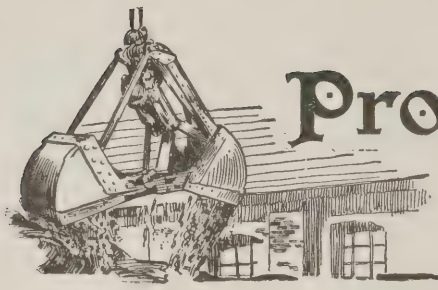
WEEKLY OPERATING TIME AT CERTAIN BITUMINOUS COAL MINES, AUG. 7 TO OCT. 21, 1922.*

Week Ended	Total Number Reporting	Mines Shut Down: Entire week	5 days and less than 6	4 days and less than 5	3 days and less than 4	2 days and less than 3	1 day and less than 2	Less than 1 day	Mines Operated Full Time
		Number							
Aug. 12	1,203	231	60	236	228	132	99	61	156
Aug. 19	1,166	260	52	169	162	143	98	90	192
Aug. 26	1,603	184	81	310	306	229	181	107	205
Sept. 2	1,864	150	109	318	297	322	239	180	249
Sept. 9	2,029	138	121	469	438	278	216	227	89
Sept. 16	1,982	109	157	418	441	278	208	149	222
Sept. 23	2,154	99	213	551	461	293	223	148	166
Sept. 30	2,199	82	221	628	480	317	180	141	150
Oct. 7	2,216	96	233	691	458	317	171	122	128
Oct. 14	2,143	66	198	640	574	265	159	107	134
Oct. 21	2,249	97	200	722	526	275	158	136	135
				Per Cent					
Aug. 12	100.0	19.2	5.0	19.6	18.9	11.0	8.2	5.1	13.0
Aug. 19	100.0	22.3	4.4	14.5	13.9	12.3	8.4	7.7	16.5
Aug. 26	100.0	11.5	5.0	19.3	19.1	14.3	11.3	6.7	12.8
Sept. 2	100.0	8.0	5.8	17.1	15.9	12.3	12.8	9.7	13.4
Sept. 9	100.0	6.8	8.6	23.1	21.6	13.7	10.6	11.2	4.4
Sept. 16	100.0	5.5	7.9	21.1	22.3	14.0	10.5	7.5	11.2
Sept. 23	100.0	4.6	9.9	25.6	21.4	13.6	10.3	6.9	7.7
Sept. 30	100.0	3.7	10.1	28.6	21.8	14.4	8.2	6.4	6.8
Oct. 7	100.0	4.3	10.5	31.2	20.7	14.3	7.7	5.5	5.8
Oct. 14	100.0	3.1	9.2	29.9	26.8	12.4	7.4	5.0	6.2
Oct. 21	100.0	4.3	8.9	32.1	23.4	12.2	7.0	6.1	6.0

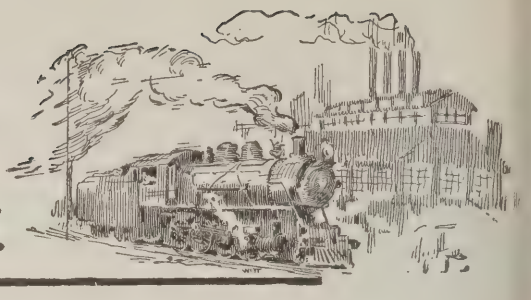
*Prepared by U. S. Bureau of Labor Statistics from records of U. S. Geological Survey.

Coal Companies Oppose Control of Indian Creek & Northern by B. & O.

The Lambert Run Coal Co., the Delmar Coal Co., the Hughes Coal Co., the New Superior Coal Co. and Clarence D. Robinson have filed a petition of intervention in the matter of the application of the Baltimore & Ohio Railroad Co. for authority to acquire control of the Indian Creek & Northern Railway Co. These coal producers contend that the Baltimore & Ohio for the past several months has furnished less than 30 per cent of the total cars required by the petitioners' mines. It is pointed out that these are local mines served only by the Baltimore & Ohio R.R. If that company were allowed to acquire the Indian Creek road, on which line are mines with a potential capacity of 200 carloads of coal per day, the Baltimore & Ohio would be in a worse position to meet the requirements of the mines on its line.



Production and the Market



Weekly Review

Uneasiness prevails throughout the soft-coal trade. Production holds close around 11,000,000 tons per week while prices continue the downward movement. *Coal Age* Index of spot prices at the mine dropped 16 points to 342 as of Jan. 29. This corresponds to an average price of $4.14 per net ton, as compared with $4.33 a week ago.

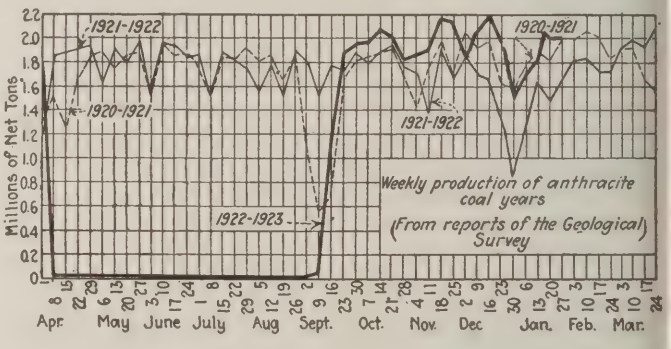
Announcement the middle of last week that operators and the union had signed a contract to continue present wages for one year from April 1, next, had no pronounced effect on the market. This outcome of the wage negotiation had been discounted following the telegram from the Coal Commission to the convention of miners and operators in Chicago on Jan. 4. Coal buyers, particularly those for industrials, had been negotiating for several weeks for storage coal in the event that it developed that there was to be a strike next spring. These orders either have not been placed or have been cancelled in the last few days.

Soft Coal Reserves Not Unusual

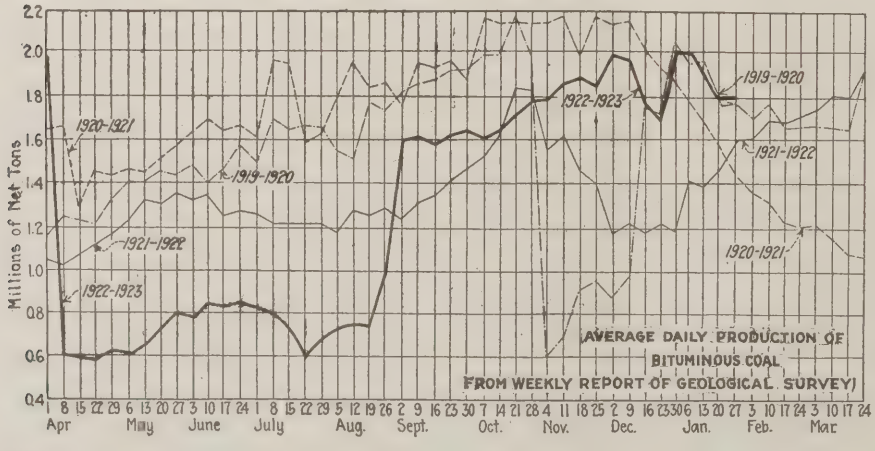
Speculation on what the stock report of the government which it is expected will be released around Feb. 4 will show with respect to reserves as of Jan. 1, centers around a figure of 40,000,000 tons as the minimum. Reserves of this size are not unusual for this time of year, and any figure in excess of 40,000,000 tons will serve to explain the actual indifference of the market. Weather and irregular and fluctuating car supply are the controlling factors at this time. Locally, poor car supply on the leading roads in Pennsylvania in both the high- and low-volatile districts serve on the one hand to uphold quotations, while on the other, embargoes such as that on the New Haven against shipments for industrial use and against B. & M. and B. & A. destinations and the B. R. & P. embargo against New York Central points have knocked down the prices of central Pennsylvania grades. Congestion at Toledo and embargoes on movement into Michigan through that gateway have tended to break the market locally and south to Columbus.

Railroad buying East and West has for the past three months been on a level with consumption. Big-lot buying is slackening off by the railroads, public utilities and the large industrials. The most active buyer continues to be the retailer, who is still taking on substitutes for anthracite in the East and meeting current requirements in the West. The outlook for February is for continued production east of the Mississippi of all the coal the railroads can carry at slowly but steadily declining prices.

One sure indication of slackening of the spot market is the effort now being made by many of the producing



interests to make contracts for the next year. Some shippers are offering twelve-months contracts beginning Feb. 1 and others are contracting from April 1. Highest-grade Pennsylvania coal is being offered for delivery through the year at $4.25 per net ton at the mines. Offerings as high as this are accompanied by guaranteed price clauses which operate to give the buyer any decrease throughout the year on the same coal under similar delivery conditions. On the New York market, buyers have offered tentatively to contract at $3.50,



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Jan. 6	7,476,000	10,993,000
Jan. 13 (*b*)	8,302,000	11,217,000
Jan. 20 (*a*)	8,782,000	10,868,000
Daily average	1,464,000	1,811,000
Calendar year	24,560,000	33,033,000
Daily av. cal. yr.	1,228,000	1,651,000
ANTHRACITE		
Jan. 6	1,242,000	1,725,000
Jan. 13 (*b*)	1,643,000	2,113,000
Jan. 20 (*a*)	1,443,000	2,010,000
Calendar year	4,328,000	5,848,000
COKE		
Jan. 13 (*b*)	119,000	323,000
Jan. 20 (*a*)	115,000	328,000
Calendar year	343,000	960,000

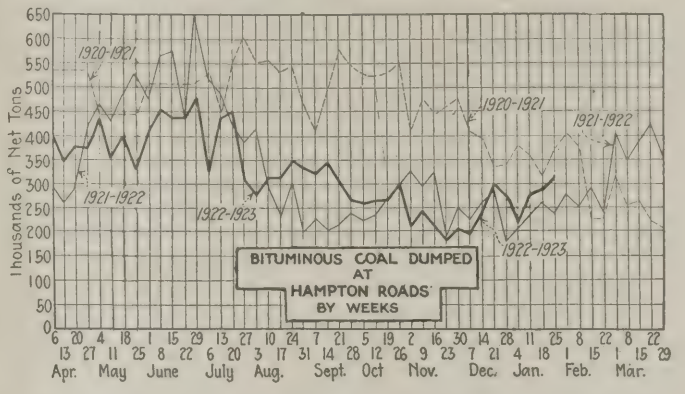
(*a*) Subject to revision. (*b*) Revised from last report

One shipper has sold his output for next year at $3.60, guaranteeing both delivery and price against wage increase. Philadelphia reports contract offerings for the next year at $3.80@$4 on the best steam coal.

Production of anthracite holds up around 2,000,000 net tons per week. Household consumers continue to insist on anthracite and this fact is making retailers generally careful in buying substitutes for fear of being caught with unsalable stock when winter breaks. The Massachusetts congressional delegation continues to urge upon Congress the policy of cutting off our Canadian neighbors from any anthracite. Canada has barely got her quota of this household fuel, but Representative Rogers and Senator Walsh appear to believe that they should not have even that. The demand for anthracite will continue strong to the end of winter.

Prices on Connellsville coke are unchanged, lack of demand on the part of the furnaces being offset by the domestic fuel demand. Buying in small lots of from one to five carloads for Canada, northern New York and Michigan has replaced the wholesale purchases of Eastern buyers that characterized December.

"For the third week in succession the production of soft coal remained stationary at about 11,000,000 tons," says the Geological Survey. "Revised estimates for the week of Jan. 20 place the total at 10,868,000 net tons.



"Preliminary reports for the present week (Jan. 22-27) indicate that loadings on Monday were less than on Monday of the week before. The rate of decline from day to day, however, was less than in that week and total

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Jan. 30 1922	Jan. 15 1923	Jan. 22 1923	Jan. 29 1923†
Smokeless lump	Columbus	$3.30	$7.25	$7.25	$6.75@ $7.75
Smkeless mine run	Columbus	2.15	6.60	6.60	**6 50@ 6 85**
Smokeless screenings	Columbus	1.55	5.85	6.00	*5.50@ 6.25*
Smokeless lump	Chicago	2.85	7.75	7.75	7.50@ 8.00
Smokeless mine run	Chicago	2.15	6.35	6.35	*6.00@ 6.25*
Smokeless lump	Cincinnati	3.15	7.75	7.50	*7.00@ 7.50*
Smokeless mine run	Cincinnati	2.05	6.35	6.00	6.00
Smokeless screenings	Cincinnati	1.40	6.10	6.00	6.00
*Smokeless mine run	Boston	4.70	8.75	8.75	*8.00@ 8.25*
Clearfield mine run	Boston	1.95	4.85	4.75	*4.00@ 4.75*
Cambria mine run	Boston	2.45	5.50	5.25	*4.50@ 5.25*
Somerset mine run	Boston	1.90	5.10	5.00	*4.25@ 4.85*
Pool 1 (Navy Standard)	New York	2.85	5.75	5.75	*5.25@ 5.75*
Pool 1 (Navy Standard)	Philadelphia	3.00	.....	5.75	*5.25@ 5.70*
Pool 1 (Navy Standard)	Baltimore	2.70	6.10	5.50	*5.00@ 5.25*
Pool 9 (Super. Low Vol.)	New York	2.20	5.25	5.25	*4.75@ 5.25*
Pool 9 (Super. Low Vol.)	Philadelphia	2.40	5.75	5.55	*4.60@ 5.00*
Pool 9 (Super. Low Vol.)	Baltimore	2.45	5.75	5.10	*4.75@ 5.00*
Pool 10 (H.Gr.Low Vol.)	New York	2.05	4.75	4.50	*4.00@ 4.50*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.00	5.25	5.20	*4.15@ 4.50*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.05	5.20	4.35	*4.00@ 4.25*
Pool 11 (Low Vol.)	New York	1.65	4.25	3.35	*3.25@ 3.75*
Pool 11 (Low Vol.)	Philadelphia	1.70	4.35	4.20	*3.15@ 3.35*
Pool 11 (Low Vol.)	Baltimore	1.95	4.20	3.75	*3.25@ 3.50*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.40	3.60	3.35	*3.00@ 3.25*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	4.15	3.65	*3.10@ 3.40*
Pool 54-64 (Gas and St.)	Baltimore	1.65	3.85	3.25	*3.00@ 3.25*
Pittsburgh sc'd gas	Pittsburgh	2.65	5.25	5.35	*4.75@ 5.00*
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.35	3.50	*3.25@ 3.50*
Pittsburgh slack (Gas)	Pittsburgh	1.75	3.20	3.40	*3.25@ 3.50*
Kanawha lump	Columbus	2.50	6.25	6.25	*5.00@ 5.50*
Kanawha mine run	Columbus	1.65	3.75	3.35	*3.15@ 3.40*
Kanawha screenings	Columbus	1.15	3.35	3.10	3.00@ 3.25
W. Va. lump	Cincinnati	2.45	6.50	6.00	*6.00@ 6.25*
W. Va. Gas mine run	Cincinnati	1.35	3.75	3.50	**3 25@ 3 65**
W. Va. Steam mine run	Cincinnati	.....	3.35	3.05	**3 00@ 3 50**
W. Va. screenings	Cincinnati	1.05	3.25	3.00	**3 00@ 3 50**
Hocking lump	Columbus	2.50	5.35	5.10	*4 25@ 5.00*
Hocking mine run	Columbus	1.90	3.10	2.85	**2 65@ 3 00**
Hocking screenings	Columbus	1 25	2.75	2.60	2.50@ 2.75
Pitts. No. 8 lump	Cleveland	3.05	5.00	5.10	*3.25@ 5.50*
Pitts. No. 8 mine run	Cleveland	$2.00	$3.40	$3.60	*$3.35@ $3.50*
Pitts. No. 8 screenings	Cleveland	1.55	3.15	3.25	3.15@ 3.35
Midwest					
Franklin, Ill. lump	Chicago	3.65	5.35	5.35	5.25@ 5.50
Franklin, Ill. mine run	Chicago	2.35	3.85	3.85	3.75@ 4.00
Franklin, Ill. screenings	Chicago	1.90	2.70	2.65	2.50@ 2.85
Central, Ill. lump	Chicago	3.00	4.35	4.10	*3.75@ 4.00*
Central, Ill. mine run	Chicago	2.35	3.50	2.85	2.75@ 3.00
Central, Ill. screenings	Chicago	1.50	2.10	1.70	*1.50@ 1.75*
Ind. 4th Vein lump	Chicago	3.25	5.10	4.85	4.75@ 5.00
Ind. 4th Vein mine run	Chicago	2.40	3.60	3.60	3.50@ 3.75
Ind. 4th Vein screenings	Chicago	1.60	2.50	2.30	2.25@ 2.40
Ind. 5th Vein lump	Chicago	2.95	4.10	4.10	4.00@ 4.25
Ind. 5th Vein mine run	Chicago	2.20	3.10	3.10	3.00@ 3.25
Ind. 5th Vein screenings	Chicago	1.45	2.25	1.80	1.75@ 1.85
Standard lump	St. Louis	2.90	4.10	4.10	*3.50@ 3.75*
Standard mine run	St. Louis	2.00	2.60	2.60	*2.25@ 2.75*
Standard screenings	St. Louis	1.00	1.85	1.85	*1.50@ 1.75*
West Ky. lump	Louisville	2.60	4.35	4.10	*3.75@ 4.25*
West Ky. mine run	Louisville	1.90	2.55	2.60	*2.25@ 2.75*
West Ky. screenings	Louisville	.95	2.30	2.30	*1.80@ 2.25*
West Ky. lump	Chicago	.....	4.25	4.25	4.00@ 4.50
West Ky. mine run	Chicago	.....	2.60	1.85	**2.25@ 2.50**
South and Southwest					
Big Seam lump	Birmingham	2.90	3.95	3.95	3.45@ 4.45
Big Seam mine run	Birmingham	1.85	2.35	2.35	2.25@ 2.50
Big Seam (washed)	Birmingham	2.10	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	6.25	6.25	*5.75@ 6.25*
S. E. Ky. mine run	Chicago	.....	3.85	3.25	3.00@ 3.50
S. E. Ky. lump	Louisville	2.75	6.50	6.50	6.00@ 7.00
S. E. Ky. mine run	Louisville	1.55	3.50	3.10	3.00@ 3.25
S. E. Ky. screenings	Louisville	1.10	3.25	3.25	2.75@ 3.25
S. E. Ky. lump	Cincinnati	2.75	6.50	5.60	5.25@ 6.00
S. E. Ky. mine run	Cincinnati	1.45	3.60	3.35	*2.85@ 3.50*
S. E. Ky. screenings	Cincinnati	.95	3.10	3.00	*2.75@ 3.00*
Kansas lump	Kansas City	5.00	5.50	5.50	5.50
Kansas mine run	Kansas City	4.00	3.75	3.60	3.50@ 3.75
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	Jan. 22, 1923 Independent	Jan. 22, 1923 Company	Jan. 29, 1923† Independent	Jan. 29, 1923† Company
Broken	New York	$2.34	.....	$7.60@ $7.75	$9.00	$7.75@ $8.25	$9.00	$7.75@ $8.25
Broken	Philadelphia	2 39	$7.00@ $7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@ 12.00	8.00@ 8.35	9.25@ 12.00	8.00@ 8.35
Egg	Philadelphia	2 39	7.25@ 7.75	7.75	9.25@ 11.00	8.10@ 8 35	9.25@ 11.00	8.10@ 8.35
Egg	Chicago*	5 09	7.50	8.25	12.00@ 12.50	7.20@ 8.25	12.00@ 12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@ 12.00	8.00@ 8.35	9.25@ 12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@ 12.50	7.35@ 8.25	12.00@ 12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8 20	7.90@ 8.10	9.25@ 12.00	8.00@ 8.35	9.25@ 12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8 10	8.05@ 8.25	9.25@ 11.00	8.15@ 8.35	9.25@ 11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@ 12.50	7.35@ 8.35	12.00@ 12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5 75	5.75@ 6.45	7.50@ 11.00	6.15@ 6.30	7.50@ 11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.50	6.15@ 6.20	7.00@ 9.50	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6 25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2 75@ 3.00	3.50	5.25@ 6.00	4.00@ 4.10	5.25@ 6.00	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.60@ 5.50	4.00	5.00@ 5.50	4.00
Rice	New York	2.22	2 00@ 2.50	2.50	2.40@ 2.75	2.75@ 3.00	*2.25@ 2.75*	2.75@ 3.00
Rice	Philadelphia	2.14	2 00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2 22	1 50@ 1 85	1.50	1.50@ 2.50	1.50@ 2.00	*1.50@ 2.00*	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1 75	1 50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.

loadings for the first four days showed a slight increase. The indications are that the total output will again be in the neighborhood of 11,000,000 tons."

Mid-West Situation

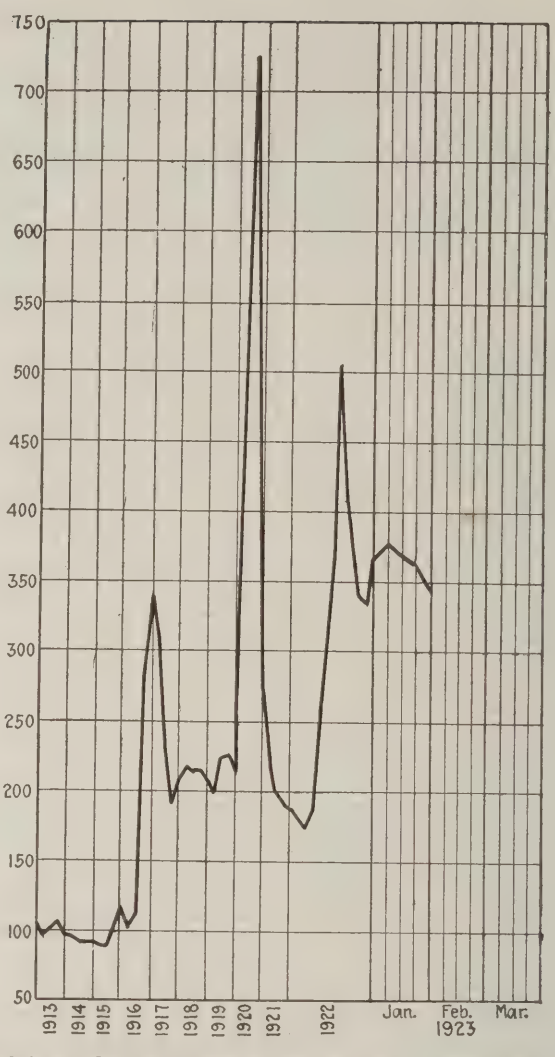
Practically every Midwestern coal market is displaying identical symptoms: The bottom is sinking. A dash of colder weather during the past week with some snow had a trifling effect and weak transportation made a marked impression. Had it not been for them a sure drop in prices even on the best domestic grades would have taken effect not later than February 1. The standard price of $5.50 a ton for southern Illinois lump—the choicest domestic coal of that state—is maintained by the principal operators only because the available supply is low.

Smaller operators have undersold that price considerably to get business. Continued poor car service, due principally to the fact that railroads are not favoring coal any longer now that no emergency seems to exist, is expected to continue at least for a time. Naturally this means less steam coal on the market. Steam buyers have taken no fright at this prospect and stockers are not rushing into the market, but there is a slight firming of the steam trade. It is anticipated that screenings will not drop any lower. They are selling in southern Illinois now for $2.50@$2.75 with a few sales at $3 but in Central Illinois they have sunk to $1.50 which compares with screenings from the Standard field.

The Chicago market has seen the inflow of a good deal more Eastern coal during the past week. It has moved on the narrowest margins through jobbers' hands and has been placed with such effort that there has been no encouragement to move any larger quantity of it to that dumping ground. Eastern smokeless, whose volume reaching Chicago is still small but increasing slowly, has been selling steadily at $6 with an occasional shading under that during the last few days.

The average of two days a week in running time in the southern Illinois fields and those mining regions clustering east of St. Louis has been enough of an indication to the miners there of what they may expect during the coming three quarters of a year under the old scale of wages. A good deal of dissatisfaction is already apparent among them. Even railroad tonnage in these fields, especially from the Du Quoin and Standard districts, has fallen off thus reducing working time still further.

Standard coal, always lowest in price, has found a fair domestic demand in St. Louis at $3.50@$3.75, but no other coal has been moving easily on that market. Local retail prices in that city on domestic sizes are: Standard, $6.75; Mt. Olive, $7.50; Carterville, $9.50; byproduct coke, $12.50; smithing, $14; all sizes of anthracite, $16.25. Country demand there is weak on all fuels. Dealers are still trying to unload what they have in their yards before a big general drop occurs.



Coal Age Index 342, Week of Jan. 29, 1923. Average spot price for same period, $4.14. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Jan. 13, 1923 Inclusive	Week Ended Jan. 13,
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	94.4	(a)
Somerset County	74.9	36.3	34.7	31.4
Panhandle, W. Va.	51.3	57.3	56.6	52.9
Westmoreland	58.8	65.8	57.4	55.9
Virginia	59.9	55.7	53.7	52.1
Harlan	54.8	22.1	21.6	24.2
Hazard	58.4	16.4	18.1	19.5
Pocahontas	60.0	36.6	33.6	34.0
Tug River	63.7	28.8	36.4	32.4
Logan	61.1	26.2	31.6	31.8
Cumberland-Piedmont	50.6	31.7	44.4	43.2
Winding Gulf	64.3	30.4	34.9	28.8
Kenova-Thacker	54.3	42.4	42.2	40.7
N. E. Kentucky	47.7	28.4	32.6	34.3
New River	37.9	31.6	32.1	32.6
Oklahoma	59.6	59.1	50.2	43.8
Iowa	78.4	75.9	84.2	80.1
Ohio, Eastern	46.6	40.8	36.0	30.4
Missouri	66.8	76.3	89.0	85.2
Illinois	54.5	49.9	60.4	56.8
Kansas	54.9	55.9	62.7	59.7
Indiana	53.8	37.7	56.9	51.3
Pittsburgh†	39.8	41.2	39.9	26.0
Central Pennsylvania	50.2	53.4	46.6	43.0
Fairmont	44.0	35.5	41.5	32.3
Western Kentucky	37.7	32.4	35.1	35.5
Pittsburgh*	31.9	56.1	73.7	67.0
Kanawha	13.0	15.6	18.2	16.9
Ohio, Southern	24.3	38.1	42.7	38.6

* Rail and river mines combined.
† Rail mines.
(a) No report.

In Kentucky the market generally is softer. There has been some movement of domestic sizes at prices off 25 or 50 cents but all buying is in small lots. Nobody is stocking. Short car supply is having its usual effect in that region too. The Louisville & Nashville has averaged about 20 per cent and the Illinois Central in the neighborhood of 45 per cent in western Kentucky which is low enough to prevent volume from knocking prices flat. However western Kentucky lump has sunk to $3.75@$4.25, mine run to $2.25@$2.75 and screenings to $1.80@$2.25. A good deal of this coal that goes out of the state, moves on consignment hunting a buyer. Jobbers have difficulty in placing shipments until they pass all points of rail congestion. Eastern Kentucky, also with a low car supply is holding up on lump to levels above $6 but there is little call for mine run and screenings have weakened to $2.75@$3.25.

The Northwest is experiencing a noticeable softening in spots. Most of these spots are around the Head-of-the-Lakes where dock men are beginning to worry a little for fear they will not be able to dispose of their 1,750 000-ton bituminous stock by spring. Immediately upon last week's New York settlement with the union for a continuance of the present scale for another year, they started a sales campaign with price concessions of 25 and 50 cents on all

soft coals. Dock lump is selling for $9, run of pile $8.25 and screenings as low as $6. Dock operators are frank to say they must cut overhead costs during the coming year and they hope to eliminate the middleman in their effort to meet competition. It is noted in Minneapolis that rail competition is keener than ever right now. Good grade rail coal is laid down in the Twin Cities at $1@$3 less than the cost of competing coal on the docks. The freight rate of dock coal to that market is $1.85. The effect on trade is apparent.

Around the Head-of-the-Lakes it is now admitted there is enough anthracite. The wail for more of it is dying out and docks with hard coal unsold are starting to push it. Prices remain firm however. But in Milwaukee the supply is still a matter of worry. Retail sales are mostly in one-ton lots. A little is coming in by rail but the domestic demand is by no means satisfied and smokeless is not arriving in sufficient volume. Screened Pocahontas sells for $16 and mine run, $12.50. There is a brisk business in coke.

Gloom continues to spread through the coal trade in the Southwest where soft weather, constant oil competition and poor co-operation by railroads conspire to make the coal operator's life unhappy. Few mines have worked more than half time lately. Car shortage has done its bit, however, in holding prices firm. There has been no recession from the standard price of $5.50 for Kansas lump, $3.75 for mine run and $2.50 for screenings while Arkansas semi-anthracite maintains its lump price of $6@$7. Colorado and Utah markets continue weak because of soft weather. In Salt Lake City, Utah lump has dropped from $5.50 to $5.

Ohio Conditions Easier

Settlement of the wage scale controversy and the continued mild weather combined to soften the coal trade in Ohio.

Bituminous coal receipts at Cleveland during week ended January 20th decreased 303 cars under the preceding week, due principally to transportation conditions. Total receipts amounted to 2,587 cars divided 2,021 for industries and 566 to retail yards. Average weekly receipts since January 1st are 2,942 cars as compared with 2,345 cars during the last quarter of 1922.

It had been possible to increase the output of the New River field somewhat during the latter part of January owing to a larger run of cars during the earlier part of each week and on Monday, January 15 the output reached the highest level in several years, 45,000 tons being loaded that day.

Pocahontas production has been slightly increased and yet the output is not much above 225,000 tons a week. Tug River mines are also loading more coal. The output, however, is still a little less than full-time capacity.

More cars are being distributed to the mines in the Kanawha region than was true as to the early part of January and it has been possible for such mines to increase their working time. Increased production however, has been at the expense of higher price levels for with so much more fuel going to market from the Kanawha and other regions prices have been dropping and it has become exceedingly hard to keep pace with them from day to day. Mine run for western delivery now commands approximately $3 a ton, with lump ranging from $5 to $6.

It has become possible to speed up production to some extent in the Logan region where mines are now working about on a half time basis so that the output has reached about 250,000 tons a week. Such an increase has been due to better transportation facilities.

Throughout the greater part of January influenza among the miners and their families in Virginia was making inroads on production to the extent of about 7 per cent. Car shortage losses, however, affected production to the extent of nearly 40 per cent and inability to secure more empties was principally responsible for a slightly lower output. However, a heavy tonnage was being used in the production of coke which is now averaging about 17.000 tons a week in the field. A softer market had the effect of causing a slight price recession, buying being on a lighter scale.

Under the stimulus of a better car supply Northern Panhandle mines were able during the latter part of January to produce more coal and to materially increase shipments inasmuch as haulage to various markets was better. The volume of coal for Eastern markets was especially large.

Dropping prices featured market conditions in northern West Virginia as elsewhere in West Virginia during the week ending January 20 and at the outset of the following week, due to several causes. In the first place with cars more plentiful, a larger tonnage of fuel was flowing to market and in the next place consumers, particularly of steam coal, were not so strongly in the market.

Production has reached large proportions in the Upper Potomac, Georges Creek and surrounding territory, aggregating more than 110,000 tons a week which is the highest figure reached in some time.

North Atlantic Market Quiet

Spot inquiry for bituminous in New England is even less pronounced than a week ago. Buyers are more inclined to wait developments. The wage settlement at New York, and somewhat less favorable prospects for manufactured goods have together caused a marked change in the outlook for February. Port facilities at Boston are again congested, upwards of 80,000 tons having been entered at Mystic wharf alone and waiting discharge. A share of this is British coal for locomotive supply, but most of the accumulation results from increased shipments of Pocahontas and New River. Demurrage has accrued to such an extent that steam users are unwilling to make purchases except at competitive prices f.o.b. cars. On the whole the trade is apprehensive that quotations will be materially less within a reasonably short time.

Spot prices on all the Pennsylvania grades have dropped 50c. or more in consequence, and more than a few shippers are willing to accept orders on this basis for shipment when the embargoes are raised.

At Hampton Roads the available coal on cars is steadily mounting, and this applies both to Navy standard grades and those high volatiles that are shipped in anticipation of demand for railroad supply. Movement to Tidewater has shown a steady increase as compared with deliveries West, and most of the agencies agree that the trade is in for a sluggish market. Spot coal that is being urged on buyers inland from Boston has sold as low as $10 per gross ton on cars Boston, this basis comparing with $11 a fortnight ago. Notwithstanding the embargoes all-rail there has been surprisingly little inquiry for spot coal the past few days.

F.O.B. Norfolk and Newport News Pocahontas and New River have already sold down to $8 per gross ton f.o.b. vessel. Buyers are so scarce that shippers are inclined to listen to any favorable offering and a much lower level is anticipated during the current month. The slow dispatch at the loading piers ten days or so ago has now materially improved and steamship owners are again willing to make charters without guaranteed days for loading.

Anthracite Output Holds Up

"The production of anthracite in the week ended January 20 is estimated at 2,010,000 net tons including mine fuel, local sales, and washery and dredge output," by the Geological Survey. "This estimate is based on reports from the nine principal carriers, showing a total of 38,429 cars loaded. This is a decrease of 5 per cent as compared with the week preceding.

"Preliminary reports for the first half of the present week indicate a slight increase over last week and that the total production for the week will be about 2,100,000 tons."

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended January 13, 1923	873,251	198,686
Previous week	770,303	187,746
Same date in 1922	714,191	157,964

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
January 13, 1923	28,282	6,155	73,342	37,014
January 7, 1923	20,426	5,490	73,285	34,243
Same date in 1922	439,982	.....	.....	.....

Foreign Market And Export News

British Coal Production Registers Big Gain; Export Demand Heavy

Output of British coal during the week ended Jan. 13 was 5,605,000 tons as against 4,385,000 tons the previous week, an increase of 1,220,000 tons, according to a cable received by *Coal Age*.

There is a heavy demand for shipments to the United States and France and the ports of South Wales are crowded with ships. A number of boats are unable to finds berths.

It is estimated that approximately 300,000 tons has been sold to the United States and Canada for shipment early this year, and it is said that many inquiries have been received from the United States for steam and gas coals for shipment over the next 3 or 4 months.

The Swedish State Railways are in the market for tenders for 70,000 tons of the best steam coals for delivery into March.

If France seizes all the Ruhr coal for herself and Italy, Germany must turn to Britain to compensate herself for what she will lose.

There were 8,345,606 tons of British coal exported to Germany in 1922 as against 817,877 tons in 1921 and 13,457 tons in 1920. Last year's export nearly equaled the tonnage exported in 1913 when it was 8,952,328 tons.

French Miners Want Wage Conferences Resumed

The miners of the Nord and Pas-de-Calais have asked that the negotiations for a wage increase be resumed at once. These negotiations which were started several weeks ago were postponed until April next but the miners on account of the continued rise in the cost of living request that the demands be taken up immediately.

There has been a decrease in the demand for domestic coals. Arrears have been partly overtaken and delays of delivery do not exceed more than two or three weeks.

The demand for industrial coals remains excellent. Pithead stocks have dwindled to unimportant figures and stocks of the most merchantable sorts are almost completely wiped off.

The imports during November amounted to 1,964,940 metric tons of coal; 437,078 metric tons of coke and 179,866 metric tons of patent fuel.

The exports during the same period were 295,336 metric tons of coal, 47,442 metric tons of coke and 16,525 metric tons of patent fuel.

Germany supplied to France and Luxemburg in November and December, the following amounts of reparation fuel, in metric tons:

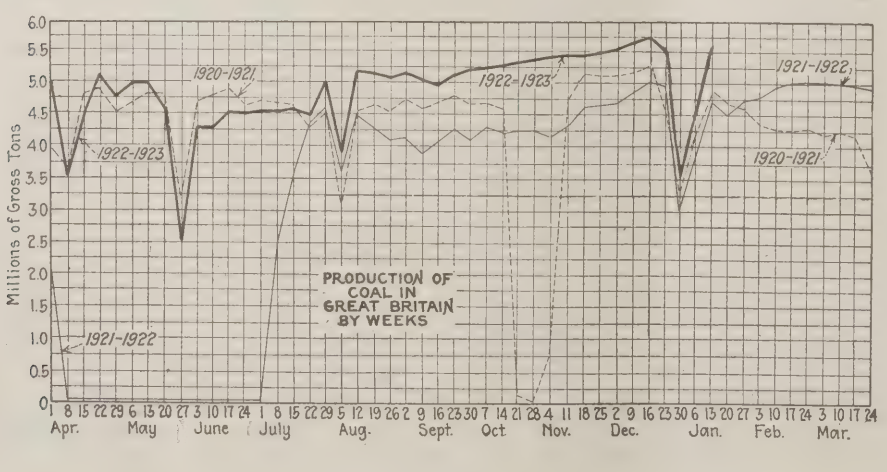
	France		Luxemburg	
	November	December	November	December
Coal	332,901	320,232	3,068	5,617
Coke	387,754	402,080	125,223	122,687
Lignite briquets	52,499	52,134	5,060	5,030
Totals	773,154	774,446	133,351	133,334

The December coal shipments included 33,314 tons of coking slacks.

Hampton Roads Situation Dull

Business at Hampton Roads was comparatively dull, and coastwise movements continued to slow up on account of reported surplus of stocks in the north. Supplies at this port increased to a point greater than at any time in the last three months, but car supply continued at about 35 per cent of normal.

Increase in general shipping has made bunker business fairly active, but no exports, except occasional small cargoes, have been booked. In the domestic trade, a scarcity of prepared soft coal is seen, while anthracite is practically unobtainable. Prices of Pocahontas coal have gone up to $14, and run of mines is $11, the highest figure ever reached here by these grades. The general feeling in the trade was one of optimism, and the general tone of the market was firm.



Ruhr Valley Coal Output Increased

Coal production of the Ruhr Valley amounted to 97,350,000 tons in 1922, as against 94,114,785 in 1921, an increase of 3,235,215 tons. The December output was 7,900,000 tons, a decrease of 696,214 tons from that of the previous month, due to the suppression on Dec. 18 of the extra-shift agreement. While the November production amounted to nearly 8,600,000 tons that of December inclusive of the pits on the left side of the Rhine amounted to 7,900,000 tons, at 23¼ working days.

The following table shows the total production of the last two years and that of the year 1913 in tons:

	1913	1921	1922
January	9,786,005	8,072,912	8,132,763
February	9,194,112	8,174,606	7,737,974
March	9,181,430	7,685,185	9,014,278
April	9,969,560	7,894,985	7,512,646
May	9,261,448	6,954,607	8,081,951
June	9,586,385	7,753,350	7,078,361
July	10,150,347	7,782,676	7,864,200
August	9,795,236	8,068,065	8,336,773
September	9,696,397	7,853,871	8,265,688
October	9,895,090	8,047,353	8,827,126
November	8,932,276	7,772,658	8,596,214
December	9,101,858	8,054,517	7,900,000
Whole year	114,550,153	94,114,785	97,350,000

Export Clearances, Week Ended Jan. 25, 1923

FROM HAMPTON ROADS

	Tons
For Atlantic Islands:	
Nor. SS. Karmoy, for Guayabal	1,819
For Canada:	
Br. Schr. Harry A. MeLennan, for St. John's	1,108
For Canal Zone:	
Amer. SS. Cristobal, for Cristobal	9,440
For Santa Domingo:	
Amer. Schr. Jere G. Shaw, for Santo Domingo	550

Hampton Roads Pier Situation

	Jan. 18	Jan. 25
N. & W. piers, Lamberts Pt.		
Cars on hand	723	953
Tons on hand	49,647	68,515
Tons dumped for week	123,613	106,648
Tonnage waiting	8,400	6,650
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,522	1,439
Tons on hand	86,160	87,020
Tons dumped for week	62,154	104,147
Tonnage waiting	15,000	10,000
C. & O. piers, Newport News:		
Cars on hand	1,821	1,850
Tons on hand	100,775	103,290
Tons dumped for week	72,584	80,489
Tonnage waiting	10,280	200

Pier and Bunker Prices, Gross Tons

PIERS

	Jan. 20	Jan. 27†
Pool 9, New York	$7.75@ $8.25	$7.75@ $8.25
Pool 10, New York	7.25@ 7.50	7.25@ 7.50
Pool 11, New York	6.75@ 7.00	*6.00@ 6.50*
Pool, 9, Philadelphia	8.25@ 8.80	*7.65@ 8.00*
Pool 10, Philadelphia	7.45@ 8.00	*7.10@ 7.35*
Pool 11, Philadelphia	7.20@ 7.50	*6.60@ 6.75*
Pool 1, Hamp. Roads	8.50@ 8.75	*8.25*
Pools 5-6-7 Hamp. Rds.	8.50	*8.00*
Pool 2, Hamp. Rds.	8.50@ 8.75	*8.25*

BUNKERS

Pool 9, New York	$8.10@ $8.60	$8.10@ $8.60
Pool 10, New York	7.60@ 7.85	7.60@ 7.85
Pool 11, New York	7.10@ 7.35	*6.35@ 6.85*
Pool 9, Philadelphia	8.60@ 9.05	*8.25@ 8.60*
Pool 10, Philadelphia	8.15@ 8.50	*7.40@ 7.60*
Pool 11, Philadelphia	7.70@ 7.85	*6.90@ 7.15*
Pool 1, Hamp. Rds.	8.50@ 8.75	*8.25*
Pool 2, Hamp. Rds.	8.50@ 8.75	*8.00*

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations, by Cable to Coal Age

	Jan. 20	Jan. 27†
Admiralty, large	28s.6d.@ 29s.	**29s.@ 30s.**
Steam, smalls	18s.@ 18s.6d.	**20s.@ 20s.6d.**
Newcastle:		
Best steams	26s.	**26s.6d.@ 27s.6d.**
Best gas	24s.6d.@ 25s.	**25s.@ 26s.**
Best bunkers	22s.6d.@ 23s.6d.	**25s.**

† Advances over previous week shown in *heavy type*; declines in *italics*.

News Items From Field and Trade

ALABAMA

The Empire By-Products Corporation, chartered under the laws of Delaware, with a capital stock of $2,000,000, will soon commence construction work on a 50-oven byproducts coke plant, near Empire, in Walker County. Approximately $1,500,000 will be spent on the construction of this plant. Mr. Moore, head of the Empire Coal Co., is largely interested in the Empire By-Products Corporation. He owns extensive coal mines and other properties in Walker County.

Alabama coal fields produced 16,630,000 tons of coal in 1922. This is an increase of 3,613,000 tons, or approximately 25 per cent over 1921, according to the Alabama Mining Institute. The largest production for any one month was during August, owing to the coal strike in other fields when consumers turned to Alabama for coal supplies. The following table gives the output in Alabama fields by months in 1921 and 1922, in tons:

	1921	1922
January	1,500,000	985,000
February	1,150,000	1,025,000
March	990,000	1,380,000
April	985,000	1,179,000
May	900,000	1,380,000
June	875,000	1,500,000
July	875,000	1,530,000
August	1,050,000	1,750,000
September	1,075,000	1,450,000
October	1,285,000	1,435,000
November	1,288,000	1,550,000
December	1,047,000	1,475,000
Totals	13,020,000	16,639,000

COLORADO

Clinton L. Oliver, of Kansas City, Mo., has just returned from Paonia, where he has arranged for the mining of coal on an 80-acre tract. Several years ago this land was regarded as valueless by Mr. Oliver's father, and the senior Oliver was seriously thinking of letting it go for taxes. Coal companies in the vicinity steadfastly refused to exploit the land. The nearest railroad was a mile away. But the younger Oliver offered his father $380 an acre for the land, a total of $30,400, which was accepted with haste. Now young Oliver estimates that he will eventually receive $1,400,000 from the investment through coal royalties. The mine will be in operation by March 1 by a syndicate of Western mining men, who, under contract, will mine daily 200 tons of coal from veins totaling about 60 ft.

Robert A. Jackson, formerly mining engineer with the Hillman Coal & Coke Co., at Jerome, Pa., is now located at Walsenburg, Colorado, with the Colorado Fuel & Iron Co.

CONNECTICUT

Thomas Russell, State Fuel Administrator, has tendered his resignation and that of Deputy Administrator Charles Jaynes, of West Hartford, to Governor Templeton. Mr. Russell in his letter said that the apparent reluctance of the State Legislature to act in the present emergency coal situation "can be due to only two reasons: (1) a belief that no emergency exists—in which case this administration is not needed by the State—or (2) the fact that the character of this administration is such as to make them timid about giving it legal authority for its action. In order to clarify the situation as regards the latter condition, I feel that it would be helpful to you to give you a free hand in building up a new organization in which the Legislature might have more confidence."

ILLINOIS

A total of 6,444,922 tons of coal was produced by the mines of St. Clair County during 1922. Six men met death during the year in the mines. The annual report shows that 60 shipping mines employed 7,653 men underground and 821 on the surface. Active operating days in the shipping mines totaled 153 in the year. The St. Louis & O'Fallon Coal Co. leads in the output by shipping mines with a total of 653,883 tons in its two Nigger Hollow mines.

Lyman Graham has retired as active head of the **McLean County Coal Co.** after 55 years of service with this company. Ill health has made this step necessary. The directors of the company were unwilling to accept his resignation as president of the company, but allowed him to retire from active service and responsibility with full salary, keeping his position as president of the company, but with another man to take active management of the plant. Mr. Graham is 78 years of age and is one of the "grand old men" of the Illinois coal trade.

James G. Monahan, of Chicago, has been named manager of the Peabody Coal Co. interests in the Springfield district and will also manage the Springfield District Coal Mining Co., as successor to the late Alfred G. Hane, who died Dec. 28, 1922. Mr. Monahan has been associated with the Peabody Coal Co. for the last six years. He was formerly in charge of the Buffalo district, spent several years in the Chicago office and also was on the road for this company for some time as a salesman. He will remove his family to Springfield and make his permanent home there.

Anton Loeffler has been named acting superintendent of the three mines of the Spring Valley Coal Co. to succeed the late William Bevan. His appointment was effective Jan. 1. He has been serving as mine boss at the No. 5 mine.

Howard A. Swallow, attorney, Danville, has been elected president of the **United Electric Coal Co.,** of that city, to succeed F. E. Butcher, resigned. Mr. Swallow has for sixteen months been vice-president. J. B. Melville, treasurer, has been elected vice-president to succeed Mr. Swallow. The complete list of officers and heads of departments of this $1,500,000 coal-producing corporation is as follows: Howard A. Swallow, president; Richard Campbell, vice-president and general counsel; J. B. Melville, vice-president and treasurer; E. H. Jobson, secretary; James Anderson, general superintendent in charge of operations; F. E. Toenniges, chief engineer; L. G. Shorthouse, auditor, and J. C. Lane, M. C. Bateman, Felix Pichon, Alex Anderson and W. B. Reid, mine superintendents.

Large areas of land in Jefferson County, near Mount Vernon, have been sold recently for mining purposes and tests are now being made to ascertain the quality and the quantity of the coal. Two drills are now being used in testing out the field, which is said to adjoin the large acreage already acquired by the Nason interests in Jefferson County. One drill is now at work in Section 16 of Spring Garden township east of the Chicago & Eastern Illinois R.R. Many thousand acres of Jefferson County coal land have been sold in recent years and there are still large areas under option which are subject to sale. The Illinois Coal & Coke Corporation is the largest owner of coal land in Jefferson County, owning a tract of 30,000 acres in the southern part of the county, said to be one of the largest units of coal land owned by one company to be found in the United States. The Inland Steel Co. owns a tract of about 8,000 acres in the southern part of the county. The Southern Gem Coal Co. has extensive coal holdings in the vicinity of Waltonville and Sheller. F. S. Carson, of Waltonville, also owns approximately 1,800 acres of coal land in the vicinity of Waltonville.

The North American Co., E. W. Clark & Co., of Philadelphia, and the St. Louis & Belleville Electric Railway Co. may be **compelled to declare in court who owns the St. Louis & Belleville Electric,** an 18-mile coal road from Belleville, Ill., to East St. Louis, Ill. Suit has been filed by M. W. Borders, a Chicago attorney, asking an accounting in connection with the sale of the road to the East St. Louis & Suburban Ry. Borders asserts that E. W. Clark & Co. bought coal land on a 50-50 basis with him, which was to be developed jointly when a railway line had been projected from the St. Louis and Belleville line, and that E. W. Clark & Co. had agreed to buy his share of the land in case they sold their interest in the electric line.

Incorporation papers have been filed at Mt. Vernon for the **Southern Illinois & Kentucky R.R.** to extend from Edgewood in Effingham County, to Metropolis, opposite Paducah, Ky., and a branch from Akin, in Franklin County, southwest to the northern terminus of the proposed Benton Southern Ry. This opens up Jefferson and new parts of Franklin County coal fields. C. H. Markham, president of the Illinois Central R.R., is one of the incorporators.

INDIANA

Miners employed at the **Mt. Pleasant Coal Co.'s** mine south of Terre Haute declare they have been locked out. The mine has been closed and mine workers declare the management has refused to employ union men. The mine was opened only a short time ago and the men who were employed either were former members of the United Mine Workers or were members of other local unions. They applied for a charter and when they were admitted to the mine workers' union, G. R. Wilson, owner of the mine, is said to have discharged them.

Two men were killed recently and another seriously injured following an explosion in the **American Mine No. 1,** near Bicknell, owned by the Knox Consolidated Coal Co. It was reported that little damage was done to the mine property.

The offices of the Southern Indiana Coal Bureau, at Evansville, will be closed temporarily in the absence of H. W. Little, who has gone to Washington as secretary of the National Coal Operators' Association. It is probable the offices will not be reopened until next September.

Francisco mine No. 1, near Princeton, recently **broke its former production record** 1,772 tons of coal being hoisted in eight hours. This mine is becoming one of the largest producers in southern Indiana and is being modernized in every way. Every mine in the county started the new year right by working the first day of 1923.

The Clinton Coal Co.'s Crown Hill mine No. 3, southwest of Clinton, mining fourth-vein coal, **has resumed operations** after having been shut down for several months. Lightning damaged the brick stack at the power plant about six months ago, and until the outlook for selling coal brightened recently the stack was not repaired. Shipping conditions also have improved the business of the company sufficiently to warrant the opening of the mine, officials say.

The Arnold Fuel Co. of Indianapolis, has filed a final certificate of dissolution with the Secretary of State.

KENTUCKY

In view of a lot of talk concerning a business man **for the next governor of Kentucky, James R. Rash,** Madisonville, state senator, director, large stockholder and realty man for the St. Bernard Coal Mining Co. and father of Frank D. Rash, president of the St. Bernard, is planning to announce his candidacy on the Democratic ticket. Mr. Rash is one of the wealthiest and most influential residents of western Kentucky.

The Whitesburg mine of the Last Dollar Coal Co., at Whitesburg, was opened recently. It is on the Eastern Kentucky Division of the L. & N. R.R.

The Winchester Coal Co., of which N. M. White, Jr., of Prestonburg, is president, is planning extensive developments at Emma, on 175 acres of coal land, which will result in a production of eight cars of coal a day. The company is planning to install a steam hoist.

S. M. Reams, B. T. Milam and G. T. Anderson have incorporated the **Clear Fork Coal Co.** at Middleboro, Ky., with a capital of $150,000.

The Green River Coal Co., with post office address at Moorman, has been incorporated to do business at Mogg, with a capital of $20,000. The incorporators are: Carl A. Reis, L. D. Shearer and John R. Barrett.

The Fusonia mine of the McIntire Coal Co., at Fusonia, was opened recently. It is on the L. & N. R.R

The Letcher-Elkhorn Land Co., capital $50,000, a coal organization, **has been chartered** by Sam Collins, Lexington; D. I. Dat and Lewis E. Harvie, Whitesburg. These men have bought and leased acreage, and are planning some coal development projects. Mr. Collins is state prohibition officer.

Henry LaVoie, special representative of the Ford Motor Co., in Louisville a few days ago, in talking to the Louisville Ford dealers held that the **recent coal land purchases by Ford interests in eastern Kentucky were only a start,** as still further acquisitions are planned.

The Meem-Haskins Coal Corp. has opened the No. 2 mine, at Montago. This mine is on the L. & N. R.R.

The Idamay mine of the Smith-Abston Coal Co., at Idamay, was opened recently. It is on the L. & N. R.R.

MICHIGAN

The Koppers Co., Pittsburgh, Pa., will construct for the **Battle Creek Gas Co.**, Battle Creek, **a coal-gas plant** consisting of 11 byproduct gas ovens of the new Koppers type and a Koppers gas producer equipped with a waste heat boiler. The ovens will be 13½ in. wide and have a capacity of approximately 6¾ tons per charge. Based on coking speed of 12 hours, the plant will have a capacity of 1,500,000 cu. ft. of gas per day when heated with producer gas.

MINNESOTA

The Blue Diamond Coal Sales Co., of Cincinnati, has moved its western office, heertofore at Iowa Falls, to Minneapolis, and has opened quarters in charge of H. J. Stickney. Dock space for 250,000 tons at Duluth and Superior has been obtained and both a dock and all-rail business will be done.

The North Dakota Lignite Coal Operators' Association suggests the possibility of establishing a steel center at the Twin Cities by the use of cheap lignite fuel to work on Minnesota ores and having the large labor market of the Twin Cities to draw upon.

MISSOURI

The Otterville Mining Co., which was organized at Otterville, two months ago to prospect for coal, has sunk a shaft about 30 ft. and encountered tunnels and workings of some old abandoned mine. Three stone hammers or mauls have been found, which are different from any kind now found in this section. The oldest residents have no recollection of any white men working such a mine, and Captain Frank A. Shults, the superintendent, believes the work that of some people who inhabited the country before the coming of the white man.

The Peerless Fuel Co. has been incorporated in St. Louis to acquire by purchase, lease or otherwise, to construct, develop and operate coal mines and properties; manufacture, buy, sell and deal in coke and byproducts of coal and minerals; capital, $40,000. Shareholders: John Henderson, Carl Voigt and E. W. Brandenbruger.

The Turpin coal mine at Brookfield, which was flooded with water a few weeks ago, is being opened by Thomas Grubbs & Co., who expect to be able to deliver coal in the near future. The company has pumped the water out of the mines and has started the fans to going, preparatory to sending men into the shaft.

After he refused to give a satisfactory explanation regarding assets of a bankrupt concern in which he was a principal, **George W. Carter**, head of the Carter-Williams Coal & Grain Co., of St. Joseph, was sentenced to an indefinite term in the Buchanan County jail for contempt of court by Judge Arba S. Van Valkenburgh, of the federal court Dec. 26, 1922.

MONTANA

A bill calling for an **investigation of the cost of producing and selling coal** in this state has had two readings and is expected to pass the Legislature.

Montana market conditions are peculiar. Operators in the Roundup field, on the Chicago, Milwaukee & St. Paul R.R., report that they have been working steadily. The mines on the Great Northern, near Great Falls, have been handicapped only by lack of transportation. The railroad is taking practically all of the small coal. The Red Lodge mines of the Northern Pacific R.R. have been steadily working, but the mines in the Bearcreek field, over the hill, are in a slump. One operation put in only three days during the first two weeks of January.

NEW YORK

Charles F. Hurd, Jr., formerly assistant secretary of the Hillside Coal & Iron Co., has been made assistant to the president and assistant secretary, effective Jan. 1, 1923. Mr. Hurd takes up the duties of T. S. Pendreigh, deceased. His headquarters will be 165 Broadway, New York City.

Henry L. Harnden, formerly with the Garfield & Proctor Coal Co. and later in charge of bituminous coal sales for the Tuttle-Berger Coal Co., and **Kenneth F. Cramer**, formerly Connecticut representative of the Garfield & Proctor Coal Co. and later New England representative of the Tuttle-Berger Coal Co., **have formed the Hornden-Cramer Coal Co.**, with offices at 150 Nassau Street and a branch office in Hartford, Conn. They will transact a wholesale coal business.

O. D. Street, for the past ten years general manager of distribution of the Western Electric Company, has been **elected vice-president of the McGraw-Hill Company**, in executive charge of the **Electric Railway Journal, Bus Transportation, Electrical World, Electrical Merchandising, Journal of Electricity and Western Industry** and **Industrial Engineer.** Mr. Street brings to these publications a broad background of business training and an extensive contact in the electrical industry.

Mr. Street was born in Massachusetts in 1877. He entered the organization of the Western Electric Company in 1901 on his graduation from Williams and has a broad practical training. He was in charge of telephone sales on the Pacific Coast, assistant to the president, Atlanta branch manager, general telephone sales manager and latterly general manager of distribution. During the war he rendered invaluable service in reorganizing the warehousing division of the Quartermaster's Corps and establishing an orderly system of forwarding to Pershing's army where chaos had existed before.

Ernest L. Smith, recently appointed Fuel Administrator for Queens County, has opened an office at 422 Jackson Ave., Long Island City. His chief assistant will be Oscar F. Shaw.

The Westmoreland Coal Co. has declared a stock dividend of 33⅓ per cent, payable Feb. 1 to stockholders of record Jan. 20.

The first step in making a national corporation out of the present Burns Brothers Coal Co. is seen in the preparations which have been made calling for the organization of the National Coal Co. under the laws of the State of New Jersey. Application for a charter is expected to be made soon. The company will have an authorized preferred capital of $10,000,000 and also 500,000 shares of common stock without par value. When the Burns Brothers Coal Co. took over control of the William Farrell Coal Co. some time ago officers of the former organization announced that it was their intention to nationalize the company and extend its operations to the larger cities in other sections of the country. Many rumors have been afloat within the recent past that Burns Brothers was negotiating to take over the Consumers' Company of Chicago, the largest distributors of coal and ice in that city. Reports circulated some time ago also declared that the company intended to take over retail coal distributing organizations in St. Louis, Philadelphia and Boston.

That there are teeth in the New York State Fuel Administrator Law and that those teeth can bite was shown at Syracuse on Jan. 26, when **Fred Kenyon, a coal dealer, arrested as a coal gouger** under the fuel administration, was convicted by a jury in police court and sentenced by Justice Shove to serve three months in the penitentiary and pay a fine of $100. Kenyon was accused of having sold 81½ lb. of coal Jan. 16 when 100 lb. had been asked and paid for by the customer.

Among arrivals from Europe on the Berengaria Jan. 27 were C. M. Barnett, vice president of the Clinchfield Navigation Company, and L. R. Lewis, C. B. E. and H. Merritt, Welsh coal-mine owners.

OHIO

The Monsarrat Mining Co., chartered with a capital of $200,000 to mine coal in the Hocking Valley section, is an incorporation of a going concern which has been conducted under the name of Monsarrat Bros., in Columbus. The company has three large mines with a large acreage on the T. & O. C. side of the Hocking Valley. Incorporators are N. D. Monsarrat, C. R. Monsarrat, F. H. Watson, Aaron DuBois and William H. McCall. N. D. Monsarrat is president and C. R. Monsarrat vice-president. At the same time the **Monsarrat Bros. Coal Co.** was chartered with a capital of $25,000, by the same incorporators to act as selling agent for the mines and to do a general wholesale business. C. R. Monsarrat is president; N. D. Monsarrat is vice-president, and F. H. Watson, secretary and treasurer. F. H. Watson has been acting as sales manager of the concern.

The Board of Purchase of the Columbus municipal government has rejected all bids opened Jan. 17 for approximately 13,000 tons of nut, pea and slack for various city departments and the city council adopted a resolution authorizing the buying of coal on the open market.

Homer C. Gill, a Columbus retailer and president of the Michigan-Ohio-Indiana Coal Association, is recovering from a severe attack of grippe.

Changes brought about by the war have raised the cost of labor in Europe very materially and there is an increasing call there for equipment of the American type. An interesting example of this is the **coal crane supplied to the Coal Trading Association of Rotterdam** by a well-known engineering firm of Cleveland, Ohio, for in spite of the depreciated state of German currency and the lower price of labor in England, Belgium and France, these careful Rotterdam business men purchased this important equipment in America and placed it in the most competitive center of industrial Europe. The machinery is now in operation, being used to transfer ore from tramp steamers to Rhine barges and coal from like barges into ocean-going steamers for shipment abroad.

PENNSYLVANIA

Stockholders of the **Jefferson-Clearfield Coal & Iron Co.** met in Indiana on Jan. 16 and voted an increase in the present capital stock from $3,000,000, consisting of $1,500,000 preferred and $1,500,000 common stock to $7,500,000 by the issuance of $100 par value of additional common stock. The directors previously had declared, subject to the approval of the stockholders of the increase in stock, a dividend of 150 per cent payable in common stock on Jan. 18 to preferred and common stock of record at the close of business Dec. 30, 1922.

Fifteen hundred mine workers who for five days had tied up the production of anthracite coal at the Woodward colliery of the **Glen Alden Coal Co.** Edwardsville, with a petty grievance strike, voted Jan. 10 to return to work, following talks by District President William J. Brennan, Board Member John Boylan and several other officials of District No. 1, all of whom urged the men to call off the strike. **The men went back to work Jan. 11.** The grievance, which was occasioned by the transfer or discharge of an employee at the colliery, will be taken up in the customary way, through the board of conciliation.

The hearing on the protest by Isaac T. and Mary T. W. Starr against the sale of the stock of the **Lehigh & Wilkes-Barre Coal Co.** to the Jackson E. Reynolds Syndicate of New York has been postponed by the United States District Court at Philadelphia from Jan. 3 to Jan. 24. The postponement, it was reported, was made at the request of the Department of Justice.

The Burnwell Coal & Coke Co., a Johnstown corporation, has erected one of the most modern tipples for the dumping of coal and coke in the state. It is built of steel-cement and steel beams and has a capacity of 800 tons a day, with adequate room for unloading trucks, with separate exits and entrance. The tipple is situated on the Johnstown & Stoney Creek R.R., which connects with both the B. & O. and the P. R.R., thus affording every railway facility for coal shippers.

The Lilley Coal & Coke Co. held its annual meeting Saturday, Jan. 13, at the residence of Mrs. Jane Elliott, near West Brownsville. The following directors were elected: Thomas Elliott, Mrs. Jane Elliott, John H. Moffitt, Walter T. Lilley, and Charles E. Lilley of Bluefield, West Virginia. The present officers are: Thomas Elliott, president; Mrs. Jane Elliott, vice-president; John H. Moffitt, secretary and treasurer, and Guy Moffitt, solicitor. The Lilley company is one of the most active operating companies in the coal mining business in the Great Monongahela Valley.

The Philadelphia & Reading Coal & Iron Co. has just let the contract for fifteen blocks of houses, comprising accommodations for thirty families, to the Bell Lumber Co., Inc., of Minersville, and preliminary work has been started. Ten of the blocks will be built at Phoenix Park and five at Branchdale. The floor plans will be identical in each case, but variation in placing the covered porches, in some cases at the front and in others at the side, coupled with the company's established custom of painting no two adjoining blocks in the same colors, will give variety of external appearance. The houses will be frame, with asbestos shingle roofs and concrete cellars extending the whole length of the building. There will be six rooms in each house and, in conformity with the established policy of the Reading's land department, each will have at least two windows. This is the first housing contract of any magnitude in the lower anthracite field for 1923, and construction probably will be complete by early summer.

Roy V. Whitman, formerly with the Ebensburg Coal Co. at Ebensburg, Pa., is now chief engineer with the Standard Oil interests at Maracaibo, Venezuela.

W. G. Shallcross, formerly superintendent of mines with the Ford Collieries Co., Curtisville, has recently taken charge of the mines of the Fox Coal Co., Portersville.

G. M. Butterfield, identified with the Jamison Coal & Coke Co.'s Pittsburgh office for 21 years, and **B. B. Blair**, who was with the same company for 15 years, have organized a company for the purpose of dealing in coal and coke under the name of the **Western Pennsylvania Fuel Co.** Offices are located in Greensburg.

Operating officials of the H. C. Frick Coke Co. gathered at the Greensburg Country Club recently for **their annual dinner.** W. H. Clingerman, president of the coke company, acted as toastmaster. J. W. Anawalt spoke on "The Union Supply Company; Its Mission and Purpose." "The Problem of Mechanical Coal Loading" was the theme of G. E. Huttle of Scottdale. R. E. Kirk spoke on "Human Relations in Industry."

Charles Brown, 35 years old, yard boss for the Hillman Coal & Coke Co. at Luzerne plant at Maxwell, Luzerne township, was **shot twice and killed instantly** Jan. 20 by William Thompson, a negro, who had been discharged Friday by the yard boss. On Friday he had words with the negro over the way the latter was doing his work. He told the negro, it was said, that if he would not follow instructions he might consider himself discharged. The negro ignored the official and was ordered to leave the plant. When Brown was at breakfast at a boarding house the next morning, the negro entered and shot him twice. Brown leaves a wife and three children.

UTAH

The Columbia Steel Corporation, San Francisco, has placed a contract with the Koppers Co., Pittsburgh, Pa., **to install a byproduct coke plant** at Salt Lake City, in connection with a blast furnace which is to be erected there. The plant will consist of 33 ovens of the new Koppers type, having a daily carbonizing capacity of 1,000 tons of coal. The plant will run on Utah coal and this will mark the first attempt to carbonize Utah coal in a commercial way in byproduct ovens. Construction will begin immediately and it is expected the plant will be completed in about a year.

VIRGINIA

Chester B. Koontz, representative at Norfolk, for the Willard Sutherland Coal Co., has been made president of the Hampton Roads Foreign Trade Club, reorganized to include in its membership representatives of practically every shipping concern in this port.

The Southern Fuel Co., of Norfolk, has been incorporated for $50,000. T. Levy is president of the company and J. W. Powell is secretary.

WEST VIRGINIA

A. C. Westfall, of Buckhannon, has leased from Senator R. E. Talbott of Philippi, W. Va., a large coal mining property at Wilmoth, in Randolph County. The property is ready to operate, being equipped with a tipple and other mining appurtenances.

Sufficient progress has been made by the **Virginia & Pittsburgh Coal Co.** in the driving of headings at its Morgan mine No. 2 to enable this company to load a small tonnage of coal over an old tipple at the No. 2 mine. When the company is able to load coal to capacity at this mine, daily production will reach approximately 1,500 tons a day. The Morgan mine adjoins the Parker Run plant of the Fairmont & Cleveland Coal Co.

The Beveridge Co-operative Coal Co. has been organized for the purpose of operating in Upshur County, having a capitalization of $10,000. The office of the concern is to be at Buckhannon. Interested in this new enterprise are W. P. Beveridge, A. V. Rush, G. D. Toler, June Toler, Joe Barnes and Robert Cook, of Buckhannon.

M. B. Coulter, former West Virginia State Mine Inspector, is now superintendent of mines at Elm Grove, W. Va.

L. E. Frick, of Frick & Blair, Evansville (Ind.) operators, was in Cincinnati recently after a visit to the Harlan (Ky.) fields, where mining properties were gone over with a view to purchasing a going operation

The Graham Smokeless Coal Co., at Graham, has been incorporated for $470,000 and has elected the following officers: President, W. R. Graham, of Bluefield, W. Va.; secretary, R. L. Hailey, of Bluefield, W. Va.

WASHINGTON, D. C.

By purchasing the land occupied by the fuel yards at South Capital and I Streets, from the Pennsylvania R.R., it is hoped to **reduce the cost of delivering coal** from the Government Fuel Yards to the various divisions of the District Government and government buildings 10c. a ton. A net saving of approximately $8,000 a year is expected to be realized.

CANADA

After being in effect for several days the **embargo on soft coal and coke shipments on the Pennsylvania R.R. was lifted on Jan. 24** and coal will now be accepted from mines in the area affected—the bituminous field of Pennsylvania—for shipment to Buffalo and points in Canada. The removal of the embargo will have the effect of releasing for shipment to Ontario many carloads of soft coal and coke, which will go a long way toward helping to make up for the shortage of anthracite. John Macdonald has returned to Toronto after representing the Nova Scotia coal miners at the labor congress in Russia. He declares that the German industrialists will get no military assistance from Soviet Russia in the present difficulties with France.

Sale of St. George's coal fields on the west coast of Newfoundland, is reported. It is stated that an English company is the purchaser for $1,000,000, part cash, and the balance secured by eight per cent bonds of the company.

Hon. W. E. Knowles, K. C., Moose Jaw, has accepted an invitation to become independent chairman of the committee which will have placed before it the disputes between the miners and operators in the Midwest, the Canmore, the Crow's Nest and Brazeau collieries. The other members of the committee will be Robert Young, Commissioner of the Canadian Coal Operators' Association, and Robert Livett, representative of the United Mine Workers. Sessions have been opened in Calgary.

William Ryan, district president of the United Mine Workers of America, **was found guilty Jan. 24 of assault**, and remanded for sentence until this week. Crown witnesses testified that on Dec. 2 Ryan, in company with pickets, tried to restrain Boss Carpenter Klinch, at the Black Diamond mine, from going to work.

No. 5 Mine, Cumberland, Canadian Collieries (D) Ltd., has been closed down. Temporarily there will be no production from these workings, although the mine plant and equipment will be kept in condition for the resumption of operations when conditions warrant it.

It is reported that all the coal properties and claims controlled by the late Lord Rhondda in central British Columbia have passed into the hands of British interests organized for colonization work and for the development of natural resources in western Canada. Some of these properties are situated north of the town of Terrace on the Grand Trunk Pacific Railway, about 90 miles east of the seaport of Prince Rupert. A market for the coal, which it is proposed developing, may be obtained at Prince Rupert and it also is expected that an export trade to South America may be anticipated.

DECEMBER OUTPUT OF COAL IN BRITISH COLUMBIA

Mine	Tons
Vancouver Island District	
Western Fuel Corporation of Canada, Ltd., Nanaimo	69,420
Canadian Collieries (D) Ltd., Comox	31,671
Canadian Collieries (D) Ltd., Extension	19,120
Canadian Collieries (D) Ltd., South Wellington	10,040
Granby Consolidated M. S. & P. Co., Cassidy	21,514
Nanoose Wellington Collieries, Wellington	10,270
Old Wellington, Nanaimo	929
Total	162,964
Nicola-Princeton District	
Middlesboro Collieries, Middlesboro	8,548
Fleming Coal Co., Merritt	2,407
Coalmont Collieries, Coalmont	10,042
Princeton Coal & Land Co., Princeton	2,132
Total	23,129
Crow's Nest Pass District	
Crow's Nest Pass Coal Co., Coal Creek	38,399
Crow's Nest Pass Coal Co., Michel	33,571
Corbin Coal & Coke Co., Corbin	8,457
Total	80,427
Total December	267,520

Obituary

James C. Patterson, for the last thirty-five years a leading figure in the coal-mining industry in the Birmingham (Ala.) district, died Jan. 19 at his residence in Birmingham after a short illness, aged 75 years. Coming to this country from Scotland and first settling in Pennsylvania, later moving to Ohio, and coming to Birmingham district in 1885, he obtained employment with the Tennessee Coal, Iron & Railroad Co. as a miner. He forged to the front rapidly and held various official positions as a mining executive, and for a number of years was the executive head and principal owner of the Jagger Coal Co., New Found Coal Co. and West Helena Coal Co., and also held extensive interests in the Pratt Consolidated Coal Co., of which he was a director. Mr. Patterson was widely known and held in high esteem among his friends and acquaintances.

H. A. Paynter, coal operator, 40 years old, died at Winchester, Ky., Jan. 12, following a short illness. He was president of the firm of H. A. Paynter & Co. and had been prominent in the coal fields of eastern Kentucky for several years. He was a native of Carter County. His widow and two children survive.

George H. Hulett, of Cleveland, noted in the engineering field as a designer of heavy equipment for handling coal and ore, died at Daytona, Fla., Jan. 17, at the age of 76 years. Mr. Hulett was born in Conneaut, Ohio. In 1890 he became engaged in the manufacture of coal and ore handling machinery in Cleveland. In 1898 he became associated with the Variety Iron Works, Cleveland, as engineer of construction, and in 1903 he became an engineer of the present McMylern Interstate Co. and developed the Hulett unloading machine while with this company. In 1907 he became connected with the Webster, Camp & Lane Co., Akron, which soon afterward was consolidated with the Wellman-Seaver-Morgan Co., Cleveland. He was vice-president and director of this company, with which he remained until 1918. Then he became associated with his son, Frank E. Hulett, who organized the Hulett Engineering Co., and was its vice-president. He was a member of the American Society of Mechanical Engineers and of the Cleveland Engineering Co.

J. M. Kennedy, a pioneer mine operator, died at his home at Minto, N. B., on Jan. 17. He managed and controlled the Northfield Coal Co. until it was disposed of several years ago to the International Paper Co., and since then he had managed the Minto Hotel and had been engaged in other business enterprises, being exceptionally active, although 77 years old.

Cornelius Schrepferman, a well-known coal operator of Brazil, Ind., died in an Indianapolis hospital recently of paralysis. He was thirty-six years old. He had been connected with the Brazil block coal field business since a youth, having formerly been in business with his father, Nicholas. Mr. Schrepferman was in charge of mine operations while his brother had charge of the Indianapolis selling office. He is survived by the widow and a son and daughter.

Herbert Henry Ashley, 80 years old, former president of the Parrish Coal Co., died at his home in Wilkes-Barre, Pa., on Jan. 20. For forty years he was engaged in the anthracite mining industry and was a member of the old firm of Parrish, Phillip & Co., of New York City. Mr. Ashley was an old resident of Plymouth, removing to Wilkes-Barre in later years. At the time of his death he was vice-president and a director of the First National Bank of Wilkes-Barre, president of the Hazard Manufacturing Co. and was associated with the Vulcan Iron Works.

Francis Marion Dugger, 81, a capitalist and one of the pioneers in the Indiana coal-production industry, died recently at his home in Bloomfield, Ind. Mr. Dugger was a veteran of the Civil war. He was elected sheriff of Greene County, Ind., in 1866 and was re-elected three times. He was a pioneer in the development of the coal fields of Sullivan and Greene counties. As early as 1882 he became interested in coal fields and one of his first shafts was sunk near the present town of Dugger, which was named in his honor. He also sunk shafts near Linton, Midland and Jasonville, all in Indiana. For many years he was president of the Citizens State bank of Bloomfield, also of the Bloomfield Trust Co.

Traffic News

Supplement No. 23 to summary of informal embargo notices No. 3, issued Jan. 25, by the New York Central R.R. is as follows: Account embargoes placed by other lines **embargo 138 is placed by the Boston & Main R.R.** on all freight from the Boston & Albany R.R. at all junctions for movement to or via the Boston & Maine R.R., except freight which originates at stations on the Boston & Albany R.R.

Embargo 116, placed Jan 19 by the Philadelphia & Reading Ry. on bituminous coal destined to Port Richmond piers, Port Richmond, Philadelphia, Pa., **is extended** to cover all shipments consigned to Coale Corporation, Emmons Coal Co. and Willard Sutherland. **Embargo is modified** to permit shipments consigned to C. J. Mittenberg to come forward.

Embargo 76, placed Jan. 13 by the Philadelphia & Reading Ry. covering bituminous coal to Port Reading piers, Port Reading, N. J., is **modified** to permit shipments to come forward consigned to Whitely & Foedisch and Empire Coal Mining Co.

In a tentative report in the case of the Indiana Power Co. vs. the Pittsburgh, Cincinnati, Chicago & St. Louis Ry. Co., Interstate Commerce Commission Examiner Paul O. Carter finds that the rate of **70c. per net ton** charged for the transportation of bituminous coal from the carriers' team tracks at Edwardsport, Ind., to the complainant's plant was **unreasonable.** Reparation is recommended.

The American Railway Association has appointed **S. H. Charles as district manager of a newly created car-distribution district** composed of Alabama, Tennessee, Mississippi, Georgia, Florida, North and South Carolina and the New Orleans terminals, with headquarters in Birmingham, and coal operators and shippers generally expect a more equitable distribution of cars in the future and more prompt attention to complaints on transportation matters.

The I. C. C. has dismissed the complaint of the City of Detroit against the Chesapeake & Ohio Ry. Co. et al. in which it was alleged that the charges collected by the defendants on approximately 12,000 tons of bituminous coal shipped in carloads between May 3 and Aug. 1, 1921, from Holden and other points in the Kanawha district in West Virginia via the Chesapeake & Ohio. Chesapeake & Ohio Northern, and Hocking Valley to the dock at Toledo, Ohio, for transshipment across lake, were unreasonable, unjustly discriminatory and unduly prejudicial.

The Coal, Coke and Iron Ore Committee, Central Freight Association Territory, announces a public hearing 10 A.M., Feb. 8, instead of Feb. 1, as previously announced, to **consider cancellation of rates** on coke, coke ashes, coke breeze and coke dust, carloads, to Moline, Rock Island, Ill.; Davenport, Ia., and Omaha, Neb., in connection with C. B. & Q., C. M. & St. P. and C. R. I. & P. railways from origin stations in the Clairton, Connellsville and Gallitzin districts, as set out in P. R.R. Tariff AA I. C. C. 1843.

The Corona Coal Co., of Birmingham, Ala., is seeking to recover reparation from the St. Louis-San Francisco Ry. for the rates charged from Sept. 1, 1920, to Dec. 29, 1921, on all coal which moved from its mines to Pensacola, Fla., for bunker purposes. In addition, the Corona company had under contract the bunker coal output of the Empire Coal Co. The Corona company contends that the rate charged was unreasonable to the extent that it exceeded $2 per ton.

G. H. Sewards, of the West Kentucky Coal Bureau, Louisville, is back from Atlanta, Ga., where he attended a hearing before the Southern Freight Rate Committee regarding rates to the Southwest. It is proposed that rates from west Kentucky to southern Louisiana, now 25c. per ton over rates from Alabama, be placed on the same basis as rates from Alabama.

The Coal, Coke and Iron Ore Committee, Central Freight Association territory, will hold a public hearing Feb. 8, at 10 A.M., **to consider rates on bituminous coal,** carloads, to stations on Chicago & Erie R.R., Uniondale, Ind., to Huntington, Ind., inclusive, and to stations on Wabash Ry., La-Gro, Ind., to Huntington, Ind., inclusive, from mines in Inner Crescent, $2.96 per net ton with usual differential to apply from Mines in the Outer Crescent. The hearing will be held at room 606, Chamber of Commerce Building, Pittsburgh, Pa.

The I. C. C. has dismissed complaint in Docket No. 11777, Lehigh Silk Dyeing Co. vs. the Director General of Railroads, as agent, and the Lehigh Valley Railroad Co., having found that the charges assailed were not unreasonable, or otherwise unlawful, except to the extent that they exceeded those which would have accrued if complainant's shipments had been actually placed in the order of their arrival. Complaint alleged that the demurrage charges collected at Allentown, Pa., in August, 1918, on certain interstate shipments of bituminous coal were unreasonable, unjustly discriminatory and unduly prejudicial, and asked for reparation.

Examiner Mackley, for the I. C. C., has made a tentative report in Docket 13594, Megeath Coal Co. vs. The Director General of Railroads, in which he recommends that "the **rates on coal from Winton, Wyo., to destinations in Washington, Oregon and other Western states, be found unreasonable** to the extent that they exceeded the rates in effect at the time shipments moved from the Rock Springs-Kemmerer group in which Winton was subsequently included." The shipments moved between Jan. 7, 1919, and March 19, 1919.

The I. C. C. has dismissed complaint in Docket 13040, Hazel Atlas Glass Co. vs. the Director General of Railroads as agent of the Pennsylvania R.R., having found the rates assailed by complainant to be applicable. Complainant alleges that the Washington, Pa., rate of 45c. charged on 180 carloads of coal shipped between Jan. 1 and June 24, 1918, from Meadow Lands, Pa., to its plant No. 2, on the Tylerdale Connecting Railway in Canton Township, Pa., was inapplicable and unreasonable.

In Docket No. 12412—Texas Steel Co., R. S. Collins and W. H. Lantz, Receivers, vs. Director General of Railroads as agent, Chicago, Rock Island & Pacific Railway Co., et al.—**the I. C. C. finds that rates on coke, in carloads, shipped from Potter, Okla., to Rusk, Texas, during federal control, were unreasonable,** and awards reparation to complainant. The Texas Steel Co. alleged that the rates charged on 121 carloads of coke shipped between Jan. 14 and May 23, 1919, inclusive, from Howe-Potter, Okla., to Rusk, Texas, were unreasonable and in violation of Sec. 4 of the Interstate Commerce Act.

Association Activities

West Kentucky Coal Operators' Association

C. F. Richardson, of Sturgis, representing the West Kentucky Coal Co., has been named president of the West Kentucky Coal Operators' Association for the coming year. Other officers named are: J. D. Overall, Madisonville, of the Reinecke Coal Mining Co., vice-president, and C. E. Reed, secretary. The executive committee includes the following new members: F. P. Wright, Bevier, of the Crescent Coal Co.; H. L. Tucker, Central City, of the Rockport Coal Co.; A. W. Duncan, Greenville, of the W. G. Duncan Coal Co.; M. B. Lanier, Nortonville, of the Norton Coal Mining Co.; P. D. Berry, Providence, of the Providence Coal Mining Co.; Brent Hart, Morton's Gap, of the Hart Coal Co., and F. D. Rash, Earlington, of the St. Bernard Mining Co. An organization has been formed for handling transportation matters and seeking better freight rates. As usual, some of the newspapers came out with stories of the last meeting and argued around prices as the basis of the meeting. One paper later retracted its story on price discussion, which is not within the province of the organization. J. Van Norman, attorney for the organization, talked on traffic matters and cases handled before the Interstate Commerce Commission, and C. E. Reed made an interesting report of the year's work.

Hazard Coal Operators' Exchange

J. E. Johnson, Lexington, Ky., was elected president of the Hazard Coal Operators' Exchange at the annual meeting Jan. 13 in Lexington. J. T. Hatfield, Cincinnati, was chosen vice-president, and H. E. Bullock, treasurer. The secretary's office is appointive, by the executive committee. The executive committee elected was: Carol Robinson, Lexington; William J. Brown, Jr., Lexington; S R. Johnson, Johnson City, Tenn.; J. H. Bowling, Lexington; Henry Pfenning, Lexington; James Bonneyman, Cincinnati; H. K. English, Lexington; Prentice Burlingham, Cincinnati; W. E. Davis, Lexington; George W. Hay, Jenkins; W. S. Dudley, Lexington; H. H. Heimer, Columbus; A. L. Allais, Chicago, and G. P. Fitz, Hazard. A banquet was held at the Phoenix Hotel, with over 300 covers laid. W. O. Davis was toastmaster, and talks were heard from the Governor, leading coal operators and some of the big men of eastern Kentucky.

Cincinnati Coal Exchange

—The tenth annual banquet of the Cincinnati Coal Exchange was held Jan. 23 at the room of the Automobile Club and was attended by 125, the largest in its history. George Cushing, of Washington, in a characteristic talk advised resistance to the demands of the Fact Finding Commission for business information that would lead into the private affairs of the selling companies. J. D. A. Morrow, now a member of the Cincinnati trade, made a happy little talk on the coal trade as seen from the viewpoint of the upbuilding of man from the monkey stage of three million years ago. He said that probably this was the cause of too much "monkey government" in Washington. Charles Dering, of Chicago, and Joe Tuohy, were among others who featured the program.

Tug River Coal Operators 'Association

At the annual meeting of the Tug River Coal Operators' Association, held in Bluefield on Jan. 4, the following officers were elected: L. Epperly, of Bluefield, president; A. F. Leckie, of Welch, vice-president; C. C. Morfit, of Welch, secretary; J. T. Wilson of Bluefield, treasurer. The new president of the association is general manager of the Collins interests in West Virginia, having his headquarters at Bluefield. At its annual meeting the association indulged in a thorough discussion of conditions now affecting the industry, the transportation situation coming in for a lion's share of the discussion, as the full operation of mines in the Tug River field has been interfered with to a great extent by the inability to obtain cars.

Northeast Kentucky Coal Association

Levity and entertainment and the Chamber of Commerce smoker closed the meeting of the Northeast Kentucky Coal Association Jan. 25 at Ashland, Ky. Officers elected are C. W. Conners, Esco, president; E. R. Price, Vanlear, vice president; E. L. Bailey, Lookout, second vice president; George B. Archer, Prestonsburg, treasurer; Henry Laviers, Paintsville, T. S. Haymond, Wayland, and G. W. Hay, Jenkins, executive committee; C. J. Neekamp, secretary.

Coming Meetings

Northern West Virginia Coal Operators' Association will meet Feb. 13 at Fairmont, W. Va. Secretary, G. S. Brackett, Fairmont, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

National Foreign Trade Council will hold its annual conference April 25-27 at New Orleans, La.

Pittsburgh Vein Operators' Association will hold its annual meeting Feb. 12 at the Hotel Cleveland, Cleveland, Ohio. Secretary, D. F. Hurd, Cleveland, Ohio.

The Upper Potomac Coal Association will hold its annual meeting Feb. 10 at Cumberland, Md. Secretary, J. F. Palmer, Cumberland, Md.

Northwestern Pennsylvania Coal Operators' Association will hold its annual meeting March 6 at the William Penn Hotel, Pittsburgh, Pa. Secretary, T. F. Diefenderfer, Butler, Pa.

Canadian Institute of Mining and Metallurgy's annual meeting will be held March 7, 8 and 9 at the Mount Royal Hotel, Montreal, Quebec, Canada. Secretary, George C. Mackenzie, Montreal, Quebec, Canada.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Overdevelopment and Nationalization

IN HIS annual report Director Bain of the Bureau of Mines points out and decries the tendency of the West—that is, the public-land states—to so increase coal-mine development beyond current needs and thus "to bring about the same unhealthy condition [that is to say, overdevelopment] in the West, the same loss of capital and distress among miners that was so marked a feature of 1921 in the East and Middle West." Mr. Bain thinks that the federal government should be given some discretion in granting extension to the coal-mine development of the public-land states.

On another page we publish the protests of a correspondent from Lewis County, Washington, against talk of the coal industry being overdeveloped, in so far as his part of the world is concerned. Mr. McBride holds that the West is not overdeveloped, that it needs more coal mines—especially larger, better operations. He regrets that this charge has been spread over the West, hindering acquisition of new capital. We have heard operators in the East as well express the wish that the Coal Commission had not publicly advised against investment in the soft-coal industry.

Director Bain points out that, "taking into account all mines now operating on private lands and government leases, there will be built up within two years in thirteen Western states a mine capacity of 80,000,000 tons, whereas the maximum war-time market for coal from these states was 40,000,000 tons, and is now less." Remedial legislation obviously would take the form of permitting the withholding of coal leases on public lands. The present Secretary of the Interior, Mr. Fall, apparently has held that the leasing law compels the department to give all applicants the coal lands they desire to lease, although, as Mr. Bain points out: "The department cannot, however, without violation of the plain intent of the law, grant leases without setting up requirements as to minimum production per annum. It was clearly not the intent of Congress that leases should be granted to tie up land for long periods for speculative purposes. So each lease granted must require the mining of a minimum amount of coal per year and the giving of effective bond for performance. The results that flow from this seem to have been overlooked by the lessees and others."

The West is not overdeveloped, at least not notoriously so. When in the boom year of 1920 the soft-coal mines of the country as a whole averaged but 220 days' operation, Montana did 250 days, New Mexico 302, Wyoming 264, Colorado 255, and Washington 260, although Lewis County, in which Mr. McBride operates, did but 201 days. Such comparatively good records of operation do not indicate a great superfluity of coal mines. On the other hand, this winter, while the East is experiencing a car shortage and prices to suit, the Far West is chalking up time lost because of "no market."

We quite agree with Director Bain's general theory —that the coal industry of the West is storing up future grief for itself when it doubles its capacity in two years. The industry is far better off when production on a full working schedule more nearly matches demand. Were the federal government to undertake to hold back the granting of leases on public lands on any pretext of saving the industry from itself, the protest would be loud and long. While the East is debating nationalization of coal and stewing over ways and means of curing overdevelopment and irregular operation, there lies within our hands a nationalized piece of this self-same industry.

Under the leasing measure, we retain title to the coal and rule through bureaus at Washington on how the coal shall be mined, even as in France.

If we, the American people, through our Congress, want to exercise our rights of ownership, we can do whatever we desire with these public coal lands of the Far West. Is it not significant of the temper of the country that these lands are being turned over to private enterprise even as the farmer-owned lands of the East?

Knuckling of Mine Cars

SO MANY are the causes of derailments that one cannot wonder that A. S. Brosky omits one of them in his interesting article that we publish this week. Too many mine engineers design changes in the vertical alignment of track in a manner in which they would never design horizontal changes. That is, they will allow their vertical alignments, or gradients, to meet in a sharp peak but will insert curves between their horizontal alignments. Every important change of grade, every knuckle or dip, should be carefully and deliberately rounded off so that one car cannot be on one gradient and the next on an entirely different one.

This provision is more important in mines than on a railroad, because it is customary to provide in the former case that the overhang of the end of the car shall be as long as the wheelbase or, what is the same, that the car shall be three times the length of the distance between axle centers. This seems also to be the English rule. No one knows why this relationship has become established. Certain it is that knuckles in the track would have a less injurious effect if the wheels of mine wagons, as in railroad cars, were placed near the bumpers. Unfortunately, however, the tendency is all the other way. Two cars, recently illustrated in *Coal Age*, one in use in Montana and the other in West Virginia, were 4.1 times as long as their wheelbases. At a mine in Tennessee two separate types of cars had this ratio as high as 5:1. In the last two instances the overhang was more than twice as long as the wheelbase.

Any given change in gradient or any irregularity in the track such as an uneven joint will cause a greater movement at the bumpers than would occur if railroad practice as to the location of the wheel support were

followed. Should the bumpers fail to slip past each other, as they may when the trip is being pushed or held back on a steep grade, then the end of the car needing such a movement to adjust itself to changing track conditions on seeking to go downward might be lifted off the track, or in seeking to rise might tilt the end of the car nearest it, or tilt its own opposite end upward, provided the movement between bumpers at that end is not sufficiently restrained by the weight of the car and the bumper resistance.

Cars with a liberal overhang have the advantage that they can be more readily turned on a sharp room switch and can be more speedily replaced when they leave the track, but they can be detracked with equal ease, and the question arises whether it would not be better to use a longer wheelbase and make the turns into the rooms of somewhat greater radius. Fortunately the necessity for moving mining machines and still more power loaders into rooms is making managements more favorable to the use of easier room curves, but this has been accompanied by an increase in the length of cars, so that what has been gained in one direction has been lost in another.

Submerged Pumprooms

SUCTION will lift water only about 25 ft. in practical operation. It is necessary, therefore, to place pumps down close to the bottom of the mine that they are to keep free from water. Unfortunately, if the water rises, the pump is soon flooded and useless. Of course, pumps can be built that can be operated from the surface. The old Cornish pump was of this description. The engine was placed near the rim of the shaft and long pump rods descended almost to the sump and operated the pump below. This pump would be operated no matter how high the water might rise.

The long pump rods were in the way, and in America this arrangement has not been popular. The tendency has been to put the prime mover near the pump, but that meant keeping the water down below the pumping equipment or losing the use of it whenever a severe flood occurred. At first steam for the engine was passed down the shaft in pipes, but this was not desirable, for an important loss of pressure resulted and, where the shaft was lined with timber, fires were likely to break out from the heat of the steam.

When electricity was introduced it was carried down to a motor, but with electrical machinery placed at such a low level much risk was run that it would be submerged and when the water had been pumped out by some other means the motor might have to be hoisted to the surface, overhauled and baked in an oven to free it from moisture. Consequently some means to prevent the pumproom from being flooded seems desirable. Of course, with much standby capacity and large storage this difficulty might be met. If the pump failed or the water came in too fast for the main pump, another unit that was in condition could be put into operation. In case of a pump failure this might be successful in keeping down the water, but if the inadequacy was due to an excessive flood or if the flood came during a pump failure, then submergence of the pumps might not be avoided. Consequently the difficulty was not satisfactorily solved.

It was from a realization of this difficulty that the submerged pumproom resulted. In *Coal Age* this week D. C. Ashmead describes such a provision. Here the standby capacity is four times as great as that of the pump that is normally in operation; there are two pumps each twice as big as the unit on which the management relies for meeting the daily drainage needs of the mine. Nevertheless this large provision is made yet more ample by providing that until the water rises to the bed 120 ft. above, the pumproom will not be flooded. Even then by erecting a further dam it will be possible to go on pumping, utilizing the area in the second seam as storage for more water.

In August, 1920, the American Institute of Mining and Metallurgical Engineers visited the Athens mine, in the iron regions. The shaft of this mine is 2,489 ft. deep. At the bottom, or 2,400-ft. level, a pump was placed in a chamber to which access was obtained through a steel bulkhead, which, when closed, would make it possible for water to rise 100 ft. to the next level before flooding the pumproom, which could be approached by a "blind or staple" shaft, to use the language of our British cousins. The pipe entered the pumproom through the bulkhead, so that water could reach the pump but not flood the chamber in which the pumping was done. This was described in an article which appeared in *Coal Age*, Vol. 18, p. 532.

In the Gray slope the access to the pumps is not through a staple shaft but by a rock tunnel, but the principle is much the same. It will be noted that the only loss of power incurred by putting the pump thus low arises from friction, for the water entering the pump has the static head of the water above it—whenever it is above it—and so lessens the work that the pump must perform.

For this reason it might seem well to keep the pumproom where it will always be submerged, for by this means no difficulty ever will be experienced in making the pump take water. It will not have to pick up its water, for the water will flow under pressure to it. This advantage, however, has not been used in the Gray slope, but it seems worth considering.

It would seem that the advantage of this system is not confined to shafts. Even in slope mines, and perhaps in some drift mines, it might be used with advantage, not only to avoid starting difficulties but to prevent the flooding of the pumproom. A bulkhead could be placed above the level of the seam ready for use if the mines were completely flooded. Through this bulkhead entrance to the pumproom could be obtained. Should the flood rise above the bulkhead it could be closed and entry be made by a shaft from some higher seam, down which men could be lowered if necessary. With modern electrical equipment, however, it might be possible to leave the machinery to its own electrical devices, especially if the motor were designed so as not to heat excessively even with continuous running. All motors that are needed for pumping where flooding is feared, no matter what the circumstances may be, should be so designed.

THE COAL COMMISSION named by the President to investigate the coal industry in America is pushing forward its work with commendable speed, and promises to make its report before April 1, the expiration of the present agreement. We hope the commission will make its report as short as possible; it can add all the statistical tables it desires. It is most important the public come to an understanding of the coal problem in America, and this understanding can best be reached through a short, concise summing up.—*Louisville Evening Post.*



Zeigler No. 2 Adopts Cage Hoist and Raises Seventeen Tons per Minute with Ease

Cars Hold Five Tons—Seven Dumps Made in Two Minutes—Reciprocating Screen Plate Under Bins Resizes Nut Before Loading—Degradation Returns to Rescreener — Fuel Coal and Ashes Handled by Same Conveyor

By Frank H. Kneeland*
New York City

FROM the standpoint of daily output per single producing mine opening few coal plants can compete with those of the Bell & Zoller Mining Co., at Zeigler, Ill. During the month of March, 1922, Mine No. 1 produced, so far as is known, the largest monthly output of any mine in the world, the total output for the month being 164,109 tons, or an average of 6,078 tons per working day.

Mine No. 1 is an old operation, the shaft having been sunk many years ago. At the opposite end of the town lies Mine No. 2. This is a new development which has been hoisting coal for only about a year. Probably in no coal field in the world is competition more keen, nor is the preparation of bituminous coal carried further than in southern Illinois. Inasmuch as all profit, if any is made, is derived from the larger sizes of coal, every effort is made to keep down degradation. For this reason the practice at Zeigler No. 1 of discharging the coal from the mine cars by means of a rotary dump and hoisting it in a skip has been abandoned at No. 2 mine. This latter operation has self-dumping cages operated in balance in the usual manner.

The coal hoist installed at this mine consists of a pair of 28x42-in. Litchfield engines direct connected to an 8-ft. cylindrical drum. It is fitted with a steam brake and steam-actuated reversing mechanism. The rope is $1\frac{3}{8}$ in. in diameter. The cages are hoisted at this shaft with unusual rapidity. What the hoistman might be

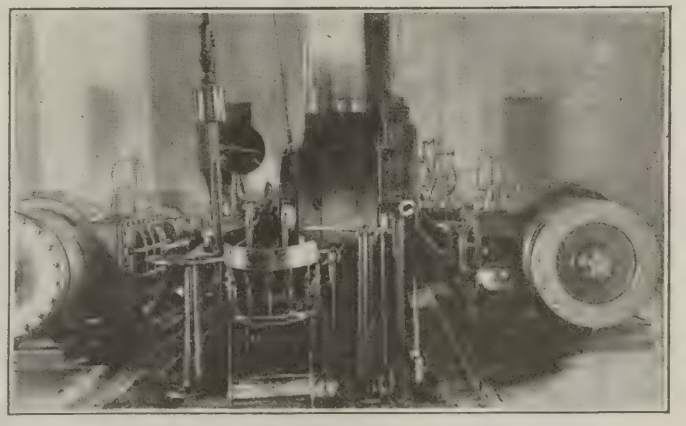


FIG. 1—HOISTING ENGINE, ZEIGLER NO. 2
This engine is lifting cages containing 4.9 tons of coal at such a speed that seven dumps are made in 2 minutes—that is $3\frac{1}{2}$ cars are discharged per minute. This is done without any unusual effort but owing to the lack of men it is not possible to feed the coal continuously to the shaft so that the output of over 8,232 tons per day which this speed of hoisting would indicate can be attained.

*Associate Editor, *Coal Age*.

NOTE—Headpiece shows foot of hoisting shaft, Zeigler No. 2. This view is taken from the empty-car tracks of the bottom. The car on the left is on the cage, which is standing at the landing. The car on the right is on the far side of the shaft ready to pass onto the cage when it descends.

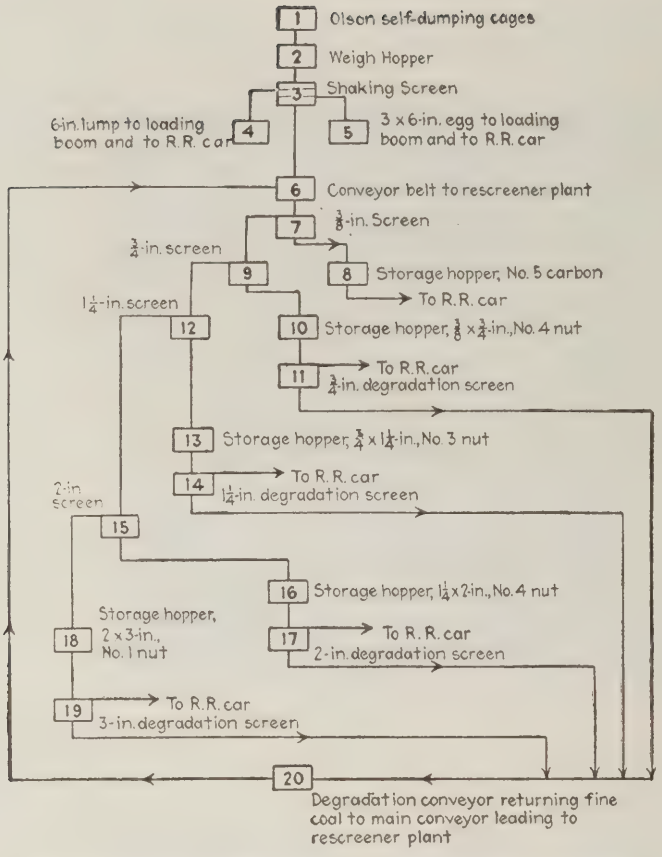


FIG. 2—FLOW SHEET OF TIPPLE AND RESCREENER

In the tipple is made a lump coal which passes over a 6-in. screen and an egg which passes through that screen and refuses to pass through one with 3-in. openings—3x6-in. egg, it is termed. In the rescreener is made nut coals which will be held on 2-in., 1¼-in., ¾-in. and ⅜-in. screens and a fine coal known as No. 5, or carbon, that passes through the ⅜-in. openings.

able to do if he tried his utmost is unknown, but in the course of an ordinary day's run an average of seven dumps in 2 minutes or, what is the same, of 3½ cars per minute, is not in the least uncommon.

When it is considered that the cars are of 5 tons nominal capacity and normally are loaded each with about 4.9 tons of coal, the daily possibilities of this mine become immediately apparent. Seeing that this speed of hoisting can be easily attained even though it be for only short intervals under present conditions, it would appear that when both organization and mine are tuned up to "concert pitch," as was Mine No. 1 during last March, the older operation will do well to look to its laurels.

At this operation the usual southern Illinois practice of making in the tipple proper only two sizes—6-in. lump. and 3x6-in. egg—has been followed. The flow sheet, or sequence of operations performed, may be seen in the illustration above (Fig. 2). The process of preparation is as follows: From the Olson self-dumping cages (1) the coal is discharged to a weigh hopper (2), from which it is discharged to the shaker screen (3). This screen has two sizes of openings—3 and 6 in. The coal that passes through the 3-in. openings is directed to the conveyor belt (6) leading to the rescreener plant. The coal that passes over the 3-in. openings but through the 6-in. perforations is known as 3x6-in. egg and goes immediately to the railroad car by way of a picking table and loading boom. That portion of the mine product that goes over the 6-in. circular opening of the tipple screen is known as 6-in. lump, and it also is loaded under the tipple after being passed over a picking table and loading boom.

Turning now to the coal that passes through the 3-in. openings in the first shaker, the belt conveyor, to which reference has already been made, delivers this to the rescreener plant, which is a separate building standing at some distance from the tipple proper. Here the coal is passed successively over ⅜-, ¾-, 1¼ and 2-in. screen openings, the five sizes thus made being known as No. 5, or carbon, and Nos. 4, 3, 2 and 1 nut coal.

On either side of the rescreener plant is placed a row of five storage hoppers, each having a capacity of 150 tons. Under each hopper is a reciprocating plate feeder. In all cases except that of the No. 5 carbon this plate is perforated with holes of the same diameter as those over which that particular size of coal was made, the plate thus forming an efficient degradation screen. Obviously the bins containing the No. 5 "carbon" require no such screen.

After passing through the ⅜-in. screen (7) the No. 5 or "carbon" goes to its storage hopper (8) and thence to the railroad car. Material passing over this screen goes to one with ¾-in. openings (9). The coal passing through this screen goes to the No. 4 nut hopper (10) and thence over the ¾-in. degradation screen (11) to the railroad car for shipment. Degraded coal passing through the openings of this screen (11) goes to the degradation conveyor (20), which returns it together with that from all the other degradation screens to the main conveyor leading to the rescreener plant.

Further description of rescreening operations hardly will be necessary, as the various processes are all similar and should be obvious from the flow sheet. It should be stated, however, that the rescreener building stands alongside the power plant and that provision accordingly is made to supply fuel to this plant direct—that is, by a coal spout leading into the basement of the boiler room. Of this arrangement more will be said later.

Two railroad tracks pass beneath the rescreener plant, one under each row of bins. The capacity of each bin (150 tons) is sufficient to assure the prompt loading of any car that may be placed beneath any particular bin. Furthermore, the contents of such a car will be as free from degradation products as it is possible to render it. In general both tipple and rescreener plant are of steel construction, only the floors being of wood. Ample window space gives the tipple plenty of light.



FIG. 3—CLEANING EGG COAL ON THE PICKING TABLE

The front end shows the loading boom to which the table leads and by which the egg coal is taken to the railroad cars.

So much for the coal-preparation plant proper. The surface works at this mine include a power plant, the necessary shops, a wash house, fan and fan house, and the headframe surmounting the man-and-material shaft, together with the man hoist and the structure that houses it. All of these buildings are of a permanent and substantial nature, fireproof materials (except in case of some floors) being exclusively employed.

The power house consists of two distinct units, boiler room and engine room, separated from each other by a partition. The building is constructed of brick, steel and glass and rests on a concrete foundation. In the boiler room six 366-hp. Heine boilers are installed. These are set in batteries of two each and are provided with Green chain-grate stokers. Four of these boilers are set with a height of 7 ft. from top of stoker rail to bottom of front water leg. In the other two boilers the height has been increased to 10 ft., thus affording a larger combustion space between the grate and tubes. When burning a fuel as high in volatile matter as the coals of southern Illinois an ample combustion space is highly advantageous, particularly when the boilers are being forced beyond their rated capacity.

The stokers under these boilers are all 8 ft. wide. Their length in four of the boilers is 9 ft. and in the

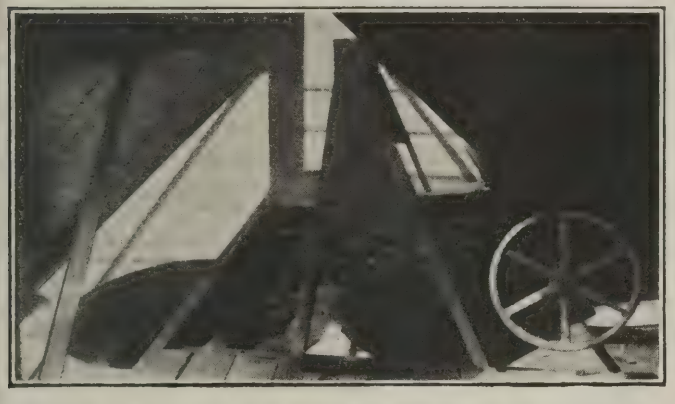


FIG. 4—NUT COAL BEING RESIZED BEFORE LOADING
In the anthracite region the coal drawn from the various bins passes over lip screens to remove degraded material. Soft coal is similarly degraded, and so, at Zeigler No. 2, all the nut bins are fitted at the bottom with reciprocating plate feeders which are perforated so that all material below standard size will be removed. The undersize goes back to the rescreener. The anthracite and the Illinois regions have this in common that in both unusual care is taken to size the coal scrupulously for the market.

other two 10 ft. All the stokers are driven from a line shaft beneath the floor, the eccentric rods extending upward through slots in the floor beside the stoker rails. Two small vertical steam engines drive the line shaft through a belt. Only one engine is required at a time, the other being held as a spare.

Hopper-bottomed overhead steel bunkers supply coal to the stokers through movable downcomer pipes. Reference already has been made to the fact that coal from the rescreener plant is spouted direct into the basement of the boiler room. Here it is delivered to a Peck carrier that forms a vertical loop extending completely around the entire bunker installation. The path of this conveyor is practically rectangular, consisting of two vertical and two horizontal parts. The two vertical parts parallel the two ends of the boiler room; one horizontal part extends above the coal bunkers, the other below and in front of the ashpit doors in the basement. The carrier buckets are so arranged that they will discharge their contents at any desired point.

By means of this carrier, coal delivered to the basement of the building is discharged to any bunker desired. Ashes removed from the boiler ashpits are carried horizontally to the end of the building and then elevated to a point near the top, where they are discharged and spouted to an ash bin outside. From this bin they are hauled away by wagon or truck and are used in grading about the plant, in surfacing the dirt roads in the vicinity or for any other purpose to which they may be adapted. The carrier thus not only fuels the plant but removes the ashes as well, both operations being entirely mechanical.



FIG. 5—ZEIGLER NO. 2, A LEADER IN BOILER PRACTICE
Chain-grate stokers and combustion chambers of the generous height suited to a high-volatile coal such as Illinois produces reduce the cost of power production. In order to make sure that coal will be delivered without interruption even the engine driving these stokers has its spare unit. These boilers have a capacity of 2,196 hp.

Three centrifugal pumps feed the boilers. These are installed in the basement of the boiler room and consist of two Manistee Roturbo machines driven through direct connection by Moore steam turbines; also a similar pump direct connected to a Terry turbine. In addition to these centrifugal units two steam piston pumps have been installed, one of which lifts water from the storage dam to an elevated tank. The other supplies the feed-water heater.

Before being fed to the boilers all feed water passes through a 3,500-hp. open feed-water heater. The two newer boiler units are fitted with a device that regulates the dampers automatically, and it is intended eventually to control the draft of all the boilers in like manner. Natural draft is furnished by a brick stack 13 ft. 6 in. in internal diameter and 225 ft. high.

Within the engine room three generating units have been installed, together with the necessary switchboards, electrical instruments and control devices. These com-



FIG. 6—FORGE SHOP HAS EVERY NEEDED DETAIL
Large cars, machine cutting and large operation are daily demanding more and more of the blacksmith shop. Mule shoeing and pick sharpening made far smaller demands on equipment than does the varied work of the modern shop.

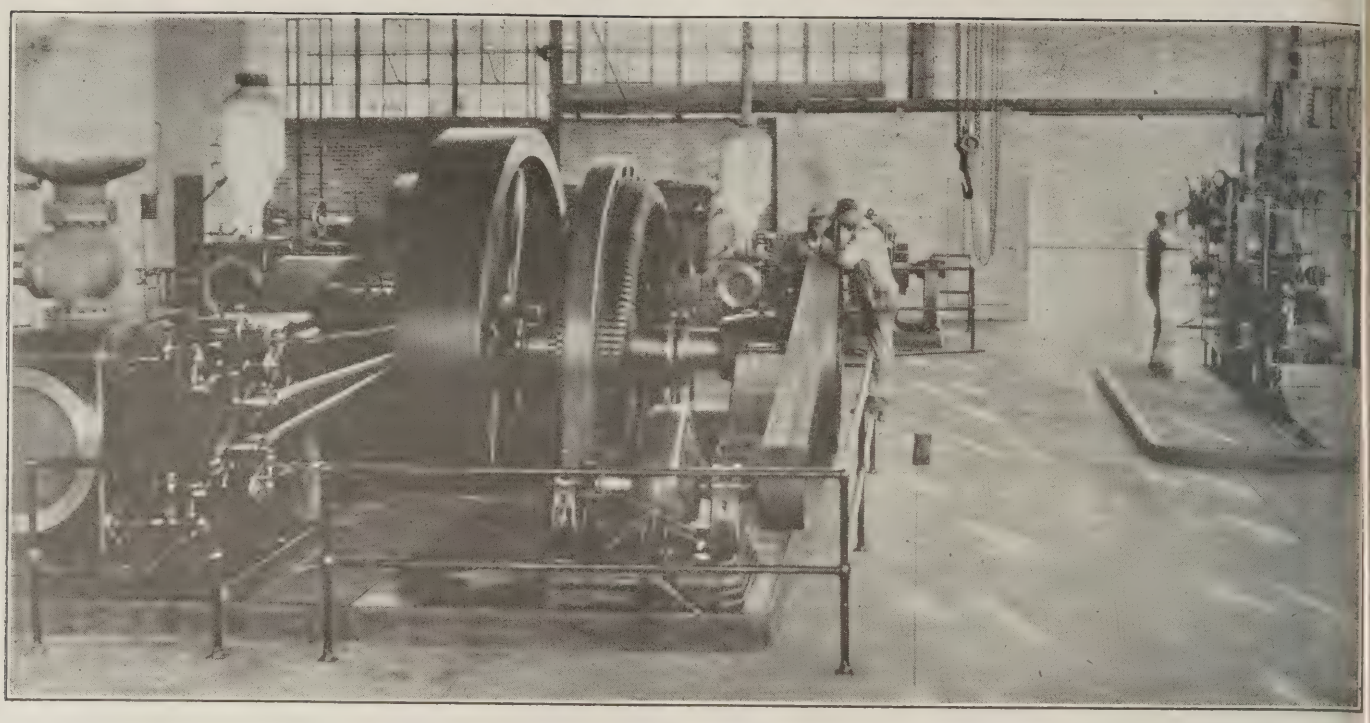


FIG. 4—HIGH-SPEED ENGINES DRIVE ELECTRICAL MACHINES
At Zeigler No. 2, economy in the production of steam is no less marked than the frugality exhibited in the use of it. The three units have an aggregate capacity of 959 kw. They soon will be supplemented by a turbine-driven unit. The two electrical units in the rearground are direct-current generators. That in the foreground is an alternating-current generator.

prise one Sprague 300-kw. 1090-amp. 250- to 275-volt direct-current generator direct connected to a 22x25-in. Chuse non-releasing corliss engine operating at 200 r.p.m.; one 364-amp. 250- to 275-volt direct-current generator direct connected to and driven by a 14x17-in. Chuse non-releasing corliss engine operating at 235 r.p.m.

In the rear of these two units and in the foreground of Fig. 7 stands a 169.5-amp. 540-kw. 60-cycle, 2,300-volt alternating-current generator direct connected to a 28x32-in. Chuse non-releasing corliss engine operating at 150 r.p.m. This unit is excited by a small generator driven by a belt from a pulley mounted on the end of the main generator shaft and overhanging the outboard or pedestal bearing.

Within a short time a large turbine unit will be installed in the rear of the equipment just described. The foundation for this new machine is now being placed. It will occupy approximately the position of the camera when taking the photo reproduced in Fig. 7. A 10-ton hand-operated traveling crane spans the width of the engine room and traverses the building from end to end.



FIG. 8—MACHINE SHOP AND ITS EQUIPMENT
Speedy repairing is one of the characteristics of a modern plant. Some part of the equipment is always needing repair. If it can be adequately and rapidly repaired at the mine the tonnage is maintained. Unfortunately accounting is not readily pushed so far that against every breakdown is charged not only the labor and material of repair but the loss of efficiency that the idleness of the part being repaired almost inevitably occasions. If that charge could be, and were, made, the realization of the value of the repair shop would be driven home with more force.

The shops at this plant, as may be judged from the accompanying illustrations, are substantially built, well arranged and adequately equipped to perform the general run of work that must be done at an operation of this kind. The wash house is 40x180 ft. in ground dimensions and is fitted to accommodate 1,000 men, about 700 now being employed above and below ground at this operation.

The air-man-and-material shaft is located about 700 ft. from the main shaft. It is served by an 18x36-in. steam hoist fitted with a 5-ft. cylindrical drum and a hoist rope 1¼ in. in diameter. The fan supplying air to the mine is a 16x5-ft. Jeffrey machine, direct-connected to a 20x24-in. Chandler & Taylor engine. It is now operated at approximately 90 r.p.m. and supplies about 175,000 cu.ft. of air per minute.

The real criteria by which any industrial or other plant must be judged are the results accomplished. Thus far Bell & Zoller plant No. 2 has not had an adequate opportunity to show of what it is capable. The plant as a whole is new and not as yet thoroughly "limbered up." The morale of the organization, however, appears to be excellent and all concerned seem to take a wholly justifiable and commendable pride in the speed with which coal can be brought to the surface. As remarked earlier in this article, therefore, when opportunity comes and both equipment and organization are thoroughly "in tune," plant No. 1 may have to do its utmost if it is to continue to be the world's champion coal producer.

ONE OF THE CONGRESSMEN points out that a great part of our country has been settled by immigrants. He fails to make mention, however, of the parts that have been unsettled by them.—*Manila Bulletin.*



Cutting Derailment Costs by Suitable Precautions

One-Inch Is Maximum Permissible Wear for Locomotive Tires—False Flange Compels Wheel to Climb Over Switch Rails and Frogs—Projecting Lips for Bumpers—Protecting the Legs of Steel Sets—Track Rerailers Desirable

By Alphonse F. Brosky*
Pittsburgh, Pa.

OF ALL the questions put by mine engineers perhaps the most persistent of all is: What is the maximum permissible wear of locomotive tires, and what is the effect of inadequate locomotive clearance on the behavior of a mine locomotive? Cases are known where locomotives have been derailed because their tires had worn down to such an extent that the clearance between the underside of the locomotive and the rails no longer was sufficient.

Where this happens a piece of slate or a hard lump of coal on the roadway may raise the locomotive from the track and cause it to leave the rails. This is more likely to occur where the track rolls, for in that event the front end of the locomotive tilts upward or downward as it travels along the roadway. By better locomotive design the dangers of derailment arising from the faults of the machine itself are being eliminated. In consequence practically all new locomotives are safe in this respect. In the past a few locomotives were designed without enough underclearance to permit the machine to run safely even when the wear on the tires still was within reason.

Knowing this, inquiry was made of mechanical engineers at mines as to the wear on a locomotive tire which might be considered reasonable, economical and safe. The reports received from many of those consulted indicated that they were practically unanimous in the belief that a locomotive never should be allowed to lower more than 1 in. by the wearing of the wheels—that is, the web radius should be reduced no more than that. Practice from mine to mine varies but little in this regard. Tires are permitted to wear ½ in., more or less, before the first turning. Then they are worn ½ in. more, thus lowing the locomotive 1 in. Occasionally it is the practice to allow the tires to wear down still more, in which event they should be turned twice. This practice is neither economical nor safe, however.

Should Wheel Tires Be Turned or Scrapped?

The superintendent of an isolated mine plant should analyze his tire cost, including all items of expense, not omitting the cost of turning. If he does so he may find that it is more economical to scrap a tire after it has become worn down ½ in. than it would be to have it turned for further use. This would be true where the mine is not equipped with a machine shop capable of doing the work. A general superintendent in an outlying district informs me that experience has taught him that it is unprofitable for him to turn down his tires. The cost of removing and sending them away for turning almost equals the cost of a new tire.

On well-kept haulage roads where no obstructions project above the level of the rails, a well-designed locomotive is in little danger of rubbing along the bottom, even though the tires be allowed to wear thin. The locomotive designers with one exception, and then only in exceptional cases, have taken care in all instances to provide clearance that will suffice as long as the tires are not allowed to wear abnormally.

Even though the motors on locomotives are hung

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Note—The headpiece to this article shows the tracks leading from No. 1 and No. 2 drifts of Mine No. 214 of the Consolidation Coal Co., at Roberts, Ky. The rail weighs 56 lb. per yard and is laid on 6x6-in. ties set on 18-in. centers. The diamond crossover, however, is laid on 8x8-in. ties so closely placed that they almost form a floor under the crossing. Between the guard rails and the true rails is placed a 2x2-in. steel piece which gradually rises toward the crossover. The flanges of the wheel ride on this bed of steel, thus elevating the tread of the wheel above the rail. In this manner the wheel, resting on its flange, has continuous support. In passing over such intersections the wheels do not bump in the customary manner. In fact the locomotive rides so easily that the passage over the intersection is hardly noticed by the motorman. Tracks like these are not excelled on the best of railroads.

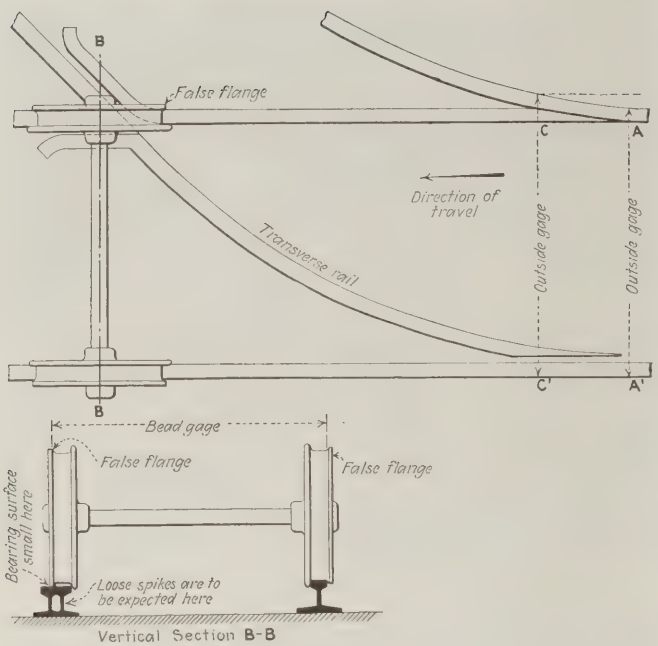


FIG. 1—GROOVED WHEEL CROSSING A SWITCH

With a grooved wheel, the false flange has to climb over the switch rail and the frog. Before it rises it becomes wedged by the recession of the surfaces against which the false flange rubs. This tends to loosen or upset the rail and to bring a thrust on the wheel. If the wheel is loose it comes off; if tight, the pin that holds it may be sheared. If it is on a locomotive and has a loose tire, that tire may be pulled off. When it finally climbs, the wheel so raised is higher than that on the other side, and the thrust is reversed. The climbing is injurious to the rail, and the running of the thin bead on the top of the rail or frog soon wears it down, a most injurious action. All of which explains why grooved wheels are to be avoided as much as possible and why some means of readily turning them in service or out of service at minimum labor continually is being sought.

low and tires wear or are turned until they are thin, reducing the underclearance as much as 1½ in., this should not cause the locomotive to rub on the bottom, provided the roadway is clean. It is not safe to lay too much stress on the cleaning of the roadway, however, for a fall of rock or coal from a car or from the roof may make the roadway, however well kept, far from clean at the point where it occurs. With decreased clearance the chances of the lowest point of the locomotive touching the transverse rail at a switching point are greatly increased.

Locomotive clearance always must be figured from the elevation of the top of the rail and not from its base. The locomotive may pass readily above the ties and yet come to grief at the transverse rail of a turnout.

The clearance between the top of the rail and the frame on low types of Westinghouse-Baldwin mining locomotives is from 4 to 4½ in. With the standard type the clearance is 6 in. However, the distance between the lowest part of the motor and the top of the rail is between 2 and 2½ in. From 1 to 1½ in. is the maximum depth to which the tire should be allowed to wear.

Deeply grooved locomotive tires are likely to cause accidents not on the straight track but in transferring at switch points and to a lesser extent in crossing over points of narrow-angled or large-numbered frogs and also in passing crossings. Not only do grooved tires cause derailments but they also damage the track accessories, and these in turn damage the locomotive, and thus the injury is intensified. The wheels of the rolling stock, even if they have no false flanges, will wear both themselves and the track.

Each time a wheel passes over from a wing to the point of a frog, or vice versa, a gap must be crossed. The passing of a wheel either of a mine car or a locomotive once over such a gap will do little damage, but during the life of rolling stock the wheels pass many times over these gaps. Although the mine cars and locomotives travel on straight track most of the time, the ill effects of turnouts and crossing on wheels are greater than the ordinary wear on a straight track. In Fig. 1 a mechanical analysis is made of the action of grooved tires at frog and switch points. A little study here will make clear the mechanics involved.

Referring to the plan, let us assume that a pair of locomotive wheels with deeply grooved tires moves toward the frog. As the wheels advance from AA' toward CC' the outside gage of the track widens though the wheel gage is constant. At AA' the outside gage of the track probably is equal to that of the distance between the false flanges, but as it widens this ceases to be true.

If there were no false flanges the wheels would travel along without any resistance except that normal to straight track, but as there is a false flange the wheel must rise so that the bead on the tread of the wheel can lift itself onto the top of the receding rail of the side track, and before it does that it becomes wedged and has to force itself clear. The same condition also is apparent when crossing from the straight rail to the frog as at B. Traveling at speed under such conditions one wheel is suddenly lifted, and that action imparts a sudden side thrust to the wheels. The action is similar to that in passing over a stepped track joint. Thus it is that grooved tires rapidly wear away the switch points. Passing in the other direction, that is from the rear of the frog to the point or from the frog toward the switch, the false flange will strike the incoming rails or the inside edge of the frog and produce a heavy thrust to the right.

Cannot Raise Switch Point to Spare Rail

To prevent derailments at such places the switch points might be raised so that they would stand at the height of the groove, but this practice would be impracticable for the grooving is not the same on all the equipment passing over the switch, and where the wheels are not so badly grooved the whole weight would fall on the point of the switch, with injurious results. The better plan is to keep the wheels reasonably free from false flanges. It is obvious also that the raising of the switch points would cause a thud when the wheels struck them, and the effect of such an elevation of the wheel would be to injure the switch point and cause the same side thrust as before.

When a grooved locomotive wheel passes over a frog point it is lifted up so as to permit the bead on the tread to cross the outer wing of the frog. In doing so the contact surface between the wheel and the rail is reduced considerably. If the frog is made of ordinary steel the false flange will rapidly wear a groove across the frog point. At best it is a difficult matter to anchor frogs and maintain their alignment. With grooved locomotive wheels it is still more difficult to prevent the frog being thrust out of line.

Unless locomotive tires are allowed to wear to a point where they have no strength, they will rarely come off at an inopportune moment. It is, it is true, a possible source of accident, and care should be taken to insure tight fits when putting tires on a wheel. Should the tire be shimmed, too much filler should not be added,

as it will put a strain on the tire which may fracture it and cause it to loosen or even come off.

One company reports an interesting accident. A gathering locomotive ran over its electric cable and severed it, and in doing so a small notch was burned in the web of the tire. The wheel rested on the exposed wires only a short time, but it was sufficiently long to weaken the tire at that point, so that not long afterward it opened up.

An instance is reported where a loose tire barely failed to cause a fatal wreck. A main-line locomotive intending to go north crossed a switch leading east. The frog engaged the loose tire and carried it toward the east. The locomotive, however, continued on its way north until it came to a curve going northwest. Not being held to the track, due to the absence of one of its flanges, the motor continued in a northerly direction and ran into the rib. The motorman jumped before the collision occurred, but two timber sets were knocked out and enough rock to fill fifteen cars fell on the roadway.

Loose wheels on mine cars are conceded to be exceedingly dangerous and without doubt cause most of the wrecks in mine haulage. These wheels will slide off at the slightest provocation when crossing a frog. Wheels rarely become loose on mine cars if they are equipped with roller bearings because the retaining pins rarely if ever break and fall out. One company reports that over a period of two years it did not have a single loose wheel.

Where mine cars are equipped with plain-bearing wheels a competent mechanic should grease the cars so that at the same time they may be inspected. Too many companies make the mistake of employing a boy or man who lacks the mechanical ability to do this work satisfactorily. One consulting engineer recommends that the scheme described in *Coal Age*, Aug. 10, 1922, page 197, be used as a means of making the detection of loose wheels absolutely certain. A similar arrangement could be rigged up underground where the lighting is insufficient for a really efficient inspection.

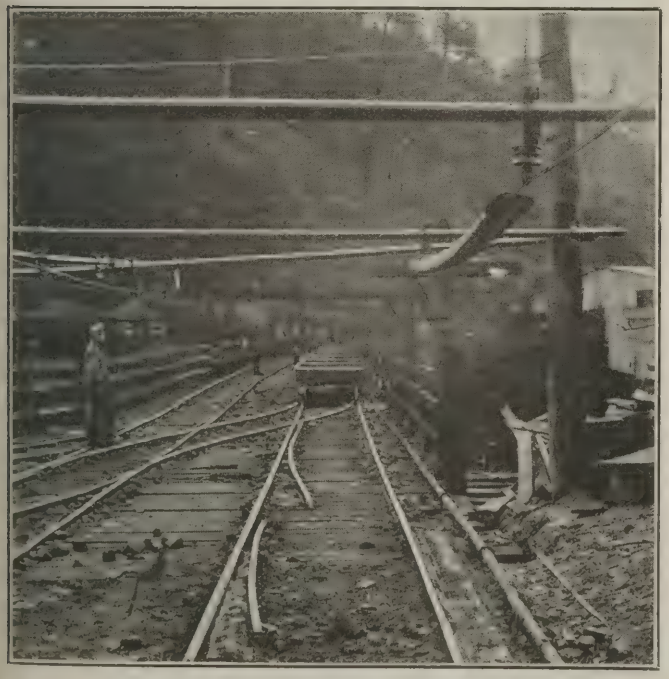


FIG. 2—TWO RERAILERS TO PROTECT PIPE LINE

These rerailers can be seen near the left rail. A plank which rises toward the throat of the rerail raises the wheels so that the treads mount the rail instead of pushing it over. A plank on the far side of the right rail similarly lifts the wheel on that side so that its flange can cross the rail and drop into place. In this way the cars are prevented from breaking the pipe line or from dropping over the side of the bridge.



FIG. 3—FOUR PERMANENT RERAILERS UNDERGROUND

These rerailers replace cars automatically as the trip proceeds on its way. The illustration is from a photograph taken at Mine No. 294 of the Consolidation Coal Co., Jenkins, Ky. The rerailers retrack cars both on coming and going trips. Note the wood inclines which raise the wheels gradually to a height at which their flanges or their treads can move readily over or onto the rail, respectively, and drop into place.

Advances in the design of bumpers both for mine cars and locomotives have done much to eliminate the derailments at curves and to prevent one bumper from climbing over another. Especially is this true of locomotive bumpers. If not provided with any other device the modern bumper is furnished at least with an overhanging lip on its upper edge. This keeps the mine car nearest the locomotive from climbing over the bumper of the latter, an occurrence that is likely to injure the motorman.

The bumper sometimes has a series of horizontal slots or shelves and is made unusually deep so that a locomotive with safety may haul mine cars of varying bumper height. In adding new mine cars to those already being used at his mine, the operator should make sure—if a new design is adopted—that these new cars will function well with the cars with which they will have to be hauled. A change of mine-car proportions usually necessitates a change of bumper design.

In an effort to secure greater safety for the motorman in hauling a trip of cars and the snapper in coupling up, and also to create a bumper which may be used over a period of years with few or no repairs, the Elkhorn Division of the Consolidation Coal Co. at Jenkins, Ky., is co-operating with the Huntington Car & Foundry Co., in the development of a bumper for its main-haulage motors.

The locomotive on the left in Fig. 6 is equipped with two 1,800-lb. cast bumpers which no doubt will stand hard usage. Each bumper is approximately 18 in. deep and has three slots making it adaptable to three types of mine car, each having a different height of bumper. A projecting lip prevents the mine car next to the locomotive from climbing, which action, if permitted, would endanger the life of a motorman whenever the motor is coupled to the trip with the control end to the rear. The face of the bumper unlike that of older types, is curved as it should be to facilitate the negotiation of curved track.

The bumper on the motor standing to the right in the



FIG. 4—STEEL SETS WITH FOOT PROTECTION

To protect the steel sets from being knocked out of place by derailed cars or locomotives, bottom separators have been provided. The roof at this point is bad; consequently over the 8-in. steel girders which span the roadway are two courses of locust tie timbers with cross members. The sets are placed at 6-ft. centers and have 4-in. H-section posts. The bottom separators are of 6x6-in. oak. The clearance on the right is 3½ ft. wide. As the illustration shows, the company has a great belief in clean haulageways and ample clearance. Still more protection would have been given the legs if they had been mounted on a concrete wall as high as or higher than the sides of the cars.

same illustration is practically of similar design though its composition is different. Its weight is two-thirds that of the solid bumper as it is built up of wood and iron. Which type ultimately will be adopted as standard depends entirely upon their comparative utility. As with all that is new the bumpers shown must go through stages of evolution before the best possible design is adopted.

Try as one will one cannot wholly prevent derailments. One can only hope to make wrecks less frequent. Consequently, the next consideration should be to limit the damage that might be done should such a derailment occur. Perhaps the most serious secondary danger is that of dislodging the timbers by which the roof is supported. When this occurs the loose rock which these timbers support is almost certain to be brought down.

Saving Posts from Blows of Derailed Cars

Discretion dictates that legs which rest on the bottom of the roadway be placed in niches so that they will not project beyond the surface of the rib. Where the roof load is no greater than may be carried safely by the coal itself, short blocks resting on the coal may be used to support the crosspieces. This will keep the footing above the danger zone which lies between the bottom of the roadway and a point slightly above the top of the mine car.

Steel timber sets find their greatest use at turnouts, and it is just here that a derailment is likely to occur. Anchoring the legs on concrete piers placed in the bottom will not always prevent these posts from being dislodged when hit by a derailed motor. The safest practice is to build a concrete wall approximately the height of the mine car and to rest short legs on this.

When a long trip of cars, either of loads or empties, travels along the roadway, the motorman being on one end and the snapper on the other, the mine car in the middle of the trip may leave the track and ride the ties without either man becoming aware of that fact. Sometimes the motorman can feel by the jerking of his locomotive that a car in the trip is derailed, but this is rare.

He may ascribe the "hard" running to a lack of lubrication or to some other condition and remain content until a pile-up occurs. A derailed car often will continue to run in this manner for long distances, being held from further displacement by the cars on either side of it. Several cars may leave the track before the motorman discovers that something is wrong.

Nowadays permanent rerailers are being introduced at points in the mine where cars are most likely to leave the track unnoticed. These form an integral part of the track itself. Sometimes they are placed on the outside of the track and sometimes on the inside. Occasionally they are placed on both sides. They automatically rerail mine cars and are equally effective in guiding the wheels of a locomotive back to the track, using its own power for that purpose.

When these rerailing devices are used an elevating platform is placed between the wing flanges and the straight track. This usually is of wood and is arranged so as to rise to the rail level at the point where the rerail and the other rail come most closely together. This is known as the "throat." In this way the wheels will be at an elevation that will make rerailing easy and automatic.

The headpiece of this article and Fig. 2 will give an excellent idea of the manner in which these operate. The latter illustration portrays a simple rerailer located on the approach to a tipple bridge. As arranged, it offers protection to the pipe line and bridge railing shown to the right of the track and automatically rerails any car that might get off on that side. A similar arrangement placed on the right-hand side of the track would rerail the cars if off on the other side. Setting a guard rail on the bridge is a precautionary measure that will prevent injury should the rerailer fail. Though it will not lift a car to the track, it will keep it away from the bridge railing for some distance.

A more effective rerailer is seen in Fig. 3. This is located in mine No. 204 of the Consolidation Coal Co., at Jenkins, Ky., on the load haulway off the First East, and therefore is not far from daylight. Its location is logical. Ten-ton locomotives ply this haulageway. Com-

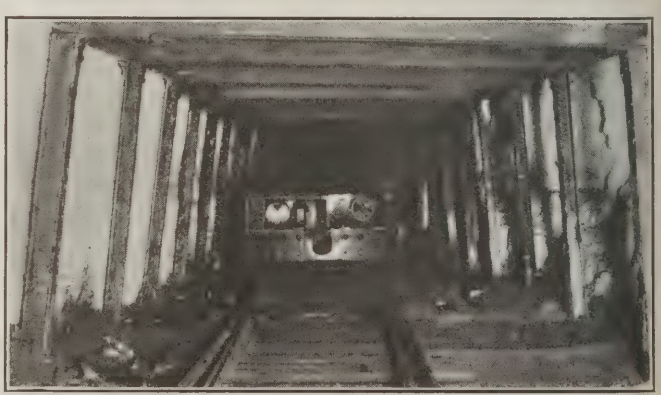


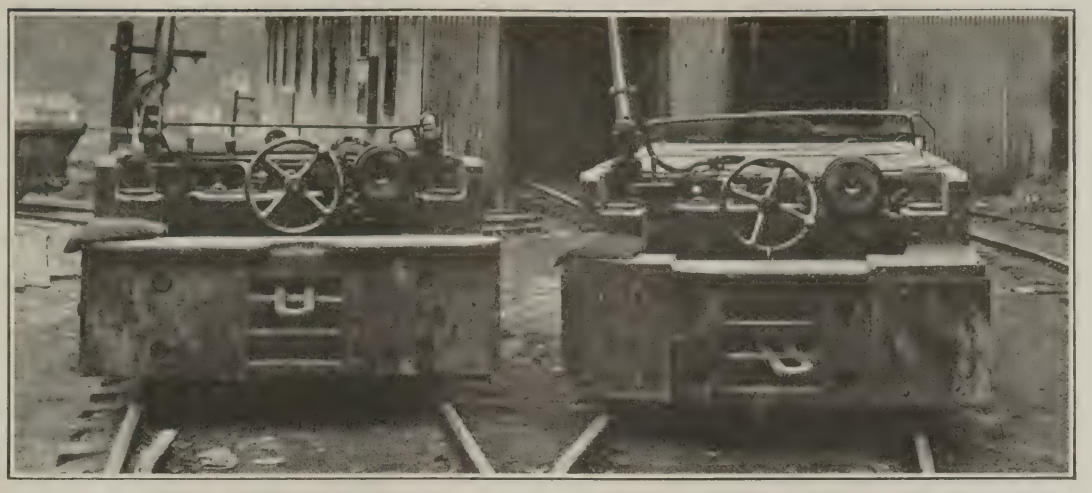
FIG. 5—STEEL SETS IN CONSOLIDATION MINE 204

The switch in this roadway is thrown parallel to the track and not at right angles to it, thereby enabling the snapper to throw his switch without danger of being crushed by the locomotive. He feels assurance when this kind of a switch is provided, and he throws it full over, saving a derailment and injury to the switch rails. With the other kind of switch he may be precipitated in front of the locomotive.

FIG. 6

Two Bumpers

The locomotive on the left has two 1,800-lb. cast bumpers 18 in. deep. It has three slots, making it adaptable to three types of cars, each with a different height of bumper. The purpose is to prevent the car from climbing onto the part of the locomotive reserved for the motorman and the controller. The bumper on the motor to the right is of a similar design but is two-thirds as heavy.



ing from the First East entry a heavy grade favors the loads. Checking and stretching the trip on such a grade is likely to cause the derailment of a car; but the entire trip will be sure to leave the mine on the steel after passing through this rerailer. On several occasions a 10-ton motor has left the track and without apparent difficulty has been put back in place with the aid of this device.

Though derailments usually occur where conditions are such as to favor them they are likely to happen even where they are least expected. Motormen insist now that their motors, regardless of type, shall carry rerailers. Efficient companies are equally as insistent on this score, maintaining that time should be saved that is now wasted in looking for the paraphernalia wherewith to retrack the locomotive which has left the rails.

The use of props, ties or a jack in this work is to be discouraged if possible as that practice is fraught with danger to life and limb. No man is a coward nor is he lacking in devotion to duty when he refuses to hold a tie or prop in position for the rerailing of a locomotive. Unusual conditions surrounding the scene of the derailment may make it impossible for a locomotive to regain the track on its own power. Another locomotive, a block and chain or a Sylat post puller will aid, the last two by holding what ground is gained by the locomotive moving under its own power. Extreme care should be taken by the men to keep out of the direct path of the chain for the latter is sure to act like a whip whenever it breaks.

Some Mines Fix a Certain Maximum Grade

Coal companies do not insist with sufficient determination on the proper installation and maintenance of their track equipment. This is just as important as good material, for complaints against the material in use when investigated usually prove that the fault lies not in faulty fabrication but rather in improper installation and maintenance.

At some mines a maximum grade is adopted and, if the coal dips at a heavier grade, the entry is raised or lowered by taking bottom or bringing down top. Where a mine is advanced correctly the daily mileages of gathering locomotives are fairly uniform. In justice to the loaders working the several mine sections, mine-car distribution should be equitable. To accomplish this end, gathering locomotives having longer hauls should care for fewer working places than those having short hauls. In most mines this practice prevails.

Under uniform conditions no more than two types of locomotives should be used, one for main haulage and the other for gathering. When this is done repairs are more easily made, fewer repair parts have to be kept on hand, and the management is better able to judge by comparison what comprises a fair day's tonnage for each locomotive, remembering always that main-haulage and gathering locomotives must each be compared with other units of the same class.

By having locomotives of a construction that the repair forces understand and by having plenty of repair parts always available, safety and economy in haulage is the better insured. Track should not be laid with rails of too many different weights. The usual three classes—heavy for the main roadways, medium for cross or room entries and light for the rooms—should be strictly followed. Transferring from one size of rail to another is better accomplished by switches than by joints, and if this plan is adopted derailments will be fewer.

Track Standards Should Be Established

If some one method of laying track is adopted the tracklayers will readily adjust themselves to it. Even when they are not required to follow any plan in laying turnouts they unconsciously will attain to some uniformity of construction throughout the mine. But scientific layout nevertheless is advisable and should be required.

The use of parallel-throw switches throughout the mine not only protects the lives and limbs of snappers but also preserves the switch points from damage and eliminates derailments of the locomotive. In setting a normal-throw switch, which is thrown toward the track, the snapper has little time until the locomotive is upon him. Thus hurried he may not close the switch completely. In consequence the motor will damage the switch point and on rare occasions will climb over it. The parallel-throw switch, because it is always in the clear whether opened or closed, imparts a confidence to the snapper that moves him to set it correctly.

Mine-car inspection is one of the most important elements in attaining freedom from haulage accidents. Some superintendents are beginning to sense that fact and at least one is a "stickler" for thorough mine-car inspection. The highest paid employee on the outside of his mine is none other than the man who inspects the mine cars. That employee is not even burdened with the job of lubrication. As the mine cars are equipped with roller bearings and do not need frequent oiling he can concentrate his attention on inspec-

tion. Cars are lubricated every ten weeks, but by someone else.

Brakes are placed on mine cars for a purpose. If we may judge from the indifference which some officials exhibit as to the condition in which they are kept, brakes are merely added through a whim of the manufacturer. How often has it happened that a snapper reached for a brake to check the speed of a mine car only to find that it did not take hold. The result usually is a collision. Only infrequently is there a derailment. But because no cars leave the track is no reason why the brakes should not be carefully watched and cars with poor brakes taken to the repair shop, for the shocks sustained by cars having ineffective braking equipment will inevitably bring them there before long.

Price Fixing by Employers and Workers

TWO unusual cases have recently developed in which the fact was brought out that employers and employees had entered into mutual agreements the effect of which was to maintain or inflate prices. The workers' interest in entering into such agreements, it is fair to assume, is the maintenance or increase of their wages.

In one of these cases a federal grand jury in Cleveland, Ohio, on Jan. 5, handed down indictments, charging violation of the Sherman Anti-Trust Law on the part of sixteen members of the Wage Committee of the National Association of Window Glass Manufacturers and the National Association of Window Glass Workers. Immediately following the indictments the federal judge sitting in Cleveland issued a temporary order restraining the manufacturers and glass workers from carrying out the terms of what has been called their "wage agreement."

The basis of both the indictments and the temporary injunction is the allegation that the manufacturers and their employees had negotiated an unlawful contract with the apparent purpose of curtailing the output of hand-blown window glass and of raising prices. A part of the proof in the case was an alleged agreement which bound certain companies to close their plants in order to curtail production.

In a somewhat similar case the Federal Trade Commission has been asked to proceed against the Photo Engravers Board of Trade of New York and the New York Photo Engravers Union No. 1. As summarized by the commission, the facts as alleged in this case are that there exists an agreement between the board and the union "to adopt and maintain a schedule of uniform prices below which no members of the board will sell photo-engraving products." A joint commission of the board and the union, the complaint states, sees that the agreement to this effect is carried out.

On its part the union, it is set forth by the commission, requires its members to cease working for any member of the board who fails to maintain the prices agreed upon. In order that such prices may be established, the union itself prepared a chart of prices to be used by all manufacturers of photo-engraving products, and bound its members to work only for members of the board who maintain such prices. The situation is thus presented of workers instructing their employers what prices to charge and forcing all consumers to pay them.

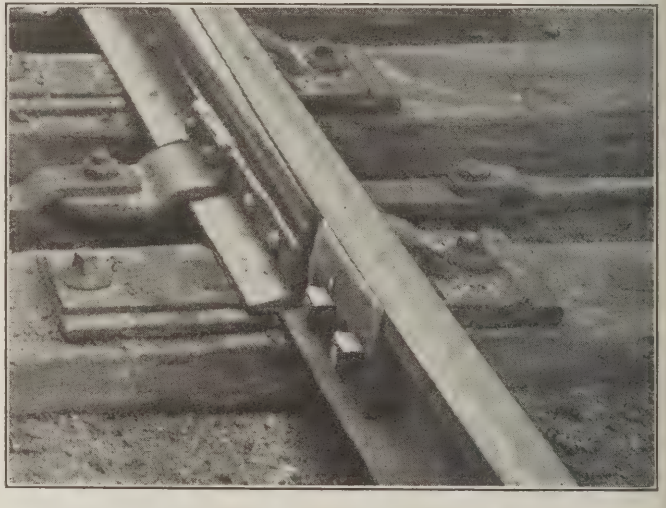
The result of the agreement, according to the complaint made public by the Federal Trade Commission, is "that practically all manufacturers of photo-engraving products in the city of New York have been compelled to join the Photo Engravers Board of Trade, giving the members of that board a monopoly of the business, and enabling them to maintain prices and eliminate competition." In the light of labor's condemnation of employers for alleged practices of this nature it will be interesting to hear counsel for the Engravers' Union defending its action at the hearing the commission is to hold on this complaint.

The Cleveland and New York cases differ in that in the latter the element of unfair competition is introduced, while in the Cleveland case the proof related mainly to attempts to limit production. But the objectives of the two agreements seem to have been essentially the same.

The attack made upon agreements of this character is likely to discourage similar attempts to maintain prices, even if, as in the photo engravers' case, the objective is mainly to enable employers to pay high wages. —*The Index.*

Curved Plate Protects Switch Points

NO PART of tramroad and railroad equipment is more ill-used than the switch point. Constructed so that it tapers to a mere sliver at the end, it is ill-adjusted to bear the excessive wear to which it is exposed. Consequently it has occurred to someone to attach to the rail by bolts a guard plate with a gently rounding edge, placing it two inches from the switch point. Its purpose is to prepare the wheels which pass it, on their way toward the switch, to meet the switch point without any sudden thrust. The wear thus comes on the protector and not on the switch. This guard plate is small and made of manganese steel. It is shaped to conform to the head of the railway rail. The heads of the bolts rest in a channel plate made to conform to the space between the head of the rail and the flange.



GUARD PLATE WHICH REDUCES WORK OF SWITCH

When a wheel has passed such a guard plate as is illustrated above, it is rightly directed and rightly placed to take the switch point, which has nothing to do whatsoever except to hold what has been gained. The weight on the wheel is carried, at least in the main, by the straight rail. Hence the switch point becomes largely functionless and lasts accordingly.

This device has been extensively used on railroads and has given excellent service, lengthening the life of the switch points, especially in unfavorable locations. As it is curved in both directions it does not interfere with traffic on the straight track. This device is known as the Mack Switch Point Protector and is manufactured by J. R. Fleming & Son Co., Scranton, Pa.

Submersible Pumproom Will Not Flood Till Water Rises One Hundred and Twenty Feet Above Pumps

No Water Admitted to Pumproom Except What Passes Through Pipes—Dams, Proof Against 300-Ft. Pressure, Isolate Pump Chamber — Water Is Stored in Coal Seam 10 Feet Below

By D. C. Ashmead*
Kingston, Pa.

OPERATORS in the anthracite region not only have to handle the water passing through the measures but are forced frequently to cope with great inrushes of surface water, which in many cases drown out the workings and preclude operation for days at a time. Usually only parts of the mines are thus affected, but it not infrequently happens that almost the entire workings are inundated.

These inrushes of water come from various sources. Thus a cloudburst may cause runs and creeks to flood over their banks and flow down shafts or slopes into the mine workings. Sometimes such flood waters break into the mine through cave holes and cracks. Then again prolonged rains cause water to enter the mines through caves and surface fissures. Workings at other times break through to old operations which are filled with water.

When these floods occur pumping is not the only cost. In the long run the loss of time due to the flooding of the workings probably will be a more expensive item, though the fact that it is not charged to drainage may cause that fact to be overlooked. When mines are closed down the overhead cost must be met without any tonnage being obtained over which to spread it, and at an anthracite mine the overhead charges are necessarily heavy.

Flooding Causes Delay in Operation

The coal companies, realizing that the flooding of mines is a costly misfortune, are taking every precaution to prevent such flooding and to provide for the speedy dewatering of the workings should a flood occur. The best method, of course, is to try to prevent such inundations, but in many cases this is impossible. The next best course is to provide a means for dewatering that will interfere with operation as little as possible.

*Assistant Editor, *Coal Age*.

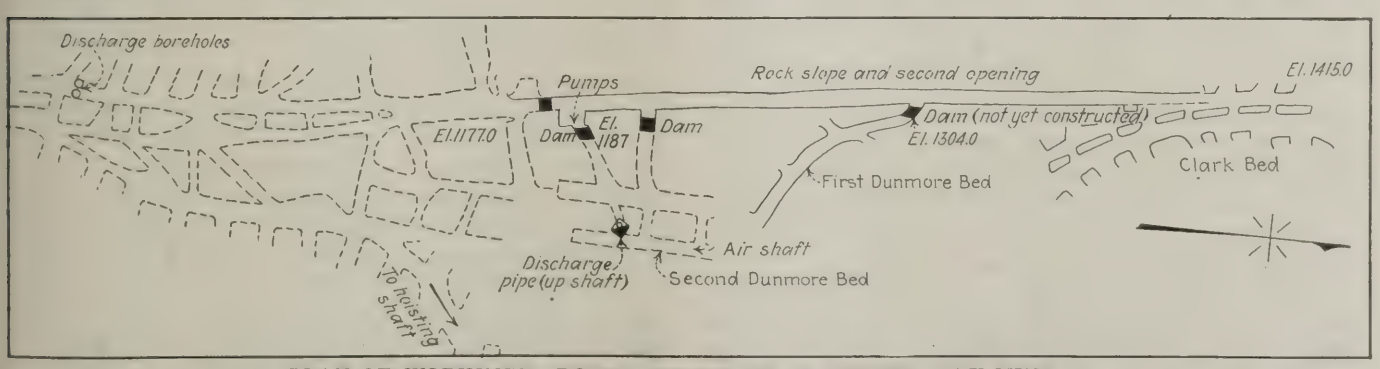
The Pennsylvania Coal Co. has provided "concealed," or submersible, pumprooms, that can be operated regardless of the condition of the workings. These pump chambers are so constructed that when the water level in the mines rises, they will not be flooded. Even when water spreads through workings around and above them the pumps still are dry and can be reached and tended in perfect safety.

At Forest City a colliery named after that town is operated by the Hillside Coal & Iron Co., which in turn is affiliated with the Pennsylvania Coal Co. In the past this mine has been visited by floods, and sad experience has convinced the coal company that the pumps must be protected so that in case of a flood they can be reached and operated as usual.

Slope, a Water-Tight Passage to Pumproom

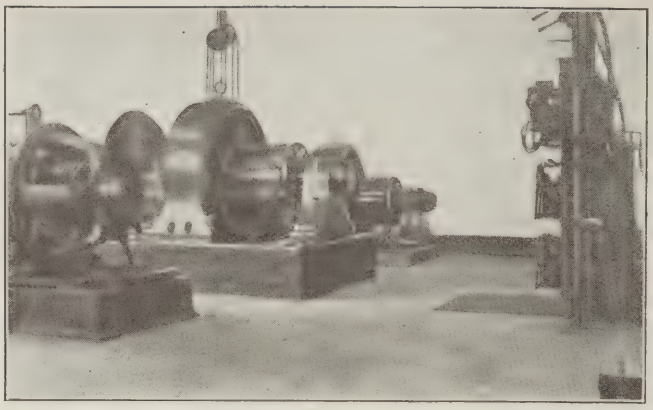
From the Clark Bed at an elevation of 1,415 ft. a rock slope extends down to the Second Dunmore bed at an elevation of 1,187 ft., or 228 ft. below. At the foot of this slope is placed the pumproom. The only way in which water could enter this rock slope from the Second Dunmore bed would be by rising 117 ft. It would then reach the First Dunmore bed at an elevation of 1,304 ft. This bed has only one opening into the rock tunnel. This can be sealed by a dam; thus water cannot get into the rock slope till it has risen in the mine 227 ft. and utilized a large excavated area in the first Dunmore Bed for storage.

At the foot of the rock slope are two openings into the Second Dunmore bed. These have been sealed by watertight dams that will withstand a head of 300 ft. The bottom of the Third Dunmore bed is 10 ft. below that of the Second Dunmore, and a seal is placed between the rock slope and this seam of coal. The old workings in the Third Dunmore bed serve as a sump for the pumps. The suction pipes pass through the dam



PLAN OF WORKINGS AROUND PUMPROOM IN FOREST CITY MINE

Beneath the pumproom floor is the seam known as the Third or Lower Dunmore and roadways which have been driven in it afford sumpage for 17,600,000 gallons. As soon as the water rises above the level of the pumproom floor, without, however, entering that chamber, it floods the Second or Middle Dunmore bed, and before it is 3 ft. above the floor it has attained a storage capacity of 34,500,000 gallons. This only partly exhibits the water storage available at this installation, for the water will not begin to flood the pumproom (except it be through the measures) till it has risen beyond the first Dunmore bed to the Clark seam, 228 ft. above the pumproom floor. The bottom of the hoisting shaft is at an elevation of 1,185 ft.



INTERIOR OF SUBMERSIBLE PUMP ROOM
In front are two 6-stage centrifugal pumps of 2,000-gallons-per-minute capacity and in the rear a centrifugal pump capable of lifting 1,000-gallons-per-minute.

into the pumproom, and the discharge pipes on their way to the surface pass out through the dam to boreholes and to the airshaft.

In the pumproom are two six-stage centrifugal pumps that will each lift 2,000 gallons per minute against a 300-ft. head. They are each driven by a 250-hp. motor and have a 12-in. suction and a 12-in. discharge. There also is another centrifugal pump having a capacity of about 1,000 gallons per minute. This is driven by a 100-hp. motor. A traveling crane with a 5-ton chain block handles the pump parts when repairs are necessary. None of the piping is above the floor of the pumproom.

This submersible chamber theoretically would be free from danger of flooding even when the water rises 228 ft. above its floor, but practically it might not be possible to rely on so great an immunity. But even figuring on 120 ft. the mine would have to be almost entirely flooded before the pumproom would be lost, for the Clark bed, that would be still untouched by the rising waters, is already worked out. In ordinary times the smaller pump can handle the water the mine makes, but in the spring, when the water is high, one or both of the larger pumps are used.

Improved Business Conditions of December Sustained During January

FIGURES which recently became available, according to the Survey of Current Business, prepared by the U. S. Bureau of Census and printed in *Commerce Reports*, tend to confirm previous reports of almost uniformly favorable business conditions during December, last. This month, which always shows some let-up in industrial movements, was characterized by well-sustained activity, with increases over the preceding month in many instances. The improvement in the transportation situation enabled heavier shipments to be made in many commodities. This improvement was particularly noticeable in building materials.

Retail sales were of record proportions, and current reports indicate that sales were well maintained during January. Prices remained relatively stable, with further increases in agricultural products, thus bringing these more nearly into line with other commodities.

The outlook for the immediate future, so far as domestic trade and industry is concerned, is particularly bright. The disturbed foreign situation has so far appeared to have but little effect upon such delicate indicators of industrial and commercial wealth as the stock and bond market.

Consumption of cotton by textile mills in December totaled 527,945 bales, or about 50,000 bales less than the high record made in November. Exports of cotton also declined, with a total of 607,853 bales in December, compared with 858,337 bales in the preceding month. Stocks of cotton increased slightly at the mills but declined at warehouses. The total in both positions at the end of December amounted to 5,996,000 bales, compared with 5,919,000 bales a month before, 6,945,000 bales a year ago, and 6,875,000 bales at the end of 1920. The prices of both cotton and cotton goods increased during December. Middling upland cotton at New York averaged 25.7c. in December, the highest since September, 1920.

Receipts of wool in Boston were particularly heavy, due to marked increase in the amount of foreign wool. The prices of wool and woolen goods showed little change from the month before.

Production of pig iron and steel ingots was well maintained during December. The output of pig iron by merchant furnaces increased somewhat in December, while sales and unfilled orders showed a large increase over November. Prices of all iron and steel products tended somewhat lower during December.

Production and shipments of steel sheets declined slightly in December, but sales and unfilled orders showed marked increases.

Automobile production showed only a slight seasonal decline in December.

The prices of most non-ferrous metals increased. Copper production showed another increase, reaching 103,845,000 lb. in December, the largest for any month since 1920.

Contracts awarded for building in the 27 Northeastern states during December totaled 38,603,000 sq.ft. of floor space, valued at $215,213,000, making this month the highest December on record. A year ago the corresponding figures showed 35,272,000 sq.ft. of floor space and a value of $198,518,000, while in December, 1920, only 14,004,000 sq.ft. was contracted for, with a total value of only $100,145,000. Residential buildings in December, 1922, accounted for 24,950,000 sq.ft. of floor space and $120,139,000 in value. Educational building was the only group showing an increase over November.

Some seasonal declines were shown in the production of lumber during December, although in every case the movement was far in excess of a year ago. Shipments were well maintained and in many species were larger than for the preceding month.

The production of face brick increased over November. Stocks and unfilled orders also were larger. Shipments and new orders for enamel sanitary ware were distinctly larger than in the preceding month.

On the whole, construction costs declined slightly after an uninterrupted rise for many months.

The Department of Labor wholesale price index showed no change in December, remaining at 156, the same as in November. Slight increases in farm products, food, cloth and clothing, chemicals, and house furnishing goods were offset by declines in fuels and metals. Dun's index number also showed no change, while Bradstreet's declined one point. The retail food index increased again, reaching 147, the highest for any month of 1922.



Problems of Operating Men

Edited by James T. Beard



Width of Rooms Not a Tonnage Factor in Mining

Remarkable Record of Two Miners Starts Discussion—Do Wide Places Increase Daily Output Per Man?—Citations from Different Workings

SOME time ago I recall reading with much interest a short article by L. F. Klingensmith, of the Potter C. & C. Co., operating at some point in Pennsylvania (Vol. 22, p. 676). The article was entitled, "Driving Wide Rooms," and its writer was desirous of ascertaining what effect the driving of wide places had on the daily output of coal, per man.

The article did not seem to attract the attention that it should have received from the readers of *Coal Age*. In a later issue, Dec. 28, p. 1041, I. C. Parfitt lays much stress on certain physical conditions existing in the seam, claiming that these have a greater effect on the output, per man, than the driving of wide places.

Remarkable Record of Two Sturdy Miners

This discussion was suggested by Mr. Klingensmith, after reading the account in *Coal Age* (Vol. 22, p. 216), where two miners, working for the Standard Island Creek Coal Co., at Cora and Taplin, W. Va., respectively, loaded what was practically a gondola each day, for thirteen consecutive working days, one man loading 469 cars, holding 656½ tons and the other 459 cars, holding 596¾ tons in the same period.

There is no getting away from the fact that this is certainly a remarkable record, made by two sturdy individuals whom it could hardly be hoped would represent the average of the coal miners working in our mines today. If it were possible for any mine official, by making a visit to these plants and studying their conditions and plan of operation, to encourage his own miners to even approach this record, the time would be well spent.

Claim Not Supported by Facts Stated

It appears that one of these miners worked in a place that was 36-ft. wide, while the other was driving two places, each 18 ft. wide, both of the men working in 4-ft. coal under practically the same conditions. The latter instance, however, does not appear to lend support to the suggestion that driving wide places is a material factor in increasing the daily tonnage per man.

With Mr. Parfitt, I am inclined to think that, aside from their physical strength, the records of these two men were influenced more by the conditions under which they worked. Loading 469 cars in thirteen days shows a daily car supply of $469 \div 13 = 36$ cars, which certainly is going some for a gathering motor, or any other system of gathering haul, assuming that the motorman or driver was serving several other places in his section.

It may be, however, that every advantage was afforded these two men by giving them all the cars they could load. In my opinion, the question of car supply is one of the most important factors affecting a man's daily tonnage, under otherwise normal conditions.

Width of Rooms Should Seldom Exceed 25 Feet

Looking backward in my own experience, and comparing results under some of the large producers where it has been my fortune to work, I recall no instances where the rooms were double-tracked. If my memory serves me rightly the conditions varied from rooms 12-ft. in width, driven on 100-ft. centers, with 88-ft. pillars between them, in some mines, to 22-ft. rooms, driven on 50-ft. centers, with 28-ft. pillars between them, in other places.

Besides these exceptionally large producers of coal, I could name instances of almost every imaginable system of working and ranging from places just wide enough to get a mine car in, to others where the long-wall face was 100 yd. in length.

Allow me to say that, in all my experience, I have never seen a largely producing coal mine where the results depended on driving wide rooms. As a rule, when the width of rooms exceed 25-ft., it is because of a specially favorable mining condition with respect to the roof and floor, and the height and quality of the coal. Under ordinary conditions, I may say further, that the driving of rooms of a greater width will generally mean the taking of a gambler's chance.

Pikeville, Ky. GEORGE EDWARDS.

Waste in Mining

Growing need of measures being taken to conserve coal supplies—Waste of coal compared with waste of timber—Many foremen to blame for wasteful practices.

TIMELY attention has been drawn to the unwarranted waste of coal in the methods of its extraction, in the letter of C. W. Atkins, *Coal Age*, Dec. 14, p. 959. I am very much in sympathy with all that he has said regarding inefficiency in the mining of coal.

Indeed, the reading of his letter has taken me back to experiences that are all too common in coal-mining practice. Owing to their important bearing on economic conditions, these should have been investigated long ago and the proper remedies applied. Mr. Atkins has spoken my mind wholly in emphasizing the need of conserving this portion of Nature's resources.

By way of comparison, our friend has spoken of the steps taken by the government, only a few years ago, to stop the slaughter of the buffalo, which if continued would soon have meant the extinction of that valuable animal. In a similar manner, I would refer to the steps already taken by the government to conserve all timber supplies, which have been growing more and more scarce, year by year.

Observation shows that what is true of timber as a natural resource, or of the buffalo, is likewise true of our supplies of coal, which are being rapidly exhausted and will take ages to replace.

There are numerous ways in which coal is being lost where it could be saved if more efficient means of extraction were employed and more restricted measures imposed on mine foremen who are so frequently prone to sacrifice large amounts of coal in their endeavors to make records for low cost of production.

In a few instances, such has been the desire to increase the amount of machine-mined coal, in comparison with that mined by the pick, that the foreman would leave the pick stumps and take out only such coal as could be mined with a machine.

One readily recalls that, but a few years ago, the practice of paying for lump coal only, caused the loss of thousands of tons of fine coal and dust, which was thrown into the gob because the miners would load only coal that would pass over the screens. The result was that the mine-run basis of payment was shortly adopted and much of that loss eliminated.

In the operation of small mines, it too often happens that the miners who dig the coal are permitted to go their own way. There is a lack of intelligent supervision and planning of the mine. While, to many, it may seem childish to ask for government restrictions in remedying these matters, to the thoughtful man it appears to be the only way open to avoid the evil.

Mayport, Pa. JAMES THOMPSON.

Inquiries Of General Interest

Port of Entry for Air and Gas in Mine Safety Lamps

In Practical Tests, Air Appears to Enter at Top of Lamp—Effect Is the Result of Rapid Diffusion of Gas About Lamp When Mixture Is Disturbed

THERE has recently arisen, among mining men in this locality, a question regarding the entry of air into a safety lamp, under all conditions of testing for gas in mines. In hopes of receiving a satisfactory solution of the problem and one that will settle our differences of opinion, I am taking the liberty of presenting the proposition to *Coal Age*, for the consideration of the editor and its readers.

Inasmuch as the Wolf and Koehler are the two types of safety lamps used almost exclusively in this district, I ask that the consideration of the question will be confined to these lamps. Without disclaiming the normal ascensional ventilation within a safety lamp, by which air enters the lamp at a point below the flame and passes out through the upper portion of the chimney, our bone of contention is whether, under certain conditions of testing for gas in mines, it is not possible for gas to enter the top of the lamp and give evidence of its presence by the usual flame cap surmounting the lamp flame.

By way of explanation, permit me to say that it has been my lot to have had several years' experience in the gaseous mines of Franklin County, Illinois, and I have handled gas under every known condition. In reference to the question in hand, it is my contention that gas will enter a safety lamp from the top or from the bottom, depending on the conditions under which the test is made.

For example, when using a smooth bonneted Wolf lamp, I have found gas in a small opening in the roof and under circumstances that convinced me the gas entered at the top of the gauze chimney and passed downward to the flame, which was on a level with the bottom of the cavity where an open light was burning at the time.

Now, it is the contention of some that, in the use of either of the two types of lamps mentioned, gas only enters through the lower portion of the gauze or at the small ports of entry below the flame. In reply to this, I ask, "If such be the case, how is it possible to detect a thin layer of gas next to the roof, without tilting the lamp sideways so as to bring the lower ports of entry in contact with the gas?" In my estimation, that must either be done or some device must be used to bring the gas down to the level of the lower ports of entry of the lamp.

On other occasions, I have found small gas feeders coming from the floor when the gas would readily manifest itself in the lamp, by giving a gas cap on the flame of the lamp as the latter sat on the floor. At the same time, when the lamp was raised 2 ft. above the floor, there was no indication of gas, the gas cap then disappearing from within the lamp. This convinced me that, in this case, the gas entered the lamp through the lower ports below the flame.

As a further test, in support of my theory that the gas may enter the top of the lamp when the test is made under conditions that would favor such entry, I used a Koehler safety lamp having a corrugated bonnet. Entering a place where gas was to be found at the roof and holding the lamp upright, I raised it to a point where the top of the bonnet was but a few inches below the roof.

A test was now made with the Burrell gas detector, by holding the end of the tube on a level with the top of the lamp bonnet on the left. The test showed the presence of 1.7 per cent of gas and a faint gas cap was clearly discernible within the lamp. At the same time, a second test taken 10 in. below the first showed no gas present in the air. Also, lowering the lamp to 10 in. below its first position, gave no indications of the presence of the gas, the gas cap then disappearing from the lamp flame.

Trusting that this communication will be taken in the spirit in which it is offered, which is to lead to a better understanding of the conditions surrounding the testing for gas by safety lamps, I would like to ask for the opinions of *Coal Age* and its experienced readers regarding this question. FRANCIS DEVLIN.

———, Ill.

We shall be glad to have the expression of opinion of firebosses and others who have had long experience with safety lamps. Our own experience, in testing for gas in mines, is that the best results are obtained where the circulation within the lamp is wholly ascensional, the gas-charged air entering at the lower ports of entry below the flame and, passing upward through the combustion chamber, escaping through the gauze chimney of the lamp.

In explanation of the test described by this correspondent, we would suggest that it was the result of the rapid diffusion of the gas into the air, a few inches from where it escaped from the strata. By reason of this rapid diffusion, the percentage of gas was too small to give any indication, either on the lamp flame or by the use of the Burrell gas detector.

In testing for a thin layer of gas, at the roof in a mine, the common practice of the most experienced firebosses is, while holding the safety lamp in an erect position, to disturb the layer of gas by blowing slightly against the roof, thus causing it to descend to the flame of the lamp. We have every confidence in the ascensional circulation of air within a safety lamp affording the most reliable means of testing for gas.

Examination Questions Answered

Miscellaneous Examination Questions

(Answered by Request)

QUESTION—*(a) Compute the lifting power of an 18x36-in. engine, steam gage pressure 110 lb. per sq.in., the diameter of the winding drum being 6 ft. (b) If this engine is geared, by a 12-in. spur on the crankshaft, to a 6-ft. gearwheel on the drumshaft, what would be the lifting power at the circumference of a 6-ft. drum?*

ANSWER—(a) The sectional area of an 18-in. cylinder is $0.7854 \times 18^2 = 254.47$ sq.in. In estimating the lifting power of the engine, the total pressure on the piston is $110 \times 254.47 =$ say 28,000 lb., or 14 tons. Applying this total pressure at right angles to an 18-in. crank, gives for the turning moment at the center of the crankshaft $14 \times 18 = 252$ in.-tons. The lifting power at the circumference of a 6-ft. (72-in.) drum is, therefore, $252 \div 36 = 7$ tons.

(b) The diameter of the gearwheel on the drum being 6 ft. and that of the spur on the crankshaft 1 ft., this engine is geared 6:1, and the lifting power, at the circumference of the drum, in this case, is $6 \times 7 = 42$ tons.

QUESTION—*How many pounds of water is a good average to evaporate from 5 lb. of coal?*

ANSWER—Assuming a coal having a calorific value of, say 14,000 B.t.u. per lb. and evaporating water from and at 212 deg. F., corresponding to 970.4 units of evaporation, the theoretical weight of water evaporated by 5 lb. of coal is $(5 \times 14{,}000) \div 970.4 =$ say 72 lb. Much will depend on the type of boiler, heating value of fuel and manner of firing. Boiler practice gives efficiencies varying from 3 to 7 per cent. A fair average evaporation in coal mining practice may be taken as, say $0.05 \times 72 = 3.6$ lb. of water.

QUESTION—*On what is a safety valve's area based?*

ANSWER—This is hardly an intelligent question. The area of a safety valve will naturally be less, the higher the steam pressure desired. The area is estimated on the steam pressure required and the weight hung on the lever, multiplied by its distance from the fulcrum, and that product divided by the distance of the valve-stem from the fulcrum. Thus, if the diameter of the safety valve is 2 in., its sectional area is $0.7854 \times 2^2 = 3.14$ sq.in. Then, for a boiler pressure of 150 lb. per sq.in., the upward pressure on the valve is $150 \times 3.14 = 471$ lb. Assuming a weight of 50 lb. and a distance of 4 in. from the valve-stem to the fulcrum, the distance of the weight from the fulcrum, in order to blow off at a pressure of 100 lb. per sq.in., is $(471 \times 4) \div 50 = 37.68$ in.

QUESTION—*How would you fire a boiler to obtain the greatest number of heat units from coal fuel?*

ANSWER—In practice the method known as "coking the coal" gives the most uniform heat in the furnace, and is less wasteful of the B.t.u. in the coal. In this method of firing, the fresh coal is spread evenly over the fire, after first remaining a brief time in the fore portion of the firebed, where it is piled and becomes heated before being spread over the hot fire. By this method the alternate cooling and overheating of the boiler plates is prevented. It is important, in firing a boiler, to adjust the draft so that the weight of air passing through the fire shall be only sufficient to burn the coal. Where more air is admitted to the firebed the effect is to chill the fire and much heat is carried into the furnace flue.

QUESTION—*Name and describe the nonexplosive gases met with in coal mines, giving their symbols, properties, atomic weights and specific gravities.*

ANSWER—The common mine gases that are nonexplosive are the carbon dioxide resulting from the complete combustion of carbonaceous matter, in every form, constantly taking place in the mine, due to the breathing of men and animals, burning of lamps and powder, decaying of timber and evaporation of acid waters. The other nonexplosive mine gas is the nitrogen of the air, resulting from the depletion of oxygen, due to various forms of combustion and absorption by the coal. These gases are both colorless and odorless. Carbon dioxide has a slight acid taste. They are both extinctive gases, contain no free oxygen and will not support life. Though not poisonous, carbon dioxide has a toxic effect on the human system. It suffocates when breathed, by excluding oxygen from the lungs. The atomic weight of carbon dioxide is half its molecular weight, or $\frac{1}{2}(12 + 2 \times 16) = 22$; and that of nitrogen 14. The specific gravity of carbon dioxide is 1.529 and that of nitrogen 0.971.

QUESTION—*In an airway 5 x 11 ft., there is passing a volume of 23,925 ft. of air per minute; what is the velocity of the air current?*

ANSWER—The sectional area of this airway is $5 \times 11 = 55$ sq.ft., the velocity of the air current is, therefore $23{,}925 \div 55 = 435$ ft. per min.

QUESTION—*If there are 76 men working in the mine and the fan is producing 15,000 cu.ft. of air per minute, the sectional area of the airway being 64 ft., how many air splits will be necessary?*

ANSWER—The West Virginia Mining Law (Sec. 17) provides that not more than sixty persons shall be permitted to work in the same air current, except by special permission of the district mine inspector, should he consider it safe to employ a larger number, not exceeding eighty men, in a single split. To comply with this law two splits of air will be required in this mine, unless, in the judgment of the mine inspector, it is safe to work the 76 men in a single split.

W. Va. University Mining Course Not "Brief" but School of Mines Is Needed

WEST VIRGINIA may not now have a school of mines, but the state and the coal industry are proud of the coal-mine engineering course offered by the College of Engineering of West Virginia University.

A news story in *Coal Age* of Jan. 11, 1923 (page 68), with reference to an address by Governor E. F. Morgan and to a letter from R. M. Lambie, Chief of the State Department of Mines, advocating that West Virginia have a school of mines, said that "though West Virginia is the second largest coal producer in the United States, it has no school of mines and only one institution offering a course in mining and that only a brief one."

A score of friends of the mining course at West Virginia University have written *Coal Age*, pointing out that though they do want a school of mines, because the mining industry in their state is of sufficient importance to warrant such a separate college, no one should conclude that the work of the State University is lacking in serving its mining students or that the course is in fact "only a brief one." A catalog of the University furnished by Prof. A. C. Callen, who heads the mining course, shows that the mining students are given two years of general engineering in common with those studying other branches of engineering, as electrical and mechanical. The mining course as such is two years, being the third and fourth of the whole course.

The point made by the West Virginians is that they have a good college of mines in conjunction with their university, but that they believe the importance of the mining industry in their state warrants a separate and larger school of mines.

West Virginia University has had for 16 years the four-year course in mining engineering described above; the university also gives a six-weeks summer course. There also are evening schools conducted under the direction of the university, which have an average attendance of about 800 men. In addition, the New River State School at Montgomery has a two-year course in mining engineering.

At the same time West Virginia has the distinction of being one of two states (the other being Indiana) out of twenty-four states with an annual mineral production valued at more than $40,000,000 without a "school of mines" or a separate mining building. New Jersey and Alaska are without colleges offering mining courses.

The establishment of a school of mines was recommended by R. M. Lambie, chief of the Department of Mines, in a letter he sent to coal operators in West Virginia. In an address delivered before the Kanawha Coal Operators' Association at Charleston, Dec. 2, 1922, Governor Morgan, after saying that West Virginia stands second among the states in production of coal mines—exceeded only by Pennsylvania—says that "no state with an annual production in excess of $100,000,000 is without a college giving courses in mining engineering, and these states all have 'schools of mines' or separate mining buildings, with the exception of West Virginia, which has a mineral production of about $400,000,000. West Virginia should no longer lag in the performance of the duty it owes to the thousands engaged in this great industry in making provisions for the proper training and development of persons desiring to enter this field of endeavor, so that the highest efficiency may be attained."

Chief Lambie writes to *Coal Age* that if the effort to get a school of mines is successful nothing would give him greater pleasure than to see the present personnel of the mining engineering department of the University of West Virginia transferred to the new school, as they are efficient and enthusiastic in their work and cooperate in every way with the mining department.

F. H. Neely, of the Avella Coal Co., at Penowd, Pa., refers to the course given at the university for the past sixteen years and adds: "In addition, West Virginia has nine men engaged in mining extension work, and was one of the first schools in the United States to give a four-year course in mining engineering devoted exclusively to the mining of bituminous coal."

Strong commendation of the work of Professor Callen is contained in letters from Herbert F. Harker, of the Elkins Fuel Co., Morgantown, W. Va., and R. E. Salvati, assistant superintendent, Island Creek Coal Co., Holden, W. Va.

Legal Status of Open-Shop Agreements

INSTRUCTIONS have been issued by the Department of Justice to the United States Attorney at San Francisco to investigate complaints that the Builders Exchange of that city has entered into an agreement not to sell material to contractors who employ only union labor. In this connection the Department of Justice has issued a statement to the effect that the Attorney General had already in a previous instance made the department's position clear that a conspiracy "that has for its purpose the destruction of organized labor is unlawful, no less than is a conspiracy directed against unorganized or open shop labor."

The action taken by the department as to the San Francisco situation is, it appears, based on a ruling made by the Attorney General on July 18, in which he stated that an agreement of the kind said to exist in San Francisco is a violation of the law whether committed by or directed against organized labor. The July ruling was substantially as follows:

That a conspiracy on the part of material dealers not to sell material to a contractor who is not operating under the American plan (open shop) is unlawful.

That an agreement to refuse goods to a contractor who employs only union men is unlawful.

That an agreement to refuse to sell to contractors who are employing more than 50 per cent of union men is unlawful.

That an agreement having for its purpose the refusal to sell to contractors whose employees are union men, and who refuse to discharge a portion of the help and engage in lieu thereof non-union men is unlawful.

While the department's attitude in this matter has not, of course, the status of a legal decision, it clearly indicates the kind of action that the Attorney General is likely to take when his attention is formally directed to agreements or contracts of this character.—*The Index.*

IN THE ARTICLE on page 3 of *Coal Age* of Jan. 4 it is stated that the Nineveh Coal Co. plant was developed to serve a 40,000-kw. plant of the Penn Public Service Corporation. The coal supply of that power plant is, and always has been, received from the No. 5 plant of the Penelec Coal Corporation, located within 500 ft. of the power plant. The error in question arose from a misapprehension of a statement in the original manuscript.

Book Reviews

A Book on British Anthracite and Its Uses

A. LEONARD SUMMERS, who is the author of a book entitled "All About Anthracite," has ventured to write, despite the all-inclusive title of his previous work, another book labeled "Anthracite and the Anthracite Industry" on behalf of Isaac Pitman & Sons, Ltd., of London and 2 West 45th St., New York City. It may be said here and now that this latter book has too large a title, for its remarks on American anthracite are too inconsiderable to be of any value. They cover about five pages and are taken for the most part from *Coal Age* and from papers by D. C. Ashmead and J. Griffen as read before the American Institute of Mining and Metallurgical Engineers. It describes the Chance system as being "the American method of separating coal from slate." Though it is making headway it has hardly established itself so widely; still it may be considered "American" as being different from that in use in any other country.

To the American reader, however, the book may not be less favorably received because it is so exclusively British, for much curiosity has been aroused as to this new rival to American anthracite in the harbors of the East. A few of Mr. Summers' remarks will be of interest. The South Wales coal field, he says, covers "five counties and has an estimated area of 1,000 square miles of which about 15 per cent is under the sea [as against 480 square miles which is the area of the anthracite coal fields in Pennsylvania]. The western portion of the field yields hard anthracite and semi-anthracite, while the varieties of the eastern area are dry steam coal, smokeless steam coal and bituminous coal.

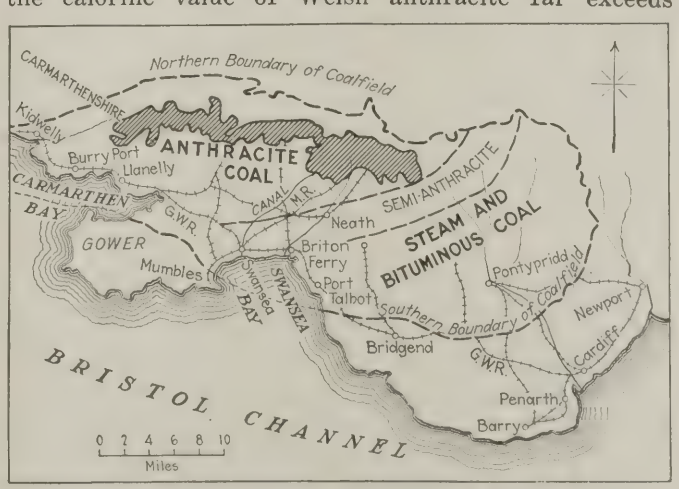
"Swansea is practically the center of the anthracite field, but considerable and valuable seams extend for several miles below the sea across Swansea Bay and in Pembrokeshire. Although the output of Welsh anthracite is only one-twentieth of that in America [Pennsylvania] it has the distinction of being of the finest quality in the world and in world-wide demand. Indeed, in normal times, prior to the Great War, of its modest output of 5,000,000 tons about 67 per cent was exported mostly to countries producing their own anthracite, only about 33 per cent being required for home use. However, Britain has grown wiser of late, and the inland demand has grown enormously.

"Forty companies are working the South Wales anthracite field, which contains seventy collieries, the most important seams being the Big, Stanllyd, Brynlloi, Peacock, Gras, Green, Charcoal, Triquart, Pumpquart and Lower Pumpquart. The largest colliery is New Cross Hands, owned, together with several other mines, by the Cleeves Western Valleys Anthracite Collieries, Ltd., of Swansea. Over 200,000 men are engaged in the whole [South Wales] field, but only 14,000 of them are in anthracite collieries. The total estimated unmined coal is 28,000,000,000 tons, of which 22.27 per cent is anthracite, 30.42 is bituminous and 47.31 semi-bituminous and steam coal."

The remarks of the author on the origin of anthracite are extremely contradictory, and one wonders at times if the author has his facts straight. He declares that there is no relation between the relative disturbance of the strata and the production [formation?] of anthracite. It usually is found that in passing through the South Wales coal fields from east to west the lower beds first exhibit the conversion into anthracite, the change being manifested at successively higher levels going west, until in Pembrokeshire all the seams are anthracite throughout. Yet in contradistinction to the first statement he says that anthracite mining is expensive because the measures are found to be subject to unbalanced stresses which cause the workings to close in after mining. In opposition to the second statement he quotes Dr. Strahan as saying that the Red bed becomes anthracite in a region where seams hundreds of feet below it have not yet assumed that character. The whole subject seems in Great Britain to be still a matter for debate with W. Galloway as protagonist in favor of the more usual theory that the deeper the seam the less the degree of anthracization.

The author quotes Dr. Strahan calling attention to the fact that the South Wales anthracites have a remarkable freedom from ash and that this diminution of ash apparently accompanies the formation of anthracite. "The Ras-las seam has about 7 per cent of ash in the bituminous area in the east of the field, but where it becomes anthracite in the west its ash content falls to only 2 per cent. Thus the percentage of ash diminishes *pari passu* with the decrease of bituminous matter. If the anthracite had been formed merely by the loss of volatile matter from the bituminous coal, the ash content would have increased, not decreased, and the conclusion seems to be that the South Wales anthracites were derived from a purer organic deposit more free from earthy matter than that from which the bituminous coals were formed." In the United States Dr. Strahan would have found that the anthracite coals on the whole have more ash than the bituminous but with some remarkable exceptions, such as the Lykens Valley coals.

Under the side caption "What is anthracite" the author says: "Being virtually pure carbon (the best quality containing quite 94 per cent of that element) the calorific value of Welsh anthracite far exceeds



SOUTH WALES COAL FIELD, ITS PORTS AND RAILWAYS

The shaded portion shows the area being worked by the anthracite collieries but as shown this does not comprise the whole area of the anthracite field. Most of the region is in Carmarthenshire and Glamorganshire, but extensions carry the field into Pembrokeshire to the west. Forty companies with seventy collieries and ten beds are found in the South Wales anthracite field.

that of bituminous, or soft, coals and it contains the least ash (less than one per cent in the higher grades).

It is jet black with a metallic luster. It is very hard, dense and slow burning. It burns steadily with a bright red glow. It gives an intense heat, is clean to handle, continues burning and absolutely smokeless."

He then gives a chemical analysis of the best Welsh anthracite: Carbon, 94.18 per cent; hydrogen, 2.99 per cent; oxygen, 0.76 per cent; sulphur, 0.59 per cent; nitrogen, 0.50 per cent, and ash, 0.98 per cent. The reviewer has been told that anthracite for carbide making can be prepared by hand picking to give some such analysis, which surely is remarkable. Doubtless the analysis given is that of hand-picked samples, but the writer fails to say so.

Much of the book is given to commending the fuel to British users for other purposes than malting (where absence of arsenic favors it), greenhouse work (where its steady burning quality commends it) and the manufacture of producer gas. The British find it difficult to start a fire with it and do not like its absence of lambent flame, the flame which endears bituminous coal to those who use it in an open hearth. The author assures them that it will give twice as much heat as bituminous coal, which may be true when an open fire is used. He deals quite lengthily with the effect of the burning of bituminous coal on the health and comfort of cities and gives some amazing figures, British and American. The book contains 126 pages measuring 4¾x7¼ in., a convenient pocket size.

Modern Researches Into the Nature of Coal

AMONG the brighter minds which are illuminating the nature of coal, F. S. Sinnatt, director of research to the Lancashire & Cheshire Coal Research Association, stands prominently forward though his work is not as well known in this country as it deserves to be. In his "Coal and Allied Subjects" he has brought together the first ten bulletins of the Research Association, which were written by himself and his co-laborers. His publishers are H. F. & G. Witherby, 326 High Holborn, London, W. C. 1.

Coal Age has already published one of the bulletins contained in this book, "Coal Dust and Fusain." The little volume opens with a long introduction on organic chemistry with reference to coal, and then discusses sampling, the influence of an addition of inert matter upon the volatile constituents evolved when coal is heated, coal analysis, Hoo cannel, carbon dioxide in coal, inorganic constituents in coal, the agglutinating power curve, stone dust and the calorific value of coal. Its 205 pages, 4¾ x 7¼ in., will be found of much interest and to contain much condensed information.

HENDRICK'S COMMERCIAL REGISTER OF THE UNITED STATES FOR BUYERS AND SELLERS issues its thirty-fifth annual edition for 1923. In this is listed articles for manufacturing and mining purposes to the number of 17,145 ranging from abrasives to zobos, with the names and addresses of the companies manufacturing them for the market. It is remarkably complete, some items taking two or more pages. In addition to this are lists of trade names and an alphabetical list of the firms mentioned. In all there are 2,321 pages, 8x11¾ in., all of which will be extremely interesting to those who desire to get in touch with all the manufacturers of any given product.

Bituminous Coal-Mine Accounting

FULLY equipped by an intensive experience with the New River Co. and the White Oak Coal Co., and with an extension experience gained when acting as secretary of the National Coal Association, W. B. Reed, author of a book entitled "Bituminous Coal-Mine Accounting," is perhaps as well qualified as anyone to write on that subject. Contact with the mines is written large in all those parts of the work where that feature is of value and contact with governmental decrees and business needs is as evident in other parts. One can hardly go wrong in following the advice of a man so well versed and so competent.

Not that all will agree with his dicta. Probably the quarrels between the various C.P.A.'s and between them and the government will never come to an end. The problem of values, for instance, is a mysterious one so long as markets ebb and flow. A man of the old school once declared that mines did not deplete. He could always sell a going mine for more than he paid for it. Another man hoped to find a purchaser to buy his mine because it had so many miles of expensive heading, though the roadways he wanted to sell ran through acres that he had already robbed of their land values. They were a means of access to the acreage beyond, it is true, but the lands would have been better had the coal been unextracted and the coal closer to the tipple. The haulageways were a debit rather than a credit seen in that light, but seen from the viewpoint that they led to coal beyond they were a credit rather than a debit, provided that coal was good and sufficiently extensive, which in that particular instance was not the fact.

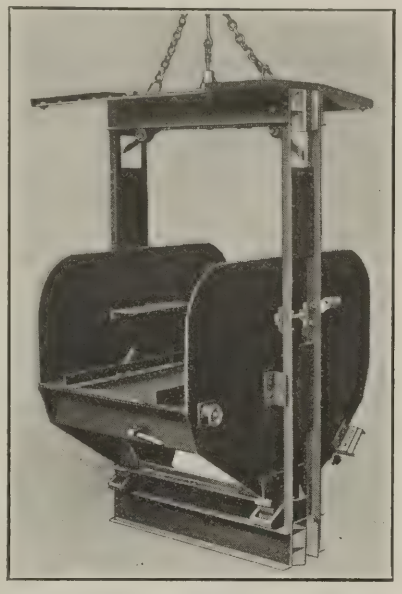
Neither of these men would have a leg to stand on in any consideration of real values, but where unreasonable men can differ so radically there is always abundant room for reasonable men to find an issue—and nowhere more than in accounting. Suffice it to say that the stand taken by Mr. Reed in regard to lands and leaseholds is always sound and reasonable and in accord with sane rules of accounting, which have in view not possible later sales or anticipated profits in operating but present selling prices. However much possible profits may influence the purchaser the owner of a property must figure his operation on the basis of retaining intact the value of the property at the price at which he purchased and erected it or in regard to land at its selling value at some subsequent time. He cannot figure on an uncertain future return.

The little details of checking payments for tonnage, yardage and deadwork, of determining daily costs, of tracking waste, of determining the correct royalty payments and of making daily production reports are treated with the sure grasp of a man who has traveled the mines, climbed railroad cars and shifted the pea back and forth on the mine scales.

In this book of 221 pages measuring 5¾x9¼ in., Mr. Reed has included not only the two rejected Federal Trade Commission forms of 1919 and 1920 but also the form submitted to the National Coal Association by a committee of its members and adopted by that body, together with the federal courts decision in the Maynard Coal Co. case, whereby the form of 1920 was made of no legal effect. There are in this book no less than sixty forms for use in keeping company books. The volume is published by the McGraw-Hill Book Co., 370 Seventh Ave., New York City.

All-Steel Self-Dump Cage for Speedy Work

FOR some time the coal industry has been looking for an all-steel cage. The illustration, herewith, shows one designed and constructed by Robert Holmes & Bros. The dumping arrangement is of the rack and pinion type. This provision makes it possible to tie the bottom of the cage so that any strain will be equally divided over the entire cage and not concentrated in any particular point. The top of the cage is tied in the same manner. The platform or body is made of heavy flange steel, tied together with 8-in. beams and the sides are of one piece, thus strengthening the cage and affording protection to men being hoisted or lowered. Two steel hanger-type keepers lock the car in place. They are so arranged on shafts under the platform that they will work either together or individually. When the cage lands at the bottom these keepers are forced downward allowing the empty car to roll off the cage. In doing so, the car wheels strike a lever which releases the keepers. thereby allowing them to return to their original position ready to receive another car. The purpose of having keepers that work independently of each other is to allow the loaded car to pass over the first keepers, locking itself into position as it strikes the second keepers. All the castings on the cage are of steel.



CAGE BUILT ENTIRELY OF STEEL

View is taken from the dump side. The button on the side plate near the floor of the cage runs in the guide which controls the forward movement of the platform in dumping. One of the forward keepers can be seen projecting from the far angle rail.

Electric Bonds Never Cause Rail Breaks

BY O. P. BOVARD*
Mansfield, Ohio

IN THE description of the meeting of the Coal Mining Institute of America at Pittsburgh on pages 1039 and 1040 of *Coal Age*, Vol. 22 (issue of Dec. 28, 1922), the writer of that article says:

"It was stated that at the meeting of the West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, in Huntington, W. Va., several rails with welded bonds were tested and that it was found that the welding crystallized the rail and weakened it, the rail breaking in every case at point of welding."

Despite the fact that this remark was not put in my mouth and follows in the report a statement made by "another member" I can but feel, in view of the fact that it is recorded that I led the discussion in question, that I should dissociate myself positively with any such point of view, which is contrary in every way to my personal experience and that of the company with which I am associated. In the application of many hundred thousand rail bonds of the welded type on industrial and mine roadways and on electric and steam railways we have never once had a report that a single rail break could be charged to the welded bond.

True in one instance in West Virginia a small rail broke owing to the insertion of an electric bond, this being installed by first burning a hole clear through the rail base with the carbon arc. This treatment injured the rail so severely as to cause breakage, which, however, did not occur at the weld.

It is the policy of practically all manufacturers to recommend that the bond be applied on the head of the rail or on the base. In no case should it be placed on the web, for in that event it is quite liable to start checks in the steel due to expansion of the point under heat when all the surrounding rail is unheated. This practice sets up extremely high stresses which may injure the rail and should, therefore, be avoided.

*Commercial engineer, Ohio Brass Co.

Wages Paid Pick Miners and Machine Miners and Helpers in Montana

	Pick Mining Per Ton	Machine Mining Per Ton	Machine Cutting Per Sq.Ft.
Red Lodge			
Veins Nos. 1, 1½ and 6	$1.20½		
Vein No. 2	1.12½		
Vein No. 3	1.12½		
Veins Nos. 4 and 5	1.08½		
* Stockett	.....	55 c., dry work	Runners 3.65 c.
		56 c., wet work	Helpers 3.28 c.
† Lehigh		87½ c.	2.89 c.
* Sand Coulee	$1.21½	55 c., dry work	Runners 3.65 c.
		56 c., wet work	Helpers 3.28 c.
‡ Loch Ray	1.21½	81½ c.	Runners 3.58 c.
			Helpers 3.27 c.
† No. 4, A.C.M. Co.		92 c.	4 c.
†Brown		92 c.	4 c.
‡ Pearce	1.21½	81½ c.	Runners 3.58 c.
			Helpers 3.27 c.
Merkle	1.28½		
Bearcreek			
† Vein No. 1	1.26½	91¼ c.	3.89 c.
Vein No. 2	1.21½		
† Vein No. 3	1.16½	87½ c.	3.64 c.
Vein No. 4	1.31½		
Vein No. 5	1.31½		
International			
Vein No. 1	1.26½		
Vein No. 2	1.21½		
† Vein No. 3	1.16½	87½ c.	3.64 c.
Vein No. 4	1.31½		
† Vein No. 5	1.31½	99 c.	3.60 c.
Smokeless and Sootless			
Vein No. 1	$1.26½		
Vein No. 2	1.21½		
† Vein No. 3	1.16½	87½ c.	3.64 c.
Montana Coal & Iron Co.			
Vein No. 1	1.26½		
† Vein No. 2	1.21½	91¼ c.	3.89 c.
† Vein No. 3	1.16½	87½ c.	3.64 c.
Eagle			
† Vein No. 3	1.16½	87½ c.	3.64 c.
Washoe			
Vein No. 1	1.26½		
Vein No. 2	1.21½		
Vein No. 3	1.16½		
† Klein	1.16½		
Republic No. 4			
4 to 5 ft. vein	1.26½		
Over 5 ft.	1.16½		
† Roundup No. 3	1.16½	97 c.	2.515 c.
† Roundup No. 5	1.16½	97 c.	2.515 c.
Star	.....	Same as Roundup	

* Drillers working as partners get 16¼ c. per coal hole. Cutting by punchers.
† Electric chain machine cutting.
‡ Cutting by punchers.

It is interesting to compare these figures with the wages paid machine miners, runners, and helpers in West Virginia, listed in *Coal Age*, vol. 22, page 878, Nov. 30, 1922:

	Machine Mining per Ton		
	Minimum	Maximum	Sample Average
West Virginia	58 c.	98 c.	69 c.
Montana	55 c.	99 c.	83 c.

COAL AGE INDEX

The indexes to COAL AGE are furnished free to all who ask for them. The index for the last half of 1922 is now ready for distribution. A copy can be had by addressing a postcard to the subscription department of COAL AGE.

Conference to Consider Standardization of Engineering Abbreviations and Symbols

A CONFERENCE to determine whether unification of engineering abbreviations and symbols should be undertaken, and if so, what the scope of such work should be, has been called by the American Engineering Standards Committee in response to requests received from the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and the Association of Edison Illuminating Companies. The conference will meet in the Board Room of the American Society of Mechanical Engineers, Engineering Societies' Building, New York City, at 10 a.m., Tuesday, Feb. 13.

As the committee's machinery has been the accepted medium during the last four years for national standardization of raw materials, industrial processes and manufactured products in the engineering field, it was requested to call a conference to consider the standardization of abbreviations and of the symbols used in engineering equations and formulas. Because of the peculiar nature of the subject, and the fact that some of the interested organizations will be unable to have representatives present, the Standards Committee has provided a questionnaire through which such organizations may send by mail, for consideration of the conference, such information as they consider desirable.

The need for the standardization of abbreviations is emphasized by the existing confusion resulting from the variety of symbols for one thing and the multiplicity of meanings of one symbol. The expression "pounds per square inch," for instance, may be represented by at least a half dozen abbreviations. Some English journals use "h.p." for "high potential," whereas in the United States it is generally used to mean "horsepower." Whether or not the letters h.p. should be capitalized or hyphenated is not agreed. The mark ″ may mean inches, seconds, or a quotation. It is used also in mathematical work for distinguishing letters in the same group of quantities, as A′, A″, etc.

Great confusion necessarily occurs because of the use of three or more different symbols for the same thing. The economies which will be gained by eliminating these ambiguities will be great both for the student and for the engineer who must refer to the varied literature of a technical subject. American standardization of engineering symbols and abbreviations should also eliminate the difficulty which foreign engineers have in correctly translating English articles into their own language, when they find widely divergent practices in the use of abbreviations.

The conference on Feb. 13 will take up the following questions for discussion and decision:

(1) Brief review of present practice of representative organizations.

(2) Brief review of practice of international and of foreign bodies.

(3) Shall the unification of abbreviations used in engineering reports, tables, publications, etc., be undertaken?

(a) If so, what shall be the scope of the work?—e.g., shall a broad program covering the general engineering field be undertaken, or shall the work be confined to one or more restricted fields?

(b) If the latter, what shall these fields be?—e.g., civil, chemical, electrical, mechanical or others, including municipal, sanitary, military, railway, mining, architectural, metallurgical, management?

(4) Shall the unification of symbols for quantities used in engineering equations, formulas and tables, be undertaken?

(a) If so, what shall be the scope of the work?—e.g., shall a broad program covering the general engineering field be undertaken, or shall the work be confined to one or more restricted fields?

(b) If the latter, what shall these fields be?—e.g., civil, chemical, electrical, mechanical, or others, including municipal, sanitary, military, railway, mining, architectural, metallurgical, management?

(5) If both lines of activities (items 3 and 4) are to go forward, should they be carried out as parts of a single undertaking or as two separate undertakings?

(6) How shall such unification be related to similar lines of work?—e.g., mathematical signs and conventions used in drawings and diagrams?

(7) Is it desirable that either line of activity be correlated with work on definitions of terms used in engineering practice?

(8) What recommendations, if any, shall be made to a continuing (sectional) committee, should one be organized—e.g., as to orienting the work in such a way as to facilitate international agreement?

(9) How shall the work be organized? For example, is it desirable to make the working committee (or committees) sufficiently large to be thoroughly representative, or is it desirable to keep it smaller, sending successive drafts of standards, minutes, etc., to interested organizations for comment and criticism?

Coke Output Gained Slightly in December

The output of byproduct coke continued to increase slowly in December. The total production was, in round numbers, 3,063,000 net tons, an increase over November of 138,000 tons. The increase was due in part to the fact that December is a 31-day month and November a 30-day month. The ratio of production to capacity was 83.5 per cent against 51.8 per cent in December 1921. This compared favorably with the ratio at times when demand for coke was most active.

Production of beehive coke also increased slightly, the total output being 1,233,000 net tons. The extent of the recovery from the depression that prevailed in 1921 is shown by the fact that the rate of output in December was 167 per cent greater than the monthly average during that year. The present rate, however, is still far behind that during the war years and the two years immediately following.

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE (*a*)

(Net Tons)

	Byproduct Coke	Beehive Coke	Total
1917 Monthly average	1,870,000	2,764,000	4,634,000
1918 Monthly average	2,166,000	2,540,000	4,706,000
1919 Monthly average	2,095,000	1,638,000	3,733,000
1920 Monthly average	2,565,000	1,748,000	4,313,000
1921 Monthly average	1,646,000	462,000	2,108,000
1922 Monthly average	2,374,000	669,000	3,043,000
Oct., 1922	2,806,000	876,000*b*	3,682,000
Nov., 1922	2,925,000*b*	1,138,000*b*	4,063,000
Dec., 1922	3,063,000	1,233,000	4,296,000

(*a*) Excludes screenings and breeze. (*b*) Revised from last report.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE

(Net Tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average	2,625,000	4,354,000	6,979,000
1918 Monthly average	3,072,000	4,014,000	7,086,000
1919 Monthly average	2,988,000	2,478,000	5,466,000
1920 Monthly average	3,684,000	3,665,000	6,349,000
1921 Monthly average	2,401,000	706,000	3,107,000
1922 Monthly average	3,411,000	1,056,000	4,467,000
Oct., 1922	4,032,000	1,382,000 (*b*)	5,414,000
Nov. 1922	4,203,000 (*b*)	1,795,000 (*b*)	5,998,000
Dec. 1922	4,401,000	1,945,000	6,346,000

(*a*) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged in byproduct ovens, and 63.4 per cent in beehive ovens. (*b*) Revised from last report.

U. S. Coal Commission to Study Productivity of Labor Under Union and Non-Union Conditions

By Paul Wooton
Washington Correspondent of *Coal Age*

Efficiency and productivity of labor under union and non-union conditions are to be studied carefully by the President's Coal Commission. Public announcement that this will be undertaken was made by Chairman Hammond on Feb. 3. He emphasized that it must be established whether or not it costs more money to produce coal at mines employing union labor than at those who observe an open-shop policy. The efficiency of labor in union mines, he said, is alleged to be 50 or 60 per cent, as compared with an efficiency of 80 per cent in non-union mines. The commission expects to make such a searching investigation of the question as to establish indisputably the facts in that connection.

At the Feb. 3 conference with the Washington correspondents Mr. Hammond reiterated the importance which the commission is attaching to storage. An engineer has been assigned to investigate minutely the matter of local storage at the coal mines. He also said that the commission is more convinced than ever that the railroads must store coal and abandon the policy of commandeering without specific permission in each case. The danger of spontaneous combustion of coal in storage, he said, appears to have been much magnified.

To attempt to divert surplus mine labor to agricultural work during slack business at mines, by the establishment of third-class fares or other expedients was frowned upon by Mr. Hammond, who declared that a way should be found to maintain uniform operation of coal mines throughout the year, thus allowing surplus labor to take permanent employment in other lines. By keeping up the bars against immigration only a few years will be required, he said, until this surplus is absorbed.

Central Stations Would Minimize Coal Handling

A further study of super-power will be recommended by the commission, it was revealed at the conference. While it was admitted that mine-mouth use of coal has a limited application only, due to the difficulty in obtaining condensing water, yet it is believed much transportation of coal can be avoided by well-located central stations.

The commission has given no formal consideration to any plan for facilitating financing of coal storage or obtaining insurance for such coal. In reply to questions, both Mr. Hammond and Dr. George Otis Smith indicated that they see no reason why the commission should concern itself particularly with any plan to make paper covering coal in storage eligible for rediscount at Federal Reserve banks or to take up other details of financing the handling of coal. So far as insurance is concerned, it was suggested that the best insurance for a coal pile is the installation of a crane and a clamshell bucket.

When asked what the commission thought of a plan to pool coal to be handled through large selling agencies, Mr. Hammond declared that such a recommendation likely would lead to a charge of paternalism. He admitted that the commission is very anxious to ascertain why a 5-per cent shortage causes a 200-per cent price advance and he said that the interests making up the coal industry should stop making faces at each other. He would hate to think any branch of the industry is as bad as the others assert that it is.

The commission as yet has no definite idea as to the legislation it will recommend. Every effort will be made, Mr. Hammond asserted, to suggest as little legislation as is possible, just enough to insure the untrammeled play of economic forces. Before public hearings are undertaken, an effort will be made to obtain substantial agreement on as many as possible of the controversial points. By resorting to this process of elimination, he believes the public hearings can be confined to the comparatively few points on which no agreement within the industry is anticipated. By that time the commission will have developed a great many facts for itself and will be in a position to know if witnesses have their facts straight.

During the course of the conference Mr. Hammond and Dr. Smith were asked, since the commission's force is necessarily a small one, if it would not be possible for the organizations of operators, mine workers, wholesalers and retailers to contribute, under proper safeguards, findings of fact which would supplement the work being done by the commission's specialists. Neither of the two commissioners was inclined to look with favor on the suggestion. It is feared that public confidence in the commission's conclusions would be weakened if any of its findings were based on data prepared by the operators, the mine workers or other branches of the industry, regardless of the steps the commission might take to verify such data.

A flagrant outrage in the retailing of coal, Mr. Hammond said, appears to be taking place in the sale of coal by the bushel. The prices which the very poor are being compelled to pay for coal will be difficult to defend, Mr. Hammond thinks. The commission expects to look into that phase of the coal trade in the near future.

Bill Amending Coal Commission Act to Come Up in House Soon.

The bill to amend the act creating the U. S. Coal Commission so as to extend its powers, particularly in regard to obtaining sworn answers to questionnaires and providing penalties for failure to answer or for giving false answers, will be taken up in the House Friday, Feb. 9, or will go over until next week.

The bill was called up Monday by the Interstate Commerce Committee when it was reached on the unanimous consent calendar of the House. Representative Winslow, chairman of the committee, asked for its passage, but Representative Blanton, of Texas, objected. One objection was sufficient to prevent consideration Monday.

As the Interstate Commerce Committee has considerable legislation pending, the steering committee has set aside Friday for consideration of bills from this committee, with the possibility that the latter part of Thursday's session will see the start of this work. The committee has eight bills that its members consider important for early consideration and Chairman Winslow has set seven of them ahead of the coal commission amendment. If the commission bill is not reached Friday, a special rule to bring it before the House as an extraordinary item of business will be asked early next week, Chairman Winslow has announced.

Judge Alschuler Off Coal Commission

Judge Samuel Alschuler, of Chicago, has forwarded to President Harding his resignation as a member of the United States Coal Commission, and it will be accepted, it was announced at the White House Feb. 2.

Judge Alschuler's letter to the President tendering his resignation was not made public, but it was said at the White House that his action was prompted largely because, under the law, he could not serve on the commission and at the same time retain his position on the Circuit Court bench.

It was also said at the White House that the President will name a successor to Judge Alschuler, thus making the commission consist, as now, of seven members. No intimation was given as to whom the President has in mind to fill the vacancy nor when he would make a selection.

Pacific Coal Industry Not Overdeveloped

To the editor of *Coal Age*:

The statements of the U. S. Coal Commission, the American Mining Congress, *Coal Age* and, I might say, all technical papers as well as the newspapers that "there are one-third too many coal mines in operation" needs correction in so far as our county is concerned.

This statement could apply to the part of the United States east of the Mississippi River but not the part west of the river to the Pacific Coast. People in the West, and more particularly the Pacific Coast, who are trying to secure capital in the East to develop coal lands are confronted with this fact when they seek money in the East.

Montana, Wyoming, Colorado and New Mexico produce coal and are able to dispose of all they produce. Utah produces much coal but not enough to supply the demand on her. Arizona, Nevada and California produce no coal and have to depend on Colorado and Utah and coal by imports. Oregon produces about 1 per cent of the coal she uses and that is lignite produced at Coos Bay. Most of Oregon's coal comes from Utah. Idaho produces no coal. Lately they have been trying to open a coal vein in the Boise Basin, southern Idaho. She gets all her coal from Colorado, Utah, Wyoming, Montana, and British Columbia and Alberta, Canada. The State of Washington produces about 2,500,000 tons per year and consumes about 5,500,000 tons per year. Coal is shipped in from Colorado, Wyoming, Montana, Utah, Alberta, British Columbia and some comes in by boat from Japan, China, Australia, New Zealand and boats coming from Europe for lumber and grain bring in coal as ballast. The smelter at Tacoma gets all its coke by boat. California, Oregon and Idaho get coke from Utah and Crows Nest, B. C., and by boat. Ships plying from Atlantic ports through the Panama Canal to Pacific ports try to bring along enough coal to return on or to get back past the canal. Most all the ships sailing from Oregon and Washington go to Vancouver Island, B. C., for coal.

Records of steamships operating from coast to coast show that the best Atlantic Coast steamship coal is 25 per cent better than Utah or British Columbia coal and about 40 per cent better than the State of Washington coal (except the Roslyn, which is owned by the Northern Pacific Railway and consumed by that railway), which is not quite as good as the best coals of Utah or British Columbia.

In the West since the war, 1914, very few mines have been opened up and the old mines are getting more difficult and costly to operate.

Most of the coal land in Washington is within the Northern Pacific land grant and it is difficult to secure land enough for a coal mine without including Union Pacific Ry. lands and they try to dictate in leasing and want the freight haul.

At Vancouver Island, B. C., steamships pay $7.50 per ton for coal and for the same coal at Tacoma and Seattle, $11.60, and for Utah, $15.50. At Columbia River ports Utah coal for steamships is $13.75. In Japan and China they coal from $5 to $6; at California ports, Utah coal, $11.50 to $12.50. You can compare these prices on the cost of operating ships on the Pacific Coast against the coal prices on the Atlantic ports. The majority of the coal miners on the Pacific coast of British Columbia are Japs, Chinese and Hindus—in the United States, all whites.

Utah coal in Portland, Ore., retails for $17.25 per ton; lignite, about $10. Coals produced about Seattle and Tacoma retail from $8 to $13 per ton. All mining out this way is done in a small way compared with coal mining in Ohio, West Virginia, Virginia and Pennsylvania.

If some of the Eastern coal producers would come out to the Pacific Coast and mine coal the way they do in the East, they could make good profits by introducing extensive and cheap mining. All the Western coal producers have a hard time securing money. A friend of mine just returned from New York. He was trying to secure cash to build a couple of miles of railroad and reorganize a coal mine to extend production, but the impression that there were too many mines now in operation defeated his purpose and it is too much for the small operator or one operator to buck against public sentiment when the coal magazines and periodicals and government agencies are crying about that there are at least one-third too many coal mines opened up, which is not a fact in the Rocky Mountains and west to the Pacific Coast. *Coal Age* could do a great and good service by correcting this erroneous report and impression.

A professor who taught seventeen years in the Agricultural College in Iowa came to Washington and purchased a 960-acre fruit ranch which was paying well. In four years he assigned to his creditors. He then published a statement that it was one thing to teach farming and another thing to farm—"That no person should teach farming unless he had ten years' experience in farming first," and I think the same thing about the coal.

J. W. McBride.
Cinnebar Coal Mine.

Bremer, Lewis Co., Wash.,
Jan. 18, 1923.

Trade Commission's Amended Answer in Maynard Case Stricken Out

The Supreme Court of the District of Columbia on Jan. 30, 1923, sustained the motion of the Maynard Coal Co. to strike out the "amended answer [of the Federal Trade Commission] upon the ground that it raises no defense." The Maynard case is the suit of the National Coal Association to restrain the Federal Trade Commission from collecting cost reports from coal operations. The case so far, including this decision, has gone clearly in favor of coal operators.

Justice Jennings Bailey said in part as follows:

"I think that the motion should be sustained. In my opinion no different question is raised from that decided in the case of the Claire Furnace Co. vs. the Federal Trade Commission, recently decided by the Court of Appeals.

"The defendant [the Federal Trade Commission] attempts to distinguish this case, and refers to the allegations of the amended answer to the effect that coal is impressed with a public interest, but the mere fact, if it be true, that coal is impressed with a public interest does not transfer the jurisdiction of its control from the states to Congress. The question is not whether a state may regulate the price and production of coal upon the theory that it is impressed with a public interest but whether such power has been given to Congress, and I find no such power.

"The defendant seems to confuse articles shipped in commerce with instrumentalities of commerce. The power to regulate the latter does not include the power to regulate the former. Nor does the fact that an article is necessary for the operation of an instrumentality of interstate commerce make it subject to regulation by Congress. If this were true, Congress would have the power to regulate the production of steel, necessary for the construction of locomotives; lumber, for the construction of coaches; rubber, for the construction of springs; food and clothing for the sustenance of the train crews; in fact, there is almost no article that might not be included in this manner. This question was fully covered by the recent decision of the Supreme Court in Heisler vs. Thomas Colliery Co. (No. 541—Nov. 27, 1922). In that case the State of Pennsylvania imposed a tax upon anthracite coal. The plaintiff sought to have the act adjudged unconstitutional. It was contended in that case that the tax was a regulation of interstate commerce."

Working a Year Non-Union, Mine Signs Up

An agreement has been entered into between the Fairmont & Lowesville Coal Co. and the United Mine Workers of subdistrict 4 of district 17, the coal company having signed the supplemental agreement late in January. For more than a year the company had been operating on a non-union basis and during that period action had been taken by the company to obtain possession of the dwellings of those who declined to work. About seventy-five miners are employed at the Fairmont & Lowesville company's mine and in recent weeks the officials of the union carried on such a vigorous organization campaign among them that the miners finally went on strike. There are several companies on the Monongahela Railway still operating on a non-union basis, however, among them being the River Seam Coal Co., the Sturm Coal Co. and the Delmar Coal Co.

Daugherty Questions Good Faith in Sale Of Lehigh & Wilkes-Barre Coal Co.

Attorney General Daugherty filed in the U. S. District Court in Philadelphia Jan. 30 a petition raising the question whether the proposed sale of the stock of the Lehigh & Wilkes-Barre Coal Co. to the Jackson E. Reynolds Syndicate of New York was made in good faith.

The stock of the coal company, which is owned by the Central Railroad of New Jersey was ordered sold under the U. S. Supreme Court decree for the dissolution of the Reading company's interests. The Jersey Central is controlled by the Reading company. The petition asks that any and all evidence bearing on the proposed sale be heard in court.

When the federal court was asked to confirm the sale to the Reynolds syndicate objections were raised by various parties on the ground that a bid by the Franklin Securities Corporation of Philadelphia was a better one. All objections were withdrawn, with the exception of that entered by Isaac T. and Mary T. W. Starr, minority stockholders in the Jersey Central.

One of the principal objections of the Starrs has been that Jackson E. Reynolds, head of the syndicate, who was officially connected with the Jersey Central and the Lehigh & Wilkes-Barre Coal Co., received "inside information," and that many members of his syndicate were disqualified from purchasing the coal stock. Hearings on the Starr objections were postponed several times.

Central Pennsylvania Renews Wage Scale

Operators and miners in the central Pennsylvania bituminous coal field came to an agreement on wages and working conditions at a conference between members of the Central Pennsylvania Bituminous Operators' Association and the officials of District No. 2, U.M.W. of A., held in Altoona on Wednesday and Thursday, Jan. 30 and 31. The agreement is identical with that under which the miners are working now and under which they went to work at the end of the strike in August, 1922.

The text of the brief agreement dated Altoona, Jan. 31, is as follows: "It is hereby agreed by the joint conference of the Association of Bituminous Coal Operators of Central Pennsylvania and the United Mine Workers of America of District No. 2 that the working agreement terminating on March 31, 1923, is hereby renewed and extended for one year from April 1, 1923, to March 31, 1924, in all the terms, provisions, customs and conditions."

The agreement was signed for the operators by B. M. Clark, president of the association; G. Webb Shillingford, vice-president, and Charles O'Neill, secretary-treasurer, in addition to twelve other operators, including John C. Forsythe, Rembrandt Peale, J. William Wetter, J. R. Caseley, C. B. Maxwell, E. W. Robertson, J. S. Sommerville, William Lamont, I. A. Boucher, Harry Boulton and M. J. Bracken.

The miners were headed by John Brophy, president of District No. 2, who signed the agreement, along with James Mark, vice-president, and Richard Gilbert, secretary, in addition to nineteen workers of the district attending the convention.

The scale provides as follows:

Pick mining, per gross ton, $1.28.

Pick mining, per net ton, $1.14.

Machine loading, per gross ton, $0.865.

Machine loading, per net ton, $0.772.

The inside day wage scale is:

Motormen, $7.60; spraggers, $7.50; skilled wiremen in charge of work being done, $7.50; wiremen's helpers, $7.27; track layers, $7.50; track layers' helpers, $7.27; bottom cagers, $7.50; drivers, $7.50; trip riders, $7.50; water and machine haulers, $7.50; timbermen, $7.50; pipe men, $7.42; trappers, $4.68; cutters, $7.60; scrappers, $7.35; all other inside day labor, $7.27.

The outside day wage scale is:

Dumpers, $6.92; ram operators, $7.10; pushers, $6.68; trimmers, $6.86; car cleaners, $6.60; firemen now working on change shifts of eight hours each, $7.10.

The day wage scales, both inside and outside, are identical with those operative when the men went to work August 16, 1920. The mining and loading prices are the same as those set April 1, 1920.

Three Sign Wage Agreements at Pittsburgh

Three wage-scale agreements were signed in western Pennsylvania last week continuing the present agreement for another year to March 31, 1924, in line with the tri-state agreement signed in New York Jan. 23.

The agreements signed last week, all with District No. 5, United Mine Workers of America, were signed in Pittsburgh, Pa., by the Pittsburgh Coal Producers' Association, the Thick Vein Freeport Coal Producers' Association and the Pittsburgh Coal Co., the last-named having withdrawn from the Pittsburgh Coal Producers' Association when that association signed the present agreement last summer.

Coal Companies Ask I. C. C. to Deny Reopening of Car-Rating Cases

The Interstate Commerce Commission has been petitioned not to grant the request of the carriers to reopen certain cases dealing with the rating of coal mines and the distribution of coal cars. The petition comes from the Slab Fork Coal Co., Scotia Coal & Coke Co., South Side Co., Turkey Knob Coal Co., Coal Run Coal Co., Branch Coal Co., Beachwood Coal & Coke Co., Greenwood Coal Co., Laurel Creek Coal Co., Quinnimont Coal Co., Maryland Coal & Coke Co., Star Coal & Coke Co., Ephraim Creek Coal & Coke Co. and the Stover Coal Co.

In addition to specific objections to the contentions of the carriers, the coal companies point out that the commission on its own motion has entered upon a general investigation of the reasonableness and propriety of all rules and regulations governing the rating of coal mines and the distribution of coal cars, including the 100-per cent rule which is at issue in the case which the carriers seek to reopen. For that reason the coal companies feel that questions involving the 100-per cent rule should be settled in the general opinion which will be issued in the assigned car case.

West Virginia Legislators Would Tax Coal

A number of bills have been introduced in both houses of the West Virginia Legislature **proposing a production tax on coal**, the rate proposed ranging all the way from 2c. to 10c. a ton. A bill introduced by Senator Suddarth, of Taylor County, fixes 2c. a ton as the rate to be paid. The Zimmerman bill, originating in the House, proposes a tax of 1 per cent of the value of all coal produced in the state, differing from other proposed production, privilege, license or depletion tax measures in that the tax is based on value rather than tonnage and being in that respect a sales tax. In the existing gross sales tax law the rate paid by coal is 0.4 per cent. In the bill introduced by Senator Hugus, of Ohio County, the rate proposed is 4c. a ton, at the mouth of the mine.

None of the measures proposed will be acted upon during the present or preliminary session but at the second or adjourned session beginning about the middle of March the principal tax issue will be between the advocates of a production tax and the advocates of a sales tax, coal operators generally favoring the latter, asserting that is more equitable to pay on value rather than to pay a flat rate on production without regard to the quality and market value of the coal produced.

600 Entombed in Silesian Mine Explosion

An explosion of fire damp in the Heinitz mine, at Beuthen, Polish Silesia, Jan. 31, entombed 600 miners, according to a press dispatch.

Of the 800 men composing the morning shift, who went into the mine shortly before the explosion, 300 still had not been rescued up to a late hour Feb. 1. Sixty bodies had been removed at latest advices and many of the rescued were suffering from injuries and were taken to hospitals.

To Penalize Anthracite Operators Failing To Report 1922 Output for Taxation

Anthracite companies and producers that failed to file reports of their 1922 production for taxation purposes by Feb. 1, unless they obtain extensions of time for filing, will be penalized, according to an announcement by Auditor General Samuel S. Lewis, of Pennsylvania. The Auditor General said that he purposes collecting the penalty even from companies whose tax cases for 1921 are still in litigation. Numerous companies, he said, have not filed reports nor asked for an extension of time.

The reports are desired, the state's fiscal officer said, in order to compute the tax due the commonwealth and also for an investigation the department is making relative to prices at the mines. In all cases where producers fail to file their reports promptly, the Attorney General's department will be notified.

A statement issued last week by the Auditor General's department shows that $2,000,000 has either been collected or is in process of collection from the anthracite producers of Pennsylvania, who owe taxes on coal mined during the last half of 1921. The statement follows:

"There have been recorded to date payments aggregating $1,807,588.15 for anthracite tax for the period from July 1 to Dec. 31, 1921, most of these payments having been made within a little more than a month. There is also in the process of payment sufficient to bring the total to approximately $2,000,000. . . .

"The total of the accounts settled for the period mentioned is $3,271,534.82, including some estimated settlements subject to revision upon the determination of pending litigation and not including interest charges. Payment of unpaid accounts is largely held up by litigation. . . .

"For the period named, accounts were made against 225 operators, representing 324 collieries or operations. No tax was assessed against 58 operators having unproductive collieries or operations during the period. Payments have been made to date by 109 operators, leaving 58 unpaid accounts."

Coal-Grading Bill Up in Pennsylvania Senate Penalizes Misrepresentation

A coal-grading bill was introduced in the State Senate at Harrisburg, Pa., Jan. 30 by Senator Horace W. Schantz, Lehigh County. It was referred to the Committee on Mines and Mining. The measure makes it unlawful to misrepresent the grade of coal sold or offered or advertised for sale. The bill covers anthracite, bituminous, semi-bituminous and all other grades of coal.

According to the provisions of the bill all coal sold within Pennsylvania is graded as follows:

Grade A—All coal containing less than 10 per cent of ash and less than 1½ per cent of sulphur.

Grade B—All coal containing less than 15 per cent of ash and less than 3 per cent of sulphur.

Grade C—All coal containing less than 20 per cent of ash and less than 4½ per cent of sulphur.

Grade D—All coal not classed as A, B or C.

The bill provides that all samples to determine the ash and sulphur contents shall be taken from the coal as it is sold or offered for sale on the market and not from samples taken in the mines. All samples analyzed shall be taken from a fair proportion of the whole quantity of the coal in question.

Under the provisions of the measure any person, association, copartnership or corporation selling or offering for sale or advertising for sale any coal, representing it to be of the first three grades, when the coal is below those standards, is guilty of a misdemeanor and upon conviction shall be sentenced to a fine of $1,000. The proposed act does not prohibit the sale of coal on specifications as to ash and sulphur content other than those designated by the provisions of the bill.

Senator Walsh, of Massachusetts, has presented to the U. S. Senate a letter from the State Fuel Administrator of Wisconsin, alleging impurities in coal shipments. Senator Walsh said inferior coal was being sold at high prices and that some method of standardization must be adopted to protect the public against deceit and fraud. The Wisconsin Administrator charged that anthracite coal now shipped carries greater percentages of impurities than ever before, and that the states are powerless to act.

The Massachusetts Senator has introduced a bill to establish standards for anthracite shipped in interstate or foreign commerce. The measure authorizes the Secretary of Commerce to establish by regulation standards of size, quality and condition of anthracite to be known as the U. S. Official anthracite coal standard. The bill forbids the shipment or delivery for shipment in interstate or foreign commerce of anthracite which is not of a grade fixed by these standards, and anthracite of a grade fixed by these standards under the name, description or designation of any other standard. The bill would permit the shipment or delivery for shipment to any foreign country of a grade not fixed by standard according to the specification or directions of a foreign purchaser, if the shipment is not in conflict with laws of such foreign country. Violation of the law would subject the offender to a fine of not more than $1,000 or imprisonment for not more than one year, or both. The bill was referred to the Committee on Labor, which reported favorably on it Feb. 5.

Hearing of Motion to Dismiss Petition for Logan Injunction Set for Feb. 12

Argument on the motion of counsel for the Logan Coal Operators Association to dismiss a bill of complaint filed by District 17, United Mine Workers, in the U. S. District Court for the southern district of West Virginia on Feb. 1 to restrain interference with any effort which might be made by the union to organize the Logan field, has been set for Feb. 12 by Judge George W. McClintic. In its application for an injunction the district union seeks also to restrain the Sheriff of Logan County from accepting money from the coal operators of the district for the pay of deputy sheriffs.

The argument of attorneys for the operators is that the case does not come within the jurisdiction of the federal court "since the violation of no federal law or interstate commerce regulations are charged," and it is also contended by them that all the matters charged are "solely within the jurisdiction of the state courts."

In applying for an injunction in the federal court the union seeks to prevent Sheriff Don Chafin of Logan County from interfering with the members or organizers of the union in the Logan County field, or in other words to give them free reign.

This is the first time the union has resorted to the injunction process since the decision of the U. S. Supreme Court in the Coronado case and operators in southern West Virginia look upon the petition for an injunction as the beginning of another general attempt to unionize the large territory south of the Kanawha River in West Virginia all of which is now on a non-union basis.

Pennsylvania Coal and Iron Police to Be Assigned Only in Real Emergency

Governor Gifford Pinchot, of Pennsylvania, has made an announcement to the effect that the coal and iron police, heretofore commissioned by the Governor without much formality, will in the future only be assigned where a real emergency exists and then only after investigation, if necessary.

A bill presented in the Pennsylvania Senate by John E. Stavitski, of Luzerne County, prohibits sheriffs, unless called upon by the local police authorities, to interfere in times of riot or disturbances. The bill provides that in all cities, boroughs or townships wherein there is an organized police force, it shall be unlawful for the sheriff of the county to enter therein, either in person or by deputy, for the purpose of suppressing riots or disturbances, unless he has first been requested by the officer or officers having control and authority over the police force of such municipalities.

Soft-Coal Stocks on Jan. 1 Total 36,000,000 Tons, Sufficient for 26 Days, Survey Report Shows

Industries other than steel and coke had on hand Jan. 1 an average of 40 days' supply of bituminous coal, retail coal dealers' bituminous supply amounted to 18 days, electric utilities had 33 days' supply and coal-gas plants had 60 days' supply, according to the latest survey of coal stocks by the U. S. Geological Survey.

At the rate coal was burned in November and December of last year, the report said, the stocks of soft coal on hand Jan. 1, 1923, would last 26 days and there are indications that stocks have increased since that date.

On Oct. 1, 1922, stocks on hand were sufficient to last 21 days and on June 1, 1920, when stocks were at the lowest point on record, they were sufficient for only 15 days.

The Survey shows that on Jan. 1, 1923, there were approximately 36,000,000 net tons of soft coal on hand, an increase of 4,000,000 net tons over Nov. 1, 1922, and 6,000,000 net tons over Oct. 1, 1922.

Stocks of bituminous coal in retail yards on Jan. 1, 1923, were approximately three-quarters what they were on the corresponding date a year ago. Stocks of anthracite were not quite 30 per cent of those of the same time a year ago. The total stocks of retail dealers—including both hard and soft coal—showed a decrease of 52 per cent when compared with those of Jan. 1, 1922.

Reports from 583 representative coal yards show an average of 10 days' supply of anthracite on hand. The 124 yards examined in the New England states had an average supply of 13 days each. When compared with reports received from 516 yards on Nov. 1, 1922, the survey indicates an increase of 1 per cent over that date; 70 per cent less than on Jan. 1, 1922; 41 per cent less than on Jan. 1, 1921, and 54 per cent less than on Jan. 1, 1919.

The report shows that many of the Western States had large stocks and that the decrease was most marked in the

DAYS' SUPPLY OF SOFT COAL IN HANDS OF REPRESENTATIVE INDUSTRIAL CONSUMERS, PUBLIC UTILITIES AND RETAIL COAL DEALERS, JAN. 1, 1923.

(Figures represent number of days stocks would last at current rate of consumption)*a*

State	Industries Other Than Steel and Coke: No. of Plants Reporting	Industries Other Than Steel and Coke: Days' Supply Jan. 1, 1923	Retail Coal Dealers Bituminous: No. of Dealers Reporting	Retail Coal Dealers Bituminous: Days' Supply Jan. 1, 1923	Electric Utilities: No. of Plants Reporting	Electric Utilities: Days' Supply Jan. 1, 1923	Coal-Gas Plants: No. of Plants Reporting	Coal-Gas Plants: Days' Supply Jan. 1, 1923
Total U. S.	2,265	40	1,027	18	754	33	112	60
Maine	27	63	8	39	2	1	2	134
New Hampshire	32	66	12	22	3	42	1	67
Vermont	40	74	5	28	*b*	*b*	*b*	*b*
Massachusetts	270	57	57	23	45	42	10	66
Connecticut	67	96	26	26	17	31	2	74
Rhode Island	59	86	13	13	4	30	1	76
Total New England	495	68	121	22	71	38	16	72
New York	166	50	31	10	33	31	6	57
New Jersey	100	47	13	15	27	62	1	25
Pennsylvania	129	29	39	18	53	40	3	41
Maryland	32	22	12	10	12	20	3	98
Delaware	20	44	5	3	2	33	*b*	*b*
Dist. Columbia	10	27	12	6	2	20	*b*	*b*
West Virginia	42	10	14	6	14	26	*b*	*b*
Ohio	137	32	54	11	61	31	5	32
Indiana	96	36	109	15	46	31	9	60
Illinois	137	23	85	17	44	30	8	57
Michigan								
No. Peninsula	17	138	5	53	34	52	12	36
So. Peninsula	99	51	59	18				
Wisconsin	83	44	35	32	27	53	5	258
Minnesota	59	96	9	25	34	41	2	16
Iowa	29	21	81	16	48	29	3	104
North Dakota	6	5	8	19	11	15	2	23
South Dakota	2	22	5	15	12	40	*b*	*b*
Nebraska	8	10	9	39	25	24	*b*	*b*
Virginia	27	34	16	11	15	24	2	36
North Carolina	39	31	11	22	11	31	5	15
South Carolina	42	42	13	19	9	69	2	23
Georgia	27	58	25	39	7	23	2	43
Florida	11	58	4	33	2	21	1	36
Kentucky	26	23	44	15	22	26	3	23
Tennessee	66	21	25	21	11	15	3	33
Alabama	36	27	28	23	5	11	5	38
Mississippi	3	..	14	47	13	34	4	36
Missouri	69	33	41	13	37	16	*b*	*b*
Kansas	45	22	7	35	9	23	*b*	*b*
Oklahoma	19	67	6	24	4	79	*b*	*b*
Arkansas	20	29	6	16	2	33	*b*	*b*
Louisiana	2	25	5	35	3	156	1	138
Texas	48	29	1	5	13	18	1	40
Colorado	31	39	9	21	16	21	1	55
New Mexico	4	43	8	21	6	32	*b*	*b*
Arizona	8	53	5	40	*b*	*b*	*b*	*b*
Utah	18	50	7	28	*b*	*b*	1	58
Nevada	7	41	8	34	*b*	*b*	*b*	*b*
Wyoming	3	..	5	2	6	11	*b*	*b*
Montana	15	39	6	24	5	12	*b*	*b*
Idaho	14	32	8	24	*b*	*b*	2	75
Washington	11	50	5	22	2	14	4	32
Oregon	5	*c*	8	36	*b*	*b*	*b*	*b*
California	2	*c*	6	61	*b*	*b*	*b*	*b*

(*a*) Period of consumption, Nov. 1.-Dec. 31, 1922. (*b*) No data. (*c*) Less than one-tenth of 1 days' supply.

PER CENT OF CHANGE IN TONS OF COAL ON HAND AT CERTAIN PLANTS ON JAN. 1, 1923, COMPARED WITH WHAT IDENTICAL PLANTS HAD IN THE PAST.

(Includes only plants for which stock data were available on each of the dates shown.)

State	Industries Other Than Steel and Coke, Per Cent of Change January 1, 1923 As Compared with *a*: No. of Identical Plants	Nov. 1, 1922	Jan. 1, 1922	Jan. 1, 1921	Jan. 1, 1919	Retail Coal Dealers Bituminous, Per Cent of Change January 1, 1923 As Compared with *a*: No. of Identical Plants	Nov. 1, 1922	Jan. 1, 1922	Jan. 1, 1921	Jan. 1, 1919
Total U. S.	1,871	+1	—6	—26	—43	847	—13	—28	—18	—35
Maine	22	—14	—33	—47	—63	10	—30	+45	—16	—25
New Hampshire	29	—25	—36	—60	—69	12	—45	+62	—31	+10
Vermont	35	—18	—3	—36	—50	5	—4	—12	—35	—24
Massachusetts	223	—22	—28	—51	—62	54	—32	+17	—28	—28
Connecticut	59	+4	—2	—25	—35	26	—42	—20	—12	—26
Rhode Island	47	—14	—8	—37	—57	13	—50	+122	—42	—45
Total—New England	415	—14	—21	—44	—57	120	—34	+21	—24	—27
New York	116	+11	—18	—28	—85	30	+10	+44	+2	+21
New Jersey	84	—7	—20	—43	—55	13	—38	—22	—35	—33
Pennsylvania	102	*b*	+9	+1	—8	36	—1	+9	—2	+36
Maryland	29	—15	—13	—48	—62	12	—54	—4	—24	—54
Delaware	15	—44	+1	—49	—66	5	—69	—8	—75	—70
Dist. of Col.	6	+35	+6	+18	+126	4	—9	—24	—70	+1
West Virginia	31	—2	+12	—3	—32	7	+122	—17	+33	+147
Ohio	106	+9	+7	—11	—43	49	+13	—64	—42	—60
Indiana	91	+11	+5	+3	—9	90	—6	—57	—33	—64
Illinois	110	+20	+2	—27	—51	70	—7	—14	—12	—33
Michigan										
No. Peninsula	15	+3	—24	—26	—65	4	—32	—16	—21	—45
So. Peninsula	84	+24	+20	—9	—5	48	—4	—52	+8	—65
Wisconsin	73	+8	+1	—37	—41	28	+15	—33	—7	—38
Minnesota	53	—17	—25	—44	—28	8	—23	+34	—8	+3
Iowa	25	—15	+29	—10	—39	64	—12	—29	—21	—44
North Dakota	6	+3	+15	—18	—44	6	—14	+97	—23	+84
South Dakota	2	+156	—25	—8	—68	4	—22	—48	—8	—30
Nebraska	7	—16	—40	—52	—67	11	—8	—9	—1	—30
Virginia	25	—10	+9	—25	—18	12	—30	—82	—76	—82
North Carolina	34	—23	—38	—38	—46	8	—24	—47	—13	—37
South Carolina	32	—36	—37	—29	—54	11	—36	—68	—39	—61
Georgia	23	+7	+15	+5	—4	14	+16	—24	+35	—1
Florida	6	—11	—36	—54	—64	2	—44	—75	—83	—77
Kentucky	24	+18	+25	—7	—26	39	+4	—61	—38	—58
Tennessee	53	—9	—10	—34	—28	20	+15	—61	—1	—37
Alabama	29	—3	—22	—57	—66	23	—27	—76	*b*	+175
Mississippi	19	—15	—33	—55	—69	11	—7	—5	*b*	—16
Missouri	60	+10	+5	—38	—51	31	+33	—26	+3	—37
Kansas	32	+23	*b*	—11	—35	4	+36	—36	+20	+313
Oklahoma	17	+22	+11	—30	—47	3	+6	—29	+10	—14
Arkansas	17	—1	—53	—62	—63	3	+*b*	—24	—43	—3
Louisiana	—	—	—	—	—	5	+3	—53	—39	+110
Texas	29	+24	+272	+56	+123	1	+75	+120	—30	—57
Colorado	25	—10	—3	—19	—37	8	—1	+40	+70	+31
New Mexico	3	+111	+12	—63	—72	7	+27	—3	+41	+48
Arizona	5	+5	+68	—9	+215	4	+2	+73	+54	+278
Utah	16	+38	+6	—28	—48	5	+29	—64	—38	—23
Nevada	5	—22	+2,089	+10	—66	5	+13	—19	—46	+50
Wyoming	3	*c*	*c*	*c*	*c*	3	+0	+446	—29	+58
Montana	13	+8	+8	—2	—16	3	+62	+71	+35	+209
Idaho	14	—7	—27	—36	*b*	5	—18	—25	—27	+255
Washington	10	+2	—14	—47	—7	1	—18	+64	+62	+59
Oregon	3	—100	—53	—68	—54	7	—30	—8	—46	—3
California	4	—40	—87	—85	—72	3	+10	+57	—43	—51

(*a*) A plus sign denotes an increase; a minus sign, a decrease.
(*b*) Less than 1 per cent
(*c*) No stocks on hand December 31, 1922.

territory east of the Mississippi. Reports were received from 2,265 industrial plants. Coal for steamship fuel, on Lake docks and in transit is not included in the Geological Survey's report.

DAYS' SUPPLY OF ANTHRACITE AT 583 RETAIL COAL YARDS JAN. 1, 1923, AND PER CENT OF CHANGE IN 516 YARDS

State	Days' Supply All Dealers Reporting *a* — No. of Dealers Reporting	Days' Supply Jan. 1, 1923	Change in Tons Identical Dealers *b* Per Cent of Change January 1, 1923, As Compared With — No. of Identical Dealers	Nov. 1, 1922	Jan. 1, 1922	Jan. 1, 1921	Jan. 1, 1919
Total United States	583	10	516	+1	—70	—41	—54
Maine	9	16	8	+8	—51	+150	+113
New Hampshire	12	9	12	—40	—86	—70	—65
Vermont	7	6	6	+6	—89	—83	—86
Massachusetts	56	13	54	—5	—78	—35	—62
Connecticut	27	12	27	—13	—80	—56	—75
Rhode Island	13	12	13	—24	—87	—40	—82
Total New England	124	13	120	—8	—79	—40	—67
New York	32	7	29	+13	—54	—5	+4
New Jersey	18	6	14	—39	—76	—52	—67
Pennsylvania	40	20	27	—1	—51	—46	—47
Maryland	8	1	12	—46	—94	—91	—89
Delaware	7	7	5	—18	—78	—9	—62
District of Columbia	11	8	4	—7	—72	—57	—39
West Virginia	4	43	—	—	—	—	—
Ohio	33	9	34	—31	—83	—61	—48
Indiana	63	3	65	—61	—96	—85	—95
Illinois	69	11	61	+69	—73	—46	—36
Michigan							
No. Peninsula	5	30	4	+301	—53	—54	—59
So. Peninsula	51	5	45	—30	—94	—85	—87
Wisconsin	35	18	28	+21	—67	—18	—38
Minnesota	9	25	8	+36	—34	—38	—31
Iowa	46	17	39	—13	—30	—37	—40
North Dakota	6	26	5	+4	+8	—54	—44
South Dakota	4	12	4	+54	—67	—70	—38
Nebraska	7	51	5	+1	—27	—67	—51
Virginia	11	6	7	+121	—97	—95	—84

(*a*) Figures represent number of days' stock would last at current rate of delivery to consumers, namely that in November and December, 1922.
(*b*) Includes only dealers from whom reports were available for each of the dates shown.

Union Completes Official Count of Votes In International Election

John L. Lewis received 193,824 votes for president of the United Mine Workers of America in the election held Dec. 12, according to the official count, completed Feb. 2. Philip Murray, of Pennsylvania, received 187,659 for vice-president, and William Green, of Ohio, 189,697 for secretary-treasurer. All three international officers were re-elected without opposition.

Besides these three, the following were chosen to represent the miners in the convention of the American Federation of Labor: Frank Farrington, Illinois; Thomas Kennedy, Pennsylvania; Fred Mooney, West Virginia, and John Moore, and Lee Hall, Ohio.

Northwestern Dock Operators' Association Engages Wayne Ellis as Secretary

Wayne Ellis has been selected for the secretaryship of the Northwestern Dock Operators' Association. He was selected for this important position because the dock operators are convinced that he has as thorough knowledge of coal distribution as is possessed by any coal specialist in the country. The appointment became effective Feb. 5, but Mr. Ellis was not able to undertake his duties on that date, due to the necessity of concluding some of the work he has under way for the President's Coal Commission.

THE ANACONDA COPPER MINING CO. contends that the tentative report of the Interstate Commerce Commission's examiner in the Western Coal Rate case is in error in failing to recommend that these rates be reduced.

Refuse Anthracite Data to District of Columbia Utilities Commission

Efforts of the Public Utilities Commission of Washington, D. C., to find out how much hard coal dealers in the capital are receiving from the Philadelphia & Reading Coal & Iron Co. and how those receipts compare with last winter's shipments have been without result so far. The commission sought this information after some local coal merchants had complained that they were not getting their proper proportion of the anthracite shipped by the P. & R.

The commission states that it asked that company for the desired information to verify the complaints, but that "this request was not complied with either by the main office of the company or by its local representative, and the commission, accordingly, asked the assistance of the Federal Fuel Distributor in securing the desired information."

The reply received by Engineer Commissioner Keller from Federal Fuel Distributor F. R. Wadleigh quoted a letter from Mr. Parker, director of anthracite distribution, as follows:

" 'The information requested by Colonel Keller, District Commissioner, is of strictly confidential character, which the anthracite companies have always definitely declined to furnish to anyone, and while I should like to be of service to Colonel Keller or to any other official who is assisting in the solution of the problems we have facing us, I regret that I cannot convey his request to the Philadelphia & Reading Coal & Iron Co. for a statement as to the shipments made to various dealers in the District of Columbia during the coal years of 1921-22 and 1922-23.

" 'If there is any part of the city or the District that has failed to get its proper proportion of the tonnage available through the failure of any particular dealers or dealers to get his or their supply, and I am advised to that effect, I will be glad to put the matter up to the Philadelphia & Reading Coal & Iron Co. or other shippers, but that is as far as I feel I can go in the matter.' "

Ogle Commends Commission Study of Relative Labor Efficiency and Storage

Alfred M. Ogle, president of the National Coal Association, expressed great satisfaction on learning that the President's Coal Commission will make it a special point to ascertain the relative efficiency of union and non-union labor. This and the study the commission is making of storage offer particular possibilities for being constructive and helpful to the industry, he said. He believes, as the investigation of the storage situation progresses, the commission will find that storage at the mine mouth is impracticable, except at very small mines. The principal disadvantage of storing at the mine mouth lies in the inability of the railroads to furnish sufficient transportation to move such coal in storage during times when the consuming public requires it.

"It seems an unnecessary expenditure of money," Mr. Ogle says, "to buy more coal cars under conditions as they exist today on the railroads. The trouble at the present time is with motive power and inadequate yard and terminal facilities. There are certain bottle necks on some of the most important coal roads which limit and disrupt the distribution of coal."

Mr. Ogle called attention to the fact that many of the statements made by the Coal Commission in its Jan. 15 report are being misinterpreted in the daily press. For instance, it is being published widely that the commission has found profiteering to be one of the causes of high coal prices, when as a matter of fact the commission's report states that "it has been suggested to us that one of the causes of high prices of coal is profiteering." In the next paragraph the commission goes on to point out that it has not yet obtained the figures to settle the question.

He fails to see where overdevelopment can be attributed as a cause for high prices. Excessive production is commonly supposed to be a factor in depressing prices. In Mr. Ogle's opinion, there would be no difficulty at any time, despite transportation drawbacks, in furnishing the country

its full requirements of coal, were it not for the interruptions in production and distribution by recurring strikes.

With all their other difficulties, Mr. Ogle feels that the operators should be spared the burdens heaped on them by unfair attacks from such responsible agencies as the Associated Press and the U. S. Department of Labor. On the eve of the wage agreement in New York, he states, the Associated Press carried an article which was an undeserved reflection on the operators. He feels that one of the recent radio releases of the Department of Labor is a most unjustifiable and indefensible attack on the entire coal industry. In addition, he believes that release can be regarded only as a serious discourtesy to the President's Coal Commission.

May Be Necessary to Extend Life of Coal Commission to Dec. 31, Says Hammond

As there has been delay in obtaining the legislation to compel swearing to answers to questionnaires, it may be necessary to extend the life of the President's Coal Commission until Dec. 31, Chairman Hammond intimates in a letter written to the Director of the Budget. The full text of the letter follows:

"The appropriation for the U. S. Coal Commission is in the following language:

To carry out the provisions of the act entitled "An act to establish a commission to be known as the U. S. Coal Commission for the purpose of securing information in connection with questions relative to interstate commerce in coal, and for other purposes," including personal services in the District of Columbia and elsewhere, and rent if space can not be assigned by the Public Buildings Commission in other buildings under the control of that commission, fiscal year 1923, $200,000: *Provided*, That no part of this sum shall be available for the payment of compensation of any person in excess of $7,500 per annum.

"To continue this work after June 30 and on the scale required by the terms of the act of Sept. 22 necessitates the submission of the following supplemental estimate:

To continue and conclude the investigation under the act entitled "An act to establish a commission to be known as the U. S. Coal Commission for the purpose of securing information in connection with questions relative to interstate commerce in coal, and for other purposes," including personal services in the District of Columbia and elsewhere, $400,000, to continue available for expenditure until Sept. 22, 1923, or until Dec. 31, 1923, provided the President, if he deems the continuance of the work of the commission essential to the public interest, may, by Executive order, continue the commission in force to a date not later than Dec. 31, 1923.

"The expenditures to date with all liabilities and salary encumbrances to June 30 do not exceed the amount appropriated, so that no deficit has been incurred nor need be anticipated if Congress desires only incomplete consideration of the subjects submitted to the commission for investigation.

"It is, however, quite manifest that the commission will not have discharged its duty to the Congress and the people of the United States by a report to the Congress touching certain phases of the industry and not covering the industry as a whole. To be of any use whatever, it must submit what it believes to be the truth about production, distribution, and consumption of coal, embracing, as these questions of cost and price necessarily do, the overhead charges, the income upon the investment, whether properly or improperly computed, the earnings of miners, not by averages but by classes, the problem of overdevelopment of mines and overmanning of the industry, the contracts which are entered into for the sale of the coal, the activities of wholesalers and jobbers, the transportation question in all of its ramifications, the retailing of the coal and the profits derived by the retailer and whether such profits are computed upon improper bases or not.

"There are approximately 9,000 mines involved in the inquiry. To avoid extravagant expenditure of the public funds by the indiscriminate subpoenaing of witnesses from these mines to appear before the commission, it has adopted the policy of having prepared by skilled persons certain questionnaires to be sent out in the first instance. When these have been returned, the commission will be enabled to determine upon what points it should take oral testimony to satisfy itself not only that the figures are correct but also that they are made upon bases fair and just to the American people. It is also quite evident that the controversy arising from what is known as the civil rights of American citizens into a controversy between the non-union mines and those which are operated by the United Mine Workers of America involves a painstaking hearing on the alleged facts presented by each side of the controversy.

"The Congress of the United States has also asked a report as to the conditions of life in the coal-mining communities of this country. This necessitates the sending of skilled social students into the various mining districts of America in order that they may present to the commission a view of the conditions of life in the various mining districts of our country. In the usual and ordinary way for obtaining facts, millions of dollars might be spent in the way of taking a transcribed testimony, and volume after volume might be filled with this testimony, but when so obtained it would require a technical student to pick out and separate the important facts from the mass of irrelevant matter. This commission has adopted the other plan, the one briefly described above, of endeavoring to obtain all undisputed facts through the medium of questionnaires and undisputed public documents.

"It is evident that with an additional appropriation of $400,000 it can complete the survey by its trained workers, can eliminate from taking of testimony all undisputed facts, and can compress within reasonable bounds the testimony necessary to reach measurably accurate conclusions upon the facts in controversy.

"This commission is not inclined to sit for the purpose of sitting. It does not care to waste time. It seeks to make the record of a commission which recognizes its duty to end its work as speedily as possible.

"However, the commission has not yet the power to compel swearing to answers to questionnaires for which it asked Congress. Notwithstanding delays beyond its control, the commission's purpose and hope are to conclude its labors by the 22d day of September, the time fixed in the original act. It, therefore, requests that the President of the United States may be empowered, if he deems it essential to the public interest, to continue the work of the commission to Dec. 31, 1923, and in that event the appropriation here sought shall continue to be available until that time."

"Danger of Coal Panic Past," Says Hoover

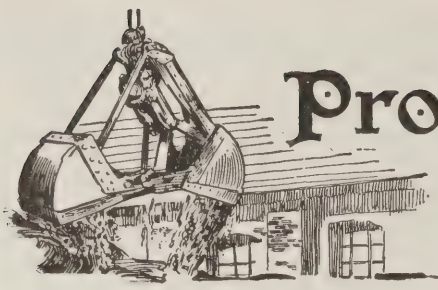
Under the caption, "Danger of Coal Panic Past," the leading editorial in the Feb. 5 issue of United States Weekly Commerce Reports, published by the Department of Commerce, which is reported to have been written by Secretary Hoover himself, descants on the bituminous coal situation as follows:

"The United States appears to have effectually passed the point where there is any danger of a coal panic as the result of short coal deliveries. The stoppage in coal production for nearly five and one-half months during the summer of 1922 threw a great burden upon the government in securing such distribution of coal as would maintain the industries and commerce of the country intact.

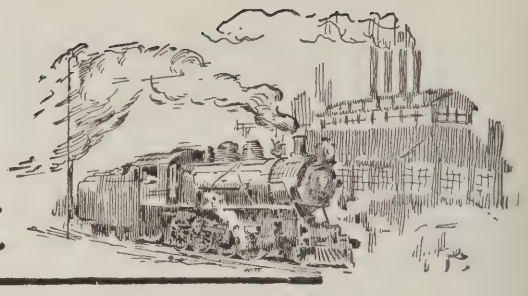
"Although approximately 60 per cent of the country's bituminous mines were closed during the period of the strike, the campaign carried on by the Department of Commerce prior to the coal strike in securing the upbuilding of national stocks to the unprecedented sum of nearly 85,000 000 tons, together with the measures taken for control of distribution subsequent to the strike, have enabled us to weather the difficulties successfully.

"The price of spot bituminous coal at the mines has averaged $4.16 per ton since the beginning of the strike on April 1, 1922. This compares favorably with an average of $5.64 per ton for spot coal for the year 1920, when there was no stoppage of production and when the output was less than 2 per cent below the maximum of any previous year. During the year 1922 we have had to face both a shortage of transportation and a tremendous stoppage of production, yet there has been less crippling of industry, with respect to both coal distribution and price, than on the previous occasion.

"The signing of the new wage agreement and its effect on labor afford a safeguard against any further stoppage in production for another year, and the stability that will thus be created will contribute materially to a renewal of competitive conditions."



Production and the Market



Weekly Review

The sharp drop in prices of soft coal, in view of the continued steady output of 11,000,000 tons per week, is the best indication of what is happening to the spot market. The buyer is gradually getting the better of it. *Coal Age* Index of spot prices of bituminous coal dropped 30 points in a week, from 342 on Jan. 29 to 312 on Feb. 5, corresponding to an average price on Feb. 5 of $3.78.

The most pronounced declines were in eastern Kentucky, Kanawha and Clearfield, where the drop was around 50c., and Cambria and Somerset and Smokeless, the low volatiles, of from 60c. to 80c. Buyers are clinging to the spot market and display no anxiety whatsoever.

The renewal of the wage agreements in the Pittsburgh and central Pennsylvania districts was to be expected following the signing of the agreement between the operators from Illinois, Indiana and eastern Ohio, and had no effect on the situation. With spring nearly here and assurances that there will be no serious labor disturbances, consumers have no apprehension. They are not anxious to buy more coal than they really need but are willing to pick up bargains.

Consumers Not Anxious to Make Contracts.

Nor are consumers ready to make contracts for the year beginning April 1. Many tentative figures have been heard at which operators are willing to sign up for a year's supply, but few contracts have been closed.

Car supply continues poor in most sections of the country. Because of continued embargoes via the Hudson River gateway the all-rail route to New England is effectually closed. Pennsylvania operators are under heavy pressure to place within much restricted territory what they can produce even under present conditions of car supply. Practically all bituminous coal for commercial purposes is excluded by certain of the railroads from the all-rail route. As a result the restrictions on shipments into New England were reflected in the receipts at the New York terminals.

Lack of cars and cold snaps in various sections of the country were the factors that kept prices from a lower level. Mines in most instances did not work more than half time and weather conditions were not such as to result in heavy consumption of coal.

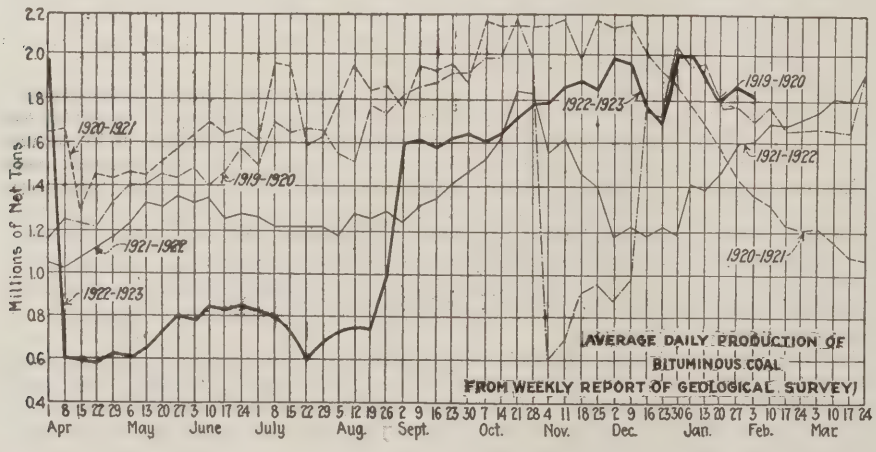
The trade was interested in bids opened by the United States Shipping Board at New York on Jan. 29 for furnishing about 8,000 gross tons of coal alongside vessels in that harbor. The prices submitted ranged $7.33 @$9.10 for three months delivery and $7.20@$8.74 for six months delivery, the coal to be the equal of Pools 1, 9 and 71. Later in the week the bids were rejected on the ground that the prices were too high. It has not been announced whether the bids would be re-advertised.

Anthracite production continues at around 2,000,000 net tons per week. Already dealers located from three to four weeks from the point of loading are said to be cancelling orders where placed with the smaller producers quoting high prices. Producers are watching the progress of the coal-grading bill introduced in the Pennsylvania State Senate, making it unlawful to misrepresent the grade of coal sold or offered or advertised for sale. The bill covers anthracite, bituminous, semi-bituminous and all other grades of coal.

Senator Walsh of Massachusetts, who has advocated the cutting off of shipments of anthracite to Canada, has sent to the U. S. Senate a communication complaining of bad preparation and also has introduced a bill establishing standards for anthracite shipped in interstate commerce.

Production of coke is limited by the car supply. A shortage of labor now and then at various works makes it possible to give the other workers nearly full employment. Demand for coke for heating purposes continues strong.

"The rate of production of soft coal has been station-



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Jan. 13	8,302,000	11,217,000
Jan. 20 (*b*)	8,782,000	10,925,000
Jan. 27 (*a*)	9,615,000	11,160,000
Daily average	1,603,000	1,860,000
Calendar year	34,175,000	44,250,000
Daily av. cal. year	1,266,000	1,639,000
ANTHRACITE		
Jan. 13	1,643,000	2,113,000
Jan. 20	1,443,000	2,010,000
Jan. 27	1,607,000	2,119,000
Calendar year	6,447,000	7,967,000
COKE		
Jan. 20 (*b*)	115,000	328,000
Jan. 27 (*a*)	113,000	346,000
Calendar year	455,000	1,307,000

(*a*) Subject to revision. (*b*) Revised from last report.

ary at about 11,000,000 net tons a week during the past four weeks," says the Geological Survey. "First estimates for the week ended Jan. 27 place the total, including mine fuel, coal coked at the mines, and local sales in addition to shipments, at 11,160,000 net tons, which is a small increase as compared with the revised estimate, 10,925,000 tons, for the week preceding.

"Preliminary reports of cars loaded during the present week (Jan. 29-Feb. 3) show 42,659 cars on Monday and a decline to 29,218 cars on Thursday. Thus the indicated total output for the present week is between 1 and 2 per cent less than for the week preceding and will be about 10,900,000 to 11,000,000 tons."

Midwest Is Uneasy

Short car supply together with a cold snap which swept down out of the Northwest at the end of last week were the two factors which staved off the long-imminent market collapse. Most Indiana and Illinois fields worked something less than half the time, which was quite enough to balance the demand. The general expectation was that the cold would continue less than a week, so there was nothing resembling a rush to market for coal. Instead, dealers everywhere kept up their clamor for further price reductions.

Indiana producers shaded their lists 25c. or 50c. at the middle of the week, dropping Fourth Vein lump back to $4.25@$4.50 and Sixth Vein to $4.50@$4.75. Central Illinois lump could hardly maintain a level of $3.75. Some sold down to $3.50. In each case there were more cars than were needed, even at 50 to 60 per cent supply. Southern Illinois association operators did not give up their $5.50 price for lump and egg, however.

A feature of the domestic market in Chicago was the dropping of the retail price of Pocahontas mine-run from $11.50 to $10 by a dealer big enough to upset the market. At once there was a general stirring about followed by a tendency on the part of the mine price to drop from $4.75@$5 down to at least as low as $4.50. A good deal of this Eastern coal is reaching Chicago just now.

Steam demand continued light, but the small volume of steam coals available kept the price from sinking much. In the case of one or two coals it even rose a faint shade. Fourth Vein screenings attained $2.50 as a top. Nobody anticipated any general rise of small sizes, but screenings are expected to hold their own for a while. No stocking is noticeable on the part of any big consumer. Buying is on a day-to-day basis.

This day-to-day tendency is most obvious in St. Louis, where few dealers stock heavily, since coal fields are so close at hand. That market has been taking light tonnages for

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

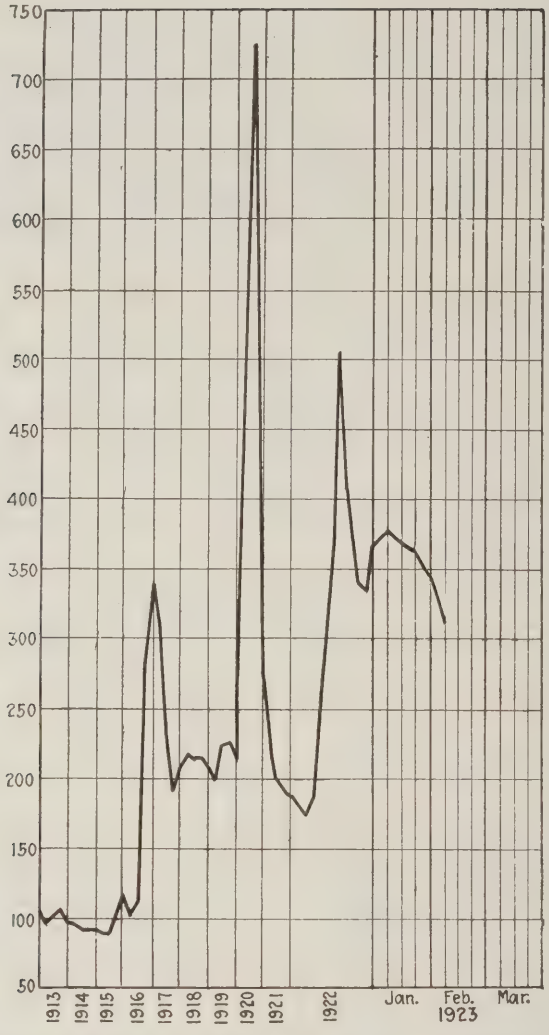
	Market Quoted	Feb. 6 1922	Jan. 22 1923	Jan. 29 1923	Feb. 5 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.25	$7.25	$7.25	*$6.50@$7.00*
Smkeless mine run	Columbus	2.15	6.60	6.65	*5.00@ 6.00*
Smokeless screenings	Columbus	1.30	6.00	5.85	*5.00@ 6.00*
Smokeless lump	Chicago	3.00	7.75	7.75	7.50@ 8.00
Smokeless mine run	Chicago	2.00	6.35	6.10	*4.75@ 5.00*
Smokeless lump	Cincinnati	3.15	7.50	7.25	*6.00@ 7.00*
Smokeless mine run	Cincinnati	1.85	6.00	6.00	*4.50@ 6.00*
Smokeless screenings	Cincinnati	1.20	6.00	6.00	*4.50@ 6.00*
*Smokeless mine run	Boston	4.70	8.75	8.10	*7.75@ 8.25*
Clearfield mine run	Boston	1.95	4.75	4.35	*3.50@ 4.25*
Cambria mine run	Boston	2.45	5.25	4.85	*3.75@ 4.60*
Somerset mine run	Boston	1.90	5.00	4.55	*3.60@ 4.25*
Pool 1 (Navy Standard)	New York	2.85	5.75	5.50	*5.00@ 5.75*
Pool 1 (Navy Standard)	Philadelphia	3.05	5.75	5.45	5.25@ 5.70
Pool 1 (Navy Standard)	Baltimore	2.55	5.50	5.10	*4.50@ 4.75*
Pool 9 (Super. Low Vol.)	New York	2.35	5.25	5.00	*4.50@ 5.00*
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	5.55	4.80	4.60@ 5.00
Pool 9 (Super. Low Vol.)	Baltimore	2.20	5.10	4.85	*4.25@ 4.50*
Pool 10 (H.Gr.Low Vol.)	New York	2.05	4.50	4.25	*3.75@ 4.50*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	5.20	4.30	4.15@ 4.50
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.00	4.35	4.10	*4.00@ 4.25*
Pool 11 (Low Vol.)	New York	1.75	3.35	3.50	3.25@ 3.75
Pool 11 (Low Vol.)	Philadelphia	1.75	4.20	3.25	3.15@ 3.35
Pool 11 (Low Vol.)	Baltimore	1.85	3.75	3.35	3.25@ 3.50
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	3.35	3.10	3.00@ 3.25
Pool 54-64 (Gas and St.)	Philadelphia	1.50	3.65	3.25	*3.00@ 3.30*
Pool 54-64 (Gas and St.)	Baltimore	1.45	3.25	3.10	*3.00*
Pittsburgh so'd gas	Pittsburgh	2.65	5.35	4.85	*4.50*
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.50	3.35	*3.00@ 3.25*
Pittsburgh slack (Gas)	Pittsburgh	1.65	3.40	3.35	*3.25@ 3.40*
Kanawha lump	Columbus	2.65	6.25	5.25	5.00@ 5.50
Kanawha mine run	Columbus	1.65	3.35	3.25	*3.00@ 3.35*
Kanawha screenings	Columbus	1.30	3.10	3.10	*2.75@ 3.00*
W. Va. lump	Cincinnati	2.55	6.00	6.10	*4.00@ 5.25*
W. Va. Gas mine run	Cincinnati	2.25	3.50	3.45	*2.50@ 3.00*
W. Va. Steam mine run	Cincinnati	1.45	3.05	3.25	*2.50@ 3.00*
W. Va. screenings	Cincinnati	1.10	3.00	3.25	*2.25*
Hocking lump	Columbus	2.65	5.10	4.60	*4.00@ 5.00*
Hocking mine run	Columbus	1.75	2.85	2.80	2.65@ 3.00
Hocking screenings	Columbus	1.35	2.60	2.60	2.50@ 2.75
Pitts. No. 8 lump	Cleveland	3.00	5.10	4.35	.....
Pitts. No. 8 mine run	Cleveland	2.00	3.60	3.40	.....
Pitts. No. 8 screenings	Cleveland	1.70	3.25	3.25	.....
Midwest					
Franklin, Ill. lump	Chicago	3.65	5.35	5.35	$5.25@$5.50
Franklin, Ill. mine run	Chicago	2.35	3.85	3.85	3.75@ 4.00
Franklin, Ill. screenings	Chicago	2.00	2.65	2.65	*2.50@ 2.75*
Central, Ill. lump	Chicago	3.00	4.10	3.85	*3.50@ 3.75*
Central, Ill. mine run	Chicago	2.35	2.85	2.85	*2.75@ 3.00*
Central, Ill. screenings	Chicago	1.65	1.70	1.60	*1.50@ 1.75*
Ind. 4th Vein lump	Chicago	3.25	4.85	4.85	*4.25@ 4.50*
Ind. 4th Vein mine run	Chicago	2.50	3.60	3.60	*3.00@ 3.25*
Ind. 4th Vein screenings	Chicago	1.85	2.30	2.30	2.25@ 2.40
Ind. 5th Vein lump	Chicago	2.95	4.10	4.10	4.00@ 4.25
Ind. 5th Vein mine run	Chicago	2.25	3.10	3.10	3.00@ 3.25
Ind. 5th Vein screenings	Chicago	1.55	1.80	1.80	1.75@ 1.85
Standard lump	St. Louis	2.90	4.10	3.60	*3.00@ 3.25*
Standard mine run	St. Louis	1.90	2.60	2.50	*2.25*
Standard screenings	St. Louis	1.00	1.85	1.60	*1.40@ 1.50*
West Ky. lump	Louisville	2.60	4.10	4.00	*3.50@ 4.25*
West Ky. mine run	Louisville	1.90	2.60	2.50	*2.25@ 2.50*
West Ky. screenings	Louisville	1.15	2.30	2.00	*1.80@ 2.00*
West Ky. lump	Chicago	....	4.25	4.25	*3.75@ 4.00*
West Ky. mine run	Chicago	....	1.85	2.35	2.25@ 2.50
South and Southwest					
Big Seam lump	Birmingham	2.90	3.95	3.95	3.50@ 4.45
Big Seam mine run	Birmingham	1.85	2.35	2.35	2.25@ 2.50
Big Seam (washed)	Birmingham	2.10	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	....	6.25	6.00	5.75@ 6.25
S. E. Ky. mine run	Chicago	....	3.25	3.25	3.00@ 3.50
S. E. Ky. lump	Louisville	2.90	6.50	6.50	*5.00@ 6.50*
S. E. Ky. mine run	Louisville	1.45	3.10	3.10	**3.00@ 3.50**
S. E. Ky. screenings	Louisville	1.15	3.25	3.00	*2.75@ 3.00*
S. E. Ky. lump	Cincinnati	2.90	5.60	5.60	*3.75@ 5.00*
S. E. Ky. mine run	Cincinnati	1.45	3.35	3.15	*2.50@ 3.00*
S. E. Ky. screenings	Cincinnati	0.85	3.00	2.85	*2.00@ 2.50*
Kansas lump	Kansas City	5.00	5.50	5.50	5.50
Kansas mine run	Kansas City	4.00	3.60	3.60	3.50@ 3.75
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	Jan. 29, 1923 Independent	Jan. 29, 1923 Company	Feb. 5, 1923† Independent	Feb. 5, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.50	6.15@ 6.20	7.00@ 9.50	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	5.25@ 6.00	4.00@ 4.10	5.25@ 6.00	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00@ 5.50	4.00	5.00@ 5.50	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 2.75	2.75@ 3.00	2.25@ 2.75	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 312, Week of Feb. 5, 1923. Average spot price for same period, $3,78. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighed in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

both steam and domestic use during the past few days, but country domestic trade near there has strengthened. As usual, the cheaper coals are most in demand. Standard 6-in. lump is selling there for $3@$3.25, 2-in. lump as low as $2.65 and screenings for $1.40@$1.50. Mt. Olive lump goes to St. Louis in small volume at $4, while the country trade pays $4.50. Mt. Olive coal is moving Northwest rather than into either St. Louis or Chicago.

Kentucky markets are not suffering particularly. Industrial demand is fair and railroads are taking heavier tonnages than they have been because of an active movement of freights. But it is freely admitted that car supply is the thing that is keeping prices fairly firm. The Louisville & Nashville averages 19 per cent and the Illinois Central 43. A threatened breakdown in transportation before March 15 caused by the constantly increasing volume of freight, finally producing various congestions at terminals and transfer points, may hold the market up.

Most Kentucky observers think the low-market of last spring has a good chance of giving a repeat performance. Last year, when a strike threatened, buyers would not buy because they counted heavily on non-union production from eastern Kentucky and a heavy output from the western end of the state whose union mines had a labor contract running another year. On Feb. 1, 1922, the highest priced block coal in the state brought $2.50@$2.75 as against $6 now; screenings, 80c.@$1.25 as compared with $2 today in western Kentucky and $2.75 in the eastern field.

Steamboat companies are again operating the big packets, and the gas and byproduct people are buying some coal. Movement is general to all districts and fairly well scattered. With no weather under 15 deg. above zero for the season in Louisville, volume as handled by retailers has been small, and orders are mostly one and two-ton lots, according to retailers.

Northwest Trade Is Dull

Nothing disturbed the Northwest's trade during the past week except general dissatisfaction with a good deal of the anthracite which has been delivered. So much bone and dirt comes through with it that the Wisconsin Fuel Commission has complained to Senator David I. Walsh of Massachusettes, hoping that the champion of the "peepul" can bring some more pressure to bear upon shippers in the field.

Trade continues light throughout the whole territory, even though prices on the considerable stocks of bituminous at the Head-of-the-Lakes have been eased down a little to draw buyers. Shipments from Duluth-Superior docks one day last week totaled only five cars, which is phenomenal. Dock men there are trying to unload their bituminous stocks but are not pushing their anthracite strongly except to the local trade. There are 32,000 tons of anthracite on hand. The plan is to increase the usual 10c.-a-ton monthly differential on anthracite during the coming spring and summer to encourage warm weather stocking.

The West Flounders Along

Some colder weather made domestic trade a little snappier in most Western markets, but nothing grew really lively. Fair transportation, almost a test to the producers in Kansas, Oklahoma and Arkansas, was largely responsible for a new cut in Kansas lump from $5.50 to $5, and of Arkansas lump from $7 to $6 and Arkansas nut from $5 to $4.

Near Salt Lake City trade picked up ever so slightly for good lump but egg coal and most steam sizes continued to drag bottom. Utah mines are working something less than half time. In Colorado too much lignite was available for market comfort. Prices fluctuated some as they turned downward.

There was a marked weakness in the Ohio coal trade. There were reductions of 25@50c. per ton on mine prices and the tendency at the end of the week was still downward. Production of lump was larger and added to the trouble of producers in finding a market. Retail dealers and consumers at Columbus are buying only for the present and retail prices are falling in sympathy with mine prices. Receipts from West Virginia and Kentucky are increasing in volume. Railroads are taking a fair tonnage and some coal is being acquired by utilities.

Reports from Cincinnati say that the market is on the downward trend, with high-volatile coals the hardest hit. Offerings of spot New River mine run at $4.75 found no takers. River business shows a heavy increase and preparations are being made for increasing the stock piles along the river front.

Production in West Virginia generally speaking did not average over 40 per cent although there was a slight improvement in car supply. The Western movement was larger, more smokeless going forward as a result of the improved car service.

Coal movement on the Charleston Division of the Baltimore & Ohio R.R. was impeded by several slides.

Production figures for the Pocahontas district of West Virginia for the year 1922, as compiled by the Pocahontas Operators' Association, shows a total of 16,130,974 tons, as compared with 13,043,942 tons in 1921, an increase of 3,087,032 tons. The output for 1922 was the largest since 1916. More coal was loaded during the second quarter than in any similar period; loadings were as follows:

First quarter,	3,796,017 tons	Third quarter,	3,605,227 tons
Second quarter,	5,717,129 tons	Fourth quarter,	3,012,601 tons

During the week the Pittsburgh Coal Producers Association, the Coal Operators of the thick vein Freeport seam, and the Central Pennsylvania Operators Association signed up with the miners, continuing their wage agreement for another year.

There is much complaint of car shortages in the Pittsburgh district, operators claiming that other industries are better treated, also that the Connellsville region is better served.

North Atlantic Market Dull

The market in New England is suffering from a lack of buyers. While anthracite receipts are in no greater volume there is notably less anxiety on the part of householders as the calendar moves forward. Inquiry for substitutes is correspondingly less, and since the average retailer feels the situation is less acute he is less and less inclined to buy spot bituminous. In the larger cities there is enough anthracite available in odd sizes to take care of most cases of real distress and many householders have been able on various representations to accumulate enough to carry them through the present season. This all has a distinct bearing on the market for steam grades, for it is roughly estimated that something like 25 per cent of the bituminous that came forward during December was shipped in anticipation of household needs. With this factor subsiding it is clear that the market probably will ease off gradually until April, when prices will settle down on something like a season basis.

Many of the Pocohontas and New River agencies are discouraged over attempts to force spot coal on unwilling buyers inland from points like Boston, Providence, and Portland. Delays in discharging have resulted in serious losses due partly to car shortage but largely to accumulations far in excess of rehandling facilities. There have been cases where boats have been detained three and four weeks at the discharging piers, and any such hardship on the distributor is enough to preclude further efforts in the same direction. Notwithstanding heavy demurrage items current prices on cars Boston have dropped to less than $10 per gross ton, with coal still pressing for sale.

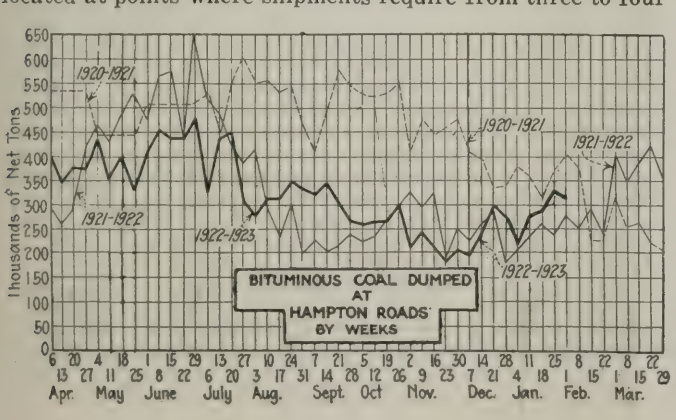
One result is the increased tonnage on wheels at the Hampton Roads terminals. Were there more than scattering demand in this territory we should probably see prices marked off 50@75c. as compared with a week ago, but the volume now actually changing hands is small and what sales there are result from quiet negotiation, with prices hard to follow from day to day. All the shippers have ample coal on hand, even though mining in most cases is less than 50 per cent of normal. There is renewed effort to place coal in the West, now that coastwise prices are less attractive, and contractors are being fed up on their February quotas.

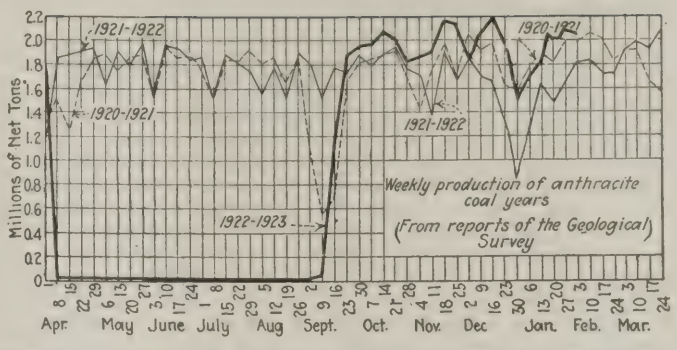
At New York demand is easier and most grades show a lowering in quotations. An occasional cargo of British coal is arriving. A cargo of free Admiralty coal which had arrived there was offered last week at a price higher than domestic coals of good quality could be gotten.

Consumers are not pressing for coal at Philadelphia and are hopeful of lower prices. The railroads seem to be well supplied with fuel and inquiries from this source are few.

Anthracite

The anthracite situation is easier. Demand for the high-priced product of the small operator has fallen off but company coal and the product of the larger independent producers are in strong call. Although there are nearly two months of winter ahead some retail dealers who are located at points where shipments require from three to four





weeks from time of shipment until delivery have cancelled their orders.

The New York State Fuel Administration has received many complaints from consumers of bad preparation of domestic coals and in some instances has ordered the dealer who delivered the coal to either remove or make allowances, at the same time to deliver other coal.

In Baltimore dealers are holding their deliveries strictly to one or two-ton lots but consumers are not able to get the fuel as desired.

"The production of anthracite in the week ended Jan. 27 is estimated at 2,119,000 net tons, including mine fuel, local sales, washery and dredge output," says the Geological Survey. "The nine principal anthracite carriers reported a total of 40,513 cars loaded during that week. When compared with the week preceding this was an increase of about 5 per cent.

"The cumulative production of anthracite for the present coal year (beginning April 1, 1922, to Jan. 27, 1923), stands at 38,675,000 net tons, as against 73,067,000 tons for the same period in the preceding coal year. Thus the present coal year is 24,392,000 net tons, or 47 per cent, behind last year.

"Preliminary reports for the first half of the present week show a slight decline as compared with last week and that the total production will probably be between 2,000,000 and 2,100,000 net tons."

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Jan. 20, 1923 Inclusive	Week Ended Jan. 20, 1923
U. S. Total	55.7	...	...	...
Alabama	64.6	84.7	90.9	(a)
Somerset County	74.9	36.3	32.0	26.7
Panhandle, W. Va.	51.3	57.3	55.5	53.2
Westmoreland	58.8	65.8	55.1	50.6
Virginia	59.9	55.7	53.7	53.9
Harlan	54.8	22.1	22.0	23.0
Hazard	58.4	16.4	19.3	21.6
Pocahontas	60.0	36.6	36.1	41.1
Tug River	63.7	28.8	34.1	29.6
Logan	61.1	26.2	32.6	34.7
Cumberland-Piedmont	50.6	31.7	42.4	38.4
Winding Gulf	64.3	30.4	34.7	34.3
Kenova-Thacker	54.3	42.4	42.4	43.0
N. E. Kentucky	47.7	28.4	31.1	28.1
New River	37.9	31.6	34.2	38.4
Oklahoma	59.6	59.1	45.6	38.5
Iowa	78.4	75.9	62.9	80.5
Ohio, Eastern	46.6	40.8	34.5	31.5
Missouri	66.8	76.3	82.1	71.2
Illinois	54.5	49.9	56.9	51.3
Kansas	54.9	55.9	58.8	51.0
Indiana	53.8	37.7	54.7	50.5
Pittsburgh†	39.8	41.2	35.5	26.8
Central Pennsylvania	50.2	53.4	44.1	39.2
Fairmont	44.0	35.5	40.4	38.2
Western Kentucky	37.7	32.4	34.4	33.0
Pittsburgh*	31.9	56.1	71.8	68.1
Kanawha	13.0	15.6	19.7	22.8
Ohio, Southern	24.3	38.1	41.4	38.8

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded— All Cars	Coal Cars
Week ended Jan. 20, 1923	865,578	192,824
Previous week	873,251	198,686
Same date in 1922	731,109	162,119

	Surplus Cars— All Cars	Coal Cars	Car Shortage
Jan. 20, 1923	26,485	6,699	75,189
Jan. 13, 1923	28,282	6,155	73,342
Same date in 1922	396,192	183,399	...

Foreign Market And Export News

Demands for British Coal Increasing; Production Slightly Lower

British coal production for the week ended Jan. 20 was 5,585,000 tons as compared with 5,605,000 tons the previous week, a decrease of 22,000 tons.

The coal industry in Wales is active and the only factor retarding expansion is the question of working hours at the docks. Between 30 and 40 ships are daily unable to secure docking facilities in order to load.

French, Italian and South American demands are increasing. American tonnage has been obtained for transporting 245,000 tons of Welsh coal to the United States.

During the week ended Jan. 12 there were 437,429 tons of coal exported from Cardiff and Newport to the following countries:

	Tons
France	157,343
Italy	66,002
South America	82,720
Spain	25,534
Portugal	12,513
U. S. A.	20,097
British coal depots	41,914
Other countries	31,306
Total	437,429

The effect of the Ruhr occupation on the North English market has been an urgent demand for supplies. The collapse of the mark and the break in the French and Italian exchanges have made business difficult to transact and worry attaches to the fulfilling of orders.

The Swedish State Railways have contracted with Newcastle merchants for 69,000 tons of coal, made up of Northumberland, Durhams, and Scottish.

Export Clearances, Week Ended Feb. 3

FROM HAMPTON ROADS	Tons
For	
Nor. SS. Songelv, for Puerto Tarafa	3,517
For Cuba:	
Nor. SS. Albatros, for Havana	5,004
Dan. SS. Phonix, for Havana	2,478
FROM PHILADELPHIA	
For Cuba:	
Amer. SS., Lake Ellicott, for Havana, Cuba	

French Coke Market Active

The occupation of the Ruhr so far has had no influence on the market for French coals, except as regards coke. However, the Saar coal field, which was shipping a good part of its production to Germany probably will divert a portion of these shipments to French destinations.

From Jan. 1 to Jan. 16, inclusive, French blast furnaces have received through the Société des Cokes de Hauts-Fourneaux 174,300 tons of German coke. Coke received before Jan. 16, however, had left the Ruhr before the occupation. On the 16th alone the quantity of coke received was only 4,600 tons.

The interruption in the shipments of German coke resulted in inquiries for French, Belgian and British coke.

French coke ovens have accepted orders to supply to the Société des Cokes de Hauts-Fourneaux 38,000 tons of coke per month at 107 fr. at ovens in the Nord and Pas de Calais and at 112 fr. at ovens in the center of France. Coking slacks, on the other hand, are being sold at 72 fr. in the Nord and Pas de Calais and at 80 fr. in the central coal fields.

United States December Coal Exports

(In Gross Tons)

Coal:	Dec., 1921	Dec., 1922
Anthracite	306,277	381,758
Bituminous	770,092	1,468,917
Exported to:		
Canada	621,993	1,376,089
Panama	9,678	4,975
Mexico	6,637	8,710
British West Indies	5,627	70
Cuba	53,262	64,065
Other West Indies	11,940	10,644
Argentina	22,384	.....
Brazil	12,492	.....
Chile	1,067	2,181
French Africa	6,902	.....
Egypt	11,631	.....
Other countries	6,479	2,183
Coke	23,034	123,442
Briquets and other compositions	.....	1,293

Demand at Hampton Roads Slow

Business was dull at Hampton Roads in the face of a falling market brought on, shippers report, through lack of demand due to better car movement and to heavy stocks laid up against a probable April 1 strike of miners which is not now regarded as likely to take place. Movement to New England fell off, although general shipping brought bunkers up to a high plane.

Prices ranged around a figure that makes the prospect for export business brighter. Shippers were keenly interested in the Ruhr developments, having in mind the possibility of entering the foreign market in case Germany's supply of coal is cut off.

United States December Coal Exports by Custom Districts

(In Gross Tons)

	Anthracite	Bituminous	Coke
Maine and New Hampshire	10	44	118
Vermont	1,325	942	1,196
Connecticut	.....	30	.....
St. Lawrence	143,962	261,895	1,257
Rochester	34,444	55,852	54
Buffalo	187,583	387,836	85,545
New York	9,147	103	1,231
Philadelphia	4,202	11,632	1,032
Maryland	.....	11,060	.....
Virginia	.....	49,951	.....
South Carolina	.....	8,230	.....
Florida	.....	1,257	2,127
Mobile	.....	1,344	32
New Orleans	.....	1,239	2,562
San Antonio	31	46	.....
El Paso	116	3,665	659
San Diego	.....	25	.....
Arizona	40	3,872	5,630
San Francisco	92	928	19
Washington	.....	1,859	.....
Dakota	355	3,407	2,203
Duluth & Superior	77	7,469	3
Wisconsin	.....	100	.....
Michigan	76	204,148	18,673
Ohio	130	451,983	799
Massachusetts	18	.....	.....
Porto Rico	150	.....	4
Georgia	.....	.....	298
Totals	381,758	1,468,917	123,442

Hampton Roads Pier Situation

	Jan. 25	Feb. 1
N & W piers, Lamberts Pt.		
Cars on hand	953	1,090
Tons on hand	68,515	77,921
Tons dumped for week	106,648	90,007
Tonnage waiting	6,650	2,200
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,439	1,440
Tons on hand	87,020	83,480
Tons dumped for week	104,147	83,908
Tonnage waiting	10,000	10,000
C. & O. piers, Newport News		
Cars on hand	1,850	1,470
Tons on hand	103,290	80,590
Tons dumped for week	80,489	107,088
Tonnage waiting	200	89,015

Pier and Bunker Prices, Gross Tons

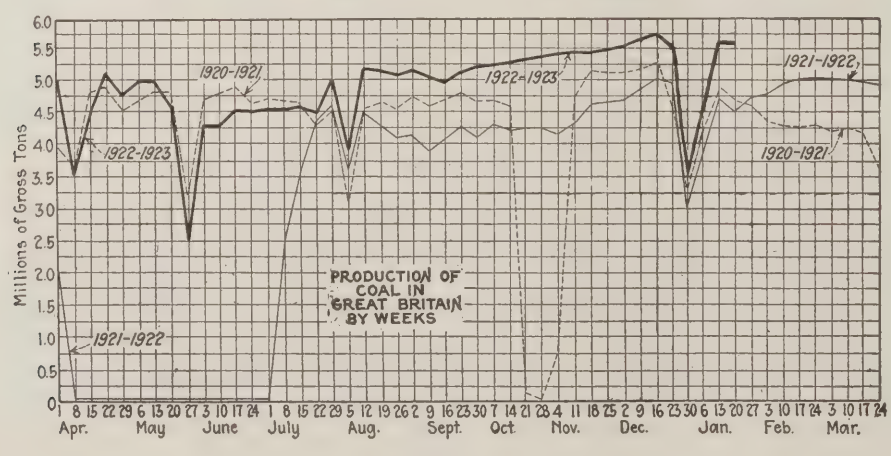
PIERS	Jan. 27	Feb. 3†
Pool 9, New York	$7.75@$8.25	*$7.50@$7.75*
Pool 10, New York	7.25@ 7.50	*6.75@ 7.00*
Pool 11, New York	6.00@ 6.50	6.00@ 6.50
Pool 9, Philadelphia	7.65@ 8.00	7.65@ 8.00
Pool 10, Philadelphia	7.10@ 7.35	7.10@ 7.35
Pool 11, Philadelphia	6.60@ 6.75	6.60@ 6.75
Pool 1, Hamp. Roads	8.25	*7.50*
Pools 5-6-7 Hamp.Rds.	8.00	*7.25*
Pool 2, Hamp. Roads	8.25	*7.50*
BUNKERS		
Pool 9, New York	$8.10@$8.60	*$7.85@$8.10*
Pool 10, New York	7.60@ 7.85	*7.10@ 7.35*
Pool 11, New York	6.35@ 6.85	6.35@ 6.85
Pool 9, Philadelphia	8.25@ 8.60	8.25@ 8.60
Pool 10, Philadelphia	7.40@ 7.60	7.40@ 7.60
Pool 11, Philadelphia	6.90@ 7.15	6.90@ 7.15
Pool 1, Hamp. Roads	8.25	*7.50*
Pool 2, Hamp. Rds.	8.00	*7.25*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Jan. 27	Feb. 3†
Admiralty, large	29s.@30s.	29s.6d.@30s.
Steam, smalls	20s.@20s.6d.	*20s.*
Newcastle:		
Best steams	26s.6d.@27s.6d.	**27s.6d.@35s.**
Best gas	25s.@26s.	**26s.@28s.**
Best bunkers	25s.	**25s.@27s.6d.**

† Advances over previous week shown in *heavy* type; declines in *italics*.



News Items From Field and Trade

ALABAMA

The Empire Coal Co., Empire, is about **to construct 40 byproduct ovens** in Walker County near some of the company's holdings, as well as railroads to the undeveloped territory of the company, surveys for which have been made. Walter Moore, of Birmingham, president of the company, estimates that the improvements will cost approximately $1,500,000.

There are 1,196 byproduct coal ovens in Alabama with a yearly capacity of 6,543,000 tons of coal and 4,750,000 tons of coke, according to official figures. Alabama now ranks fourth in the number of ovens and capacity. The byproduct coke capacity was increased in 1922 by the addition of 25 Koppers ovens at the Alabama By-Products Company and 30 Koppers ovens for the Woodward Iron Co.

The Bird Coal & Iron Co., Birmingham, has instituted suit in the courts of Talladega County against the Kuhara Mining Co. and Alexander Tison, of New York, for the recovery of the Talladega furnace property and about 6,000 acres of coal and iron properties in St. Clair and Etowah counties. The properties were acquired by the Bird company about six years ago and leased in 1919 to the Kuhara company, a Japanese corporation, title being vested in Alexander Tison, the lease of the Kuhara company alleged to be for a sufficient period to enable the manufacture of 70,000 tons of pig iron. The original owners are seeking possession of the property and damages for the use of the plant and equipment.

The Stith Coal Co., which has several drift openings at Aldridge, on the Southern Ry., in Walker County, is sinking a 400-ft. shaft to the Black Creek seam, which underlies the America seam, now being worked.

COLORADO

The Mine & Smelter Supply Co., with branches in Denver, Salt Lake City and El Paso, has taken over exclusive representation for the States of Colorado, Utah, Nevada, Wyoming, New Mexico and western Texas for Wilson Plastic-Arc Welders and Wilson Color-tipt Welding Metals.

The lignite output is steadily increasing in the northern field around Erie and Frederick if shipments by Union Pacific are to be taken as a definite indication. An average of 150 cars a day has been reaching Denver, 80 per cent of which stays in that city's territory and the balance is routed eastward as far as Omaha. This road has recently hauled as many as 177 cars a day to Denver. Burlington loadings in the field also are heavy.

Harry F. Nash, vice-president and general manager of sales of the **Alamo Coal Co.**, which has been incorporated in this state, expects to be shipping coal from the Alamo mine by June, 1923. "There is yet much to be done," he says. "A stretch of railroad four miles long must be built to connect the new property with the end of the Loma spur of the Denver & Rio Grande Western, already extending sixteen miles north of Walsenburg; a 600-ft. rock slope must be driven to open up the coal; a 2,500-ton tipple must be purchased, fabricated and erected. Mr. Nash, J. H. P. Fisk, an engineer of Walsenburg, and E. H. McCleary have charge of this construction work. Mr. McCleary is general manager of operations, W. B. Lewis, president; Harry F. Nash, vice-president and general manager; A. S. Pratt, treasurer; George C. Manly, assistant treasurer and counsel, and Howard Willets, comprise the directorate. Mr. Lewis, Mr. Nash, Mr. Pratt and Mr. McCleary occupy the same positions with the Oakdale Coal Co., operating at La Veta. Like the Oakdale, the Alamo will be a strictly domestic mine; it is hoped that the Oakdale record can be equaled—not a single car of run-of-mine coal has been shipped in ten years; the whole output has been sold in prepared sizes. "The new mine is the result of ten years' search for as good a domestic fuel as Oakdale," says Mr. Nash.

Core drilling of the 640-acre, 10,000,000-ton tract has been completed. When the log of the drill showed a depth of 640 ft., a 7-ft. seam was encountered. Sixty-five feet deeper the drill discovered an 11 ft. bed. The coal beds will be exploited through a slope on a 36-per cent inclination conforming to the dip of the coal. The method of mining will not be determined until the main slope has penetrated the coal some distance, when conditions will be better known. The panel system—driving rooms level and panel entries on the pitch, gathering with hoists—is being seriously considered. The mine is to be as up to date as modern equipment and modern methods can make it, underground and on the surface. A tipple, including rotary dump, shaking screens, loading booms and box-car loaders for two tracks, and a rescreening plant have already been designed. Five hundred kilowatts of power-plant capacity will be built as a starter.

CONNECTICUT

The Associated Company, of Hartford, maintaining a corps of inspectors for mines carrying workmen's compensation, has **equipped all its underground men with the new M. S. A. self-rescuer.** The self-rescuer protects the wearer from asphyxiation and afterdamp from explosions and fires. Incidentally, the state mine inspectors of West Virginia also are being equipped with this apparatus.

ILLINOIS

The J. W. Peterson Coal Co., Chicago, has increased its capital stock from $5,000 to $300,000.

The Citizens Coal Mining Co., Springfield, has made a stock dividend of 650 per cent, basing this stock issue on accumulated surplus and undivided profits. The company increases its capital from $60,000 to $300,000.

What is said to be the **largest coal mine electric power contract** ever entered into in Illinois has just been signed at Chicago by the **Central Illinois Public Service Co.** and the **Old Ben Coal Corporation.** The Central Illinois company will supply the entire power requirements of the coal company, which operates twelve of the largest coal mines in Illinois. Three of these mines shipped six million tons of coal last year. The contract is for ten years and the electricity bill of the Old Ben Coal Co. will amount annually to half a million dollars. The Central Illinois Public Service Co. will have an aggregate of 73 mines being operated by electricity obtained from the company, thus making this company one of the largest coal-mine power companies in the United States.

A. R. O'Dell, sales manager for the J. K. Dering Coal Co. of Chicago is spending two weeks in the Northwest developing trade.

The **Ernest Coal mine**, known as **Franco No. 2** at Harrisburg, recently **broke its hoisting record** when 3,301 tons of coal were hoisted in eight hours. The record is 200 tons over the previous record of the mine and is considered good, inasmuch as the cars used underground at this mine are of only 2-ton capacity, while other mines in the district use from 3- to 5-ton mine cars. **Mine No. 2** of **Big Creek Coals, Inc.**, near Ledford, also recently hoisted 2,363 tons in one day's work, which makes a new mark for this plant. The mine is well known also under the name of the Steel Tipple Mine.

Work has been begun upon **installing two new cages at the Peerless Coal Co.'s** mine at Springfield. The old cages were demolished when they crashed to the bottom of the pit. A broken sheave wheel caused the accident.

The Conveyors Corporation of America, Chicago, has acquired from the Green Engineering Co., East Chicago, Ind., all rights to the **Green steam jet ash conveyor.**

George W. Gosnell, Herrin, formerly county mine inspector for the Twelfth district, comprising Williamson and Johnson counties, **has been appointed state mine inspector** by Governor Small. He succeeds W. L. Morgan, Greenville, recently named state mining investigator.

A reorganization in the Nason coal interests was completed Dec. 30, 1922. All mining and field operations were consolidated under the name of the **Illinois Coal Corporation**, and the capital was increased from $1,000,000 to $10,000,000. The name was changed from the Illinois Coal & Coke Corporation Dec. 26 and the **Nokomis Coal Co.** merged with the corporation. The **Nason Coal Co.**, of Chicago, continues to be the selling company.

Fire recently caused a loss estimated at from $15,000 to $20,000 at the mine of the **Randolph Mining Co.**, at Coulterville. The flames originated in the wash house of the plant and before they could be checked had completely destroyed the boiler house and engine room, which were located near the wash house. Over 100 men are employed at this mine, most of whom will be idle until the destroyed buildings have been rebuilt.

Messrs. Hartshorn and Norman, of Danville, who are identified with the **Hartshorn Coal & Mining Co.**, with headquarters in that city, recently spent some time at Elkville, the location of their new slope and strip operations. The concern recently acquired large tracts for mining purposes near Elkville and are rapidly completing the work of setting up machinery, building tracks, etc., preparatory to producing coal. The company will operate both slope and stripping operations and will employ several hundred men when running full capacity. With the work progressing as it now is, it is expected that coal will be hoisted in from 60 to 80 days.

The Chain Belt Co., Milwaukee, announces the appointment of **Fitch S. Bosworth** as manager of the Chicago office. Mr. Bosworth has been in charge of the Chain Belt Co.'s St. Louis office for the last three years and has specialized on chain and conveying engineering problems. With him will be associated **Raymond X. Raymond**, who for several years has been connected with the export sales department in Milwaukee. **Thomas F. Scannell**, formerly of the Chicago office, has been placed in charge of the St. Louis office.

INDIANA

The Madison Mining Co. at Crown Point has filed a preliminary certificate of dissolution with the Secretary of State.

Production of mines in the Indiana field is averaging about 50 per cent of normal. Many of the mines are operating only two or three days a week, but others, especially in the Fourth vein, have operated almost full time. Mines in the northern part of the field have had better work since the first of the year than in any other part of the district. Some mines have had idle days because of car shortage, but the greatest detriment is lack of demand.

Miners in Indiana would not be required to qualify with a local board in each county where they work under the provisions of a bill recently introduced in the Indiana General Assembly. The bill seeks to repeal the miners' license law passed in 1911, which provides that any applicant for work in a mine must undergo an examination by a board of three members. Two members of the board can be named by the local labor organization in the county, under the law, and the other is an operator. Representative Isaac H. Hull, of Laporte and Starke counties, in introducing the bill said that although the 1911 act was passed ostensibly to protect miners against injury by refusing work to those not physically qualified to work, in actual effect it prevented men from working who were not members of labor organizations.

A. E. Bradshaw, formerly president of the National Building Supply Dealers' Association, and now head of the Allied Coal & Material Co., of Indianapolis, one of the largest retail coal and material supply companies in Indiana, has been named chairman of the retail committee of the Indianapolis Chamber of Commerce.

Fuel conservation problems were discussed by 150 power-plant managers and engineers who met recently at Purdue University, Lafayette, the object of the conference being to promote economy in the use of fuel in power plants. Professor G. A. Young, of Purdue, said that the nation never would be as great as its resources justified until the consumption of coal had been reduced and a greater amount of energy produced from a given consumption of fuel. R. H. Gardner, superintendent of the Northern Indiana Gas & Electric Co., said that large central power stations were more economical than a number of small plants and that centralization should be encouraged for the sake of fuel economy.

The erection of the first coal washery in Indiana is still under consideration by the J. K. Dering Coal Co., of Chicago, for its No. 8 mine at Clinton, where the company is operating in the No. 3 seam, a very difficult coal to prepare properly, but the plans have not been approved largely because of the initial cost, which would be in the neighborhood of $300,000.

IOWA

J. L. Coombes, formerly mining engineer at Lynch mines, Kentucky, is now located at Cedar Rapids, and is engaged in construction business.

KANSAS

Eight diamond core drills and one standard drill are testing the territory three miles west of Oswego for coal. A new mammoth power plant is going up on the river and excavating is almost completed.

KENTUCKY

The Pond Creek Coal Co., acquired recently by Henry Ford and his associates from T. B. Davis and his associates, **will hereafter be known as the Banner Fork Coal Corporation**, that being the name of the company under which the Ford mines in the Hazard Kentucky field are operated. Edsel B. Ford is president of the Kentucky corporation.

The Kentucky & West Virginia Power Co., of Logan, W. Va., is preparing to expend $750,000 in enlarging its plant and in constructing about 125 miles of high tension line to the Hazard field of Kentucky.

Thirty-five miles of railroad connecting Harlan County, Kentucky, and Lee County, Virginia, **is to be constructed by the Southeastern Ry. Co.**, according to articles of incorporation filed Jan. 16 at Frankfort by that company. The new line will connect with the Southern Ry. near the west of Keokee, Va., and with the Louisville & Nashville on Clover Fork. The company is capitalized at $500,000 with L. O. Pettit, Big Stone Gap, Va., as president; W. A. Hahn, Norfolk, Va., vice-president; J. F. Bullitt, Jr., Big Stone Gap, secretary, and C. R. Carver, Norfolk, treasurer. Headquarters of the company will be at Big Stone Gap.

Press reports state that the Democratic party in Kentucky is planning to run **John E. Buckingham**, of Ashland, as a business man for governor of the state. Mr. Buckingham is a big operator, who for years has been connected with the John C. C. Mayo Consolidation, Elkhorn Coal Corporation and other interests.

Good rises in the Ohio, Kentucky and other rivers of the state is resulting in coal movement opening again, as there is no ice in the rivers, and the water is at the best boating stage of some weeks. The Pittsburgh Coal Co., of Louisville; Dugan Coal Co., Slider Coal Co. and others are anticipating shipments. The Inland Waterways Co. has been moving considerable tonnage in from Kentucky River mines.

MASSACHUSETTS

The coal shortage in Massachusetts is practically over, according to figures presented recently by James J. Phelan, Emergency Fuel Administration for the state. Except for one week, since mining was resumed, production of anthracite has shown a substantial increase over that of 1921.

MINNESOTA

A survey of the coal situation through Minnesota has been published with statements of coal supplies from about one-third of the counties of the state, representing all directions. Almost without exception, hard coal is reported very short or totally exhausted, and soft coal is sufficient for the remainder of the winter. In the timber district, wood has helped out and in the west considerable lignite has been used.

E. E. Heiner, of the Superior Coal & Dock Co., has been in Duluth recently inspecting the company's enlarged dock there. Mr. Heiner asserts that the improved handling facilities made **the dock the fastest at the Head of the Lakes.**

Charles Beuglet, sales manager for the Northwestern Fuel Co., has left Duluth for a month's stay in Florida.

Ivan Bowen, **State Fuel Administrator**, has submitted a report to Governor Preus, in which he **recommends state control of the fuel trade** through a system of licensing, and a supervision of grades. According to the report, fuel should be sold by grades based on heat units, not on weight. A bill is suggested to cover this, and would provide that the governor might declare an emergency which would give power to supervise, regulate and control receipt, storage, purchase, sale, use, distribution and delivery of fuel. The railroad and warehouse commission would have power to examine all books of the various coal companies and ascertain where all coal was delivered, investigate prices by all concerned.

MISSOURI

Stewart-Thill Co. is the new name of the Walter L. Flower Co., of St. Louis, district representatives of the Conveyors' Corporation of America, Chicago. The personnel of the organization remains the same.

The **Wickham Coal Co. at St. Louis has liquidated and quit.** In 1897 E. F. Wickham organized this firm and was succeeded at his death by W. F. Wickham. In its day it was a factor in the movement of big tonnages. Ill health forced W. F. Wickham to retire. He is in California for the winter.

W. F. Heinecke, prominent in retail and jobbing circles in St. Louis, is in Florida on a two months' vacation for his health.

The Federal State Crop Reporting Service for Missouri reports from Jefferson City for 1922 that Missouri farmers estimate that 72 per cent of their fuel for 1922 was wood and only 28 per cent coal. They figure on using 14 cords of wood during the season at $3.40 per cord, or $3.10 when cut stove length. The farmers who bought coal nearly altogether a few years ago, when the price was reasonable, have now gone back almost entirely to wood.

Missouri branch of the United Mine Workers of America has elected the following officers: President, Arch Helm; vice-president, James Colley; secretary and treasurer, George Hepple. Andres Steele, of Novinger, was renamed as national board member. A. G. Llelwellyn, of Novinger, was chosen sub-district board member to succeed L. E. Medlin, of Kirksville.

Carl Hirdler, traffic manager for the Wallace Coal Co., is spending a three months' health trip at St. Petersburg, Fla.

MONTANA

The mine of the **International Coal Co.**, Bearcreek, has been taken over by a new corporation known as the **Carbon County Coal Co.**, of which Merrill Nibley of Salt Lake City, Utah, is president. McCandles Moffitt is in active charge of the mine. Mr. Nibley formerly was general manager of the Utah-Idaho Sugar Co. Mr. Moffitt was employed by the American Fuel Co. of Utah and later by the Standard Coal Co. of the same state. The International mine has been closed down for some time, but Mr. Moffitt is rapidly reconditioning it.

NEW JERSEY

At a special meeting Jan. 26 of the Board of Directors of the **Taylor-Wharton Iron & Steel Co.**, High Bridge, **Percival Chrystie** was elected president to succeed the late Knox Taylor. Mr. Chrystie was formerly vice-president and has been acting president since Mr. Taylor's death.

NEW YORK

At a meeting of the board of directors of the **Coal & Iron National Bank of the City of New York** held Jan. 25, John T. Sproull was elected chairman of the board of directors, resigning the office of president. Mr. Sproull was one of the organizers of the bank in 1904, since which time he has acted as president. Julian W. Potter was elected president, effective Feb. 1. Mr. Potter is a Southern banker who came to New York from Bowling Green, Ky., where he was vice-president of the American National Bank.

In transporting anthracite **the railroads have surpassed by more than 18 per cent, their record last year.** Robert S. Binkerd, vice chairman of the Committee on Public Relations of Eastern Railroads, declared Feb. 1 in making public a letter to Health Commissioner Copeland, taking issue with Dr. Copeland's statement that the coal shortage in New York City was due to the inability of the carriers to move coal as a result of the railroad shopmen's strike. Mr. Binkerd gave out figures from the U. S. Geological Survey, showing that since the resumption of mining on Sept. 11, 1922, up to and including Jan. 20 of this year, the anthracite-carrying railroads had handled 36,052,000 tons of coal as against 30,517,000 tons in the corresponding period of 1921-1922.

Wages of longshoremen loading coal in the Port of New York have been increased from $6 a day to $6.50 a day in the new contract between the coal handlers and the Coal Merchants' Association. The longshoremen based their demand on higher cost of living and the merchants admitted their request was reasonable and granted it without argument.

Coal truckmen of New York City who have been doubling and trebling legal rates to peddlers, who in turn passed the increased cost along to consumers have been warned by State and City Fuel Administration officials that continuation of this practice will bring prosecution. Seventeen alleged offenders were summoned to General Goethals' office to answer to complaints received by the State Fuel Administrator that they had **increased their rates from the legal $1.50 a ton to $3 and $4 a ton**, and that, the peddlers passing this increase along to private customers, the public was the sufferer from the truckmen's illegal practices. The truckmen were questioned by General George W. Goethals, State Fuel Administrator; C. W. Wickersham, counsel to the administration, and Administrators Eltz for Manhattan and Foster for the Bronx.

Pilling & Co., Inc., announce the election of Frank J. Herman, manager of coal sales, and Ralph W. Clark, manager of pig, iron sales, as directors, effective Jan. 1, 1923. During the past few months Pilling & Company, Inc., has expanded its coal selling organization greatly. A Johnstown, Pa., office was opened Oct. 1, in charge of Charles S. Martin. Bruce N. Stimets and J. B. McGolrick (who was formerly with Karm Terminal) are serving the northern New Jersey coal buyers. W. T. Miller, until recently with Pardee Brothers, is selling for them in New York State and is making his headquarters in Utica. The company also expects to open a Boston office within a short time

Senator Mortimer Ferris, of Plattsburg, tried unsuccessfully Feb. 1 to have the Senate adopt a resolution calling to the attention of the State Fuel Administrator the assertion that coal is being shipped through New York State to Canada, where it is delivered to **customers who are willing to pay $20 and $25 a ton** at the mines. Senator Ferris' resolution would have called upon the Fuel Administrator to impound such coal and distribute it at reasonable prices in New York.

William Fellows Morgan, president of the United Hospital Fund, announced that several of the hospitals in New York City are **considering abandoning the use of coal and substituting oil** for fuel. A saving of from 20 to 30 per cent can be effected, it is believed.

OHIO

George H. Merryweather, of the Waubon Coal Co., of Chicago, secretary of the American Wholesale Coal Association, and **I. C. Cochran**, managing director of the same organization, visited Columbus wholesalers Jan. 31 and were **entertained at luncheon** at the Chittenden Hotel. About two score were present and the question of organizing a closer association of wholesalers and producers and possibly retailers was taken up. A committee consisting of P. A. Coen, W. J. Hamilton, Jay Miller and M. L. Yuster was named to devise ways and means for the organization. It was decided by the committee to revive the noonday luncheon and later organize a coal association which would have for its members all of the coal industry. The question of making reports to the U. S. Coal Commission was discussed at the open meeting and reports showed that some jobbers had refused to make the reports desired. It was the consensus of opinion that the reports should be made in order to help the investigation of the Coal Commission.

E. M. Long and his two sons have **purchased three operating mines and 152 acres of coal lands** and six miles of spur track from the Short Creek Coal Co., Cadiz. The consideration was in the neighborhood of $3,000,000. The mines have a production capacity of 85,000 tons yearly.

The Southern Ohio Pig Iron & Coke Association held its annual meeting at Ironton, Jan. 24. The primary object was to get the views of the members on the coal question, with the idea of presenting the case of steel and furnace operators having their own coal mines, coke plants and cars, before the U. S. Coal Commission. After a lengthy discussion it was felt that little could be gained by this movement, and the discussion reverted to how best to insure a regular supply of good quality coal for coking and other purposes.

PENNSYLVANIA

In an opinion by Justice Simpson, the State Supreme Court on Jan. 29 affirmed the judgment of the Court of Common Pleas of Schuylkill County **denying an in-**

junction in the suit of Calvin Pardee and about forty other coal-land owners to have the county and the county commissioners enjoined from sitting as a board to "revise, raise and equalize the valuation of all property" returned by the local tax assessors. This decision means that the attack on the method has been ruled out, without prejudice to appeals from specific valuations on their merits.

For a consideration of $46,000 the entire rights of the Dolph estate to the **coal under the land in a 60-acre tract in the Borough of Olyphant have been surrendered to the Hudson Coal Co.**, the deed having been filed Jan. 29. The indenture was executed on Dec. 19, 1922, between the officials of the company and the owners of the land. The land under which the coal rights were sold is bordered on the north, south, east and west by property of the coal company. With the coal rights, the company purchased freedom from all claims for "negligent mining or negligent preparation of coal."

The Tri-District Board of the United Mine Workers of America in the anthracite fields **has decided to maintain a lobby committee at Harrisburg**, made up of one member from each district and as many more as may be necessary. It will also wage a fight against the movement started in Philadelphia to repeal the miners' certificate law, and will ask that it be extended to the bituminous fields.

William L. Connell, of Scranton, has been granted a leave of absence of six months from his duties as chairman of the Anthracite Conciliation Board. W. W. Inglis, president of the Glen Alden Coal Co., has been selected by the operators of District No. 1 to represent them on the board during his absence.

P. S. Gardner, of New York City, has taken over the old Neilson colliery at Shamokin, which has not been operated for a number of years. J. G. Hayes, of Scranton, is general manager.

The Monroe Coal Co., operating at Revloc, Cambria County, **gave prizes to its miners as an incentive to stimulate coal production during December.** Six watches were offered on a basis of merit to the best heading man, best room loaders and best cutters and scrapers. George Kirkis and Wisel Smalley won first and second prizes as room loaders, they loading 259 and 245 tons, respectively. The first prize to a heading man was won by Philip Cevallers, whose yardage for the month netted him wages amounting to $366.64 and a prize watch. John Yulius won second with a yardage which netted him $360.64 and a watch. The cutters and scrapers worked in pairs and John Yenovitch and Vincent Blaznick carried off the prizes and a nice return in wages, their aggregate output being 3,539 tons. Six suits of clothes will be awarded for the month of January.

Seward E. Button, former state mine chief under the Sproul administration, has been appointed **general superintendent of the Temple Coal Co.**, with headquarters at Scranton. Before becoming state mine chief Mr. Button was in the Temple service.

A bill has been introduced in the Senate at Harrisburg by Senator W. I. Stineman, Cambria County, "to protect bituminous coal miners in the determination of the amount of coal to be used as a basis for calculating wages." The measure provides that any miner shall be entitled to receive or, failing to receive, then **to collect by due process** of law at such rates as may have been agreed upon **full and exact wages for the mining of all merchantable coal he mines.** Seventy-six pounds is deemed one bushel and 2,000 lb. net as a ton. All cars must be uniform in capacity at each mine and no unbranded cars are allowed to enter a mine for longer than three months without being branded by the mine inspector. Violation of this provision subjects the owner to a fine of $1 a car for each day the car is unbranded. The bill also provides that at every bituminous coal mine where coal is mined by weight or measure the miners may employ a checkweighman or checkmeasurer who is to be given access to the mines and shall not be considered a trespasser. A fine of $20 to $100 is provided for violations of this provision.

Senator Berntheizel has offered a bill in the State Senate **repealing the act** of May 25, 1921, creating a state board for the **registration of professional engineers and land surveyors.** The bill has gone to the Judiciary General Committee.

Before the embers of the Chauncey breaker, destroyed by fire Jan. 27, were extinguished, George F. Lee, president of the George F. Lee Coal Co., had given the **contract for a new breaker** to E. E. Reilly, of Kingston, and undertook **to resume production in 90 days.** The breaker, at Avondale, was found on fire Sunday morning by repairmen. The fire began at the top and was so far advanced when discovered that extinguishers were not effective. About 400 tons of coal in the bins were destroyed. The burned breaker was of wooden construction, was electrically operated, and had a daily capacity of about 1,000 tons.

Representative Wilson G. Sarig, Berks County, minority leader of the House, has introduced a bill **to repeal the anthracite tax law** of 1921. The repealer is brief, merely quoting the title of the tax law and providing that it be repealed. The measure is one of the Democratic bills agreed to by the minority members at caucus as their legislative program.

SOUTH DAKOTA

The Homestake Mining Co., of Lead, which probably is the greatest operating gold mine in the world at the present time, has acquired a considerable acreage of coal land near the Shields mine at Gillette, where a model town site has been laid out and arrangements made for opening in the spring a stripping operation.

TEXAS

C. W. Osborne, of Dallas, president and manager of the O. K. Lignite Co., has made arrangements to develop 600 acres of coal land near Garrison. The company is now making arrangements to install a hoisting engine and small boilers, as well as mine cars, and it is estimated that the daily output will be five carloads.

UTAH

It is expected that the **International Mine Rescue and First-Aid Convention** will be held in Salt Lake City this summer.

The coal industry of Utah has a representative in the Legislature. He is **John E. Pettit**, superintendent of the Panther mine of the U. S. Fuel Co. in Carbon County. Mr. Pettit is a member of the House of Representatives. He has been state coal mining inspector twice.

VIRGINIA

W. N. Westerlund, assistant manager of the Norfolk office of Hasler & Co., has gone to New York to take charge of the office there. Richard Hasler has come to Norfolk from the New York office to fill the vacancy made by the transfer of Mr. Westerlund.

The Steinman Coal Co., of Steinman, whose post office address is Tandy, Va., has perfected an incorporation with a capital of $300,000. The following officers have been elected: President, James H. Steinman, Lancaster, Pa.; secretary, Whitney C. Faulkner, Richmond, Va.

WEST VIRGINIA

With the transfer of the records in the murder trial of C. Frank Keeney, president of District 17, United Mine Workers of America, from Jefferson County to Morgan County, all arrangements for the **beginning of the case, Feb. 20**, have been completed. It is scheduled to start on Feb. 20. The state will have about 125 witnesses and the defense about 75.

The Monongah Fuel Co., having recently acquired a large tract of coal land adjacent to its present mine on Kuhn's Run, in the Marion County field, **has completed plans for the installation of a plant with a capacity of between 1,500 and 2,000 tons a day.** The contract for the installation of electrical equipment, including substation, was awarded to the Fairmont Electric Service Co. The fuel company expects to install three 75-kw. 222,000-volt to 2,200-volt transformers, 100-kw. motor generator set, 25,000-volt switch, 25,000-volt lightning arrester, one steel substation tower. The apparatus will be of the Westinghouse type. The Monongah Fuel Co. has as its head David Victor, who is also general manager.

Shaker-screen equipment of the most modern type **was recently installed at the Eureka Mine** of the Consumers' Fuel Co., Randall, near Morgantown, by the Fairmont Mining Machinery Co., Fairmont. The Eureka Mine, which is one of the Bertha Coal Co. interests of Pittsburgh, Pa., now has a rating of sixty-four cars per day and with the new equipment it is hoped to develop a rating of one hundred cars daily. The Bertha Coal Co. is planning to install shaker-screen equipment at most of its large operations this year with a view of doubling production in 1923.

The Cumberland Iron Works, of Westmoreland, near Huntington, which has been operating only about three months, has been awarded a contract by the Ford coal interests for the manufacture of **several hundred mine cars for the Nuttallburg mine**, near Thurmond, in the New River field at which new machinery is being installed throughout.

WISCONSIN

A. W. Berresford has resigned as vice-president and director of the Cutler-Hammer Co., Milwaukee. Mr. Berresford's request to be released was based entirely on personal consideration. Arrangements have been made whereby his services become available in specific matters.

CANADA

Trouble between operator and employee persists in some of the fields of Alberta. The mines in and around Edmonton, it is stated by the operators, are all working with full crews and without complaint. At a recent meeting, however, it was admitted that the present situation was unsatisfactory to the public because of the expenditure by the city for police protection. On behalf of the operators it was stated that no objection would be offered to workers joining the United Mine Workers. An official of the Edmonton Trades and Labor Council declared that there were some 12,000 miners in the province of Alberta of whom about 10,000 were union men. Completion of the organization, he said, would result in the stabilization of the industry, which was what the miners wanted. Statements followed from a number of the operators. The sentiment was strongly favorable to making every possible effort to arrive at a basis for an amicable settlement of the issues in dispute.

WASHINGTON, D. C.

Bids are solicited for the transportation of one cargo of 4,000-6,500 tons of Navy coal from Hampton Roads, Va., to the Navy Supply Depot, South Brooklyn, N. Y., in vessel of **American registry**. The loading date at Hampton Roads will be between Feb. 17-20, both inclusive. Tenders will be opened at noon Feb. 12.

The Chamber of Commerce of the United States has announced the appointment of **A. B. Barber**, of Portland, Ore., as **manager of the chamber's department of Transportation and Communication.** He succeeds J. Rowland Bibbins, who resigned to take up private engineering practice.

The U. S. Supreme Court has **declined to issue a writ of certiorari sought by the S. H. Benjamin Fuel & Supply Co.** to review the decision by which it lost a suit against the Bell Union Coal & Mining Co. in which breach of contract for delivery of coal had been alleged, thus permitting the decisions of the lower courts to stand. As presented by attorneys for the Benjamin company the question involved was: "Where there is a contract for the sale of goods with instalment deliveries, each instalment to be paid for on a specific date after each delivery, does the failure of the buyer to pay an instalment promptly on the date due give the seller the right to cancel the contract unless the buyer's failure, coupled with other circumstances, indicates an intention on the part of the buyer to breach or abandon the contract or shows his inability to perform the same?" The Benjamin Company entered into a written contract with the Bell mining company in April, 1920, to purchase 25,000 tons of 2-in. screenings and 25,000 tons of prepared coal, to be delivered in equal monthly shipments from May, 1920, to April 1, 1921, at $2.50 per ton for the screenings and $3.50 per ton for the prepared coal. The Benjamin company alleged that only a small part of the shipments were made in May, June and July, and that in August the Bell company canceled the contract, alleging failure to pay on time. The Benjamin company declared that its payment for June delivery, due July 15, was mailed by check July 19 and that the delay was due to inability to get exact weights from the mine in Union County, Kentucky. The price of coal advanced steadily and rapidly in the summer of 1920 and in September the Benjamin company filed suit in the U. S. district court for eastern Pennsylvania, seeking judgment of $300,000. There was a second contract for delivery of 25 carloads, of which 9 carloads were delivered, and on this contract a jury gave the Benjamin company $2,016. The Court instructed the jury that as to the larger contract the Benjamin company had breached the contract by failure to pay on time. The Circuit Court of Appeals sustained this and now the Supreme Court has declined to review the case.

Traffic News

A report on the condition of locomotive equipment just filed by the Pennsylvania R.R. with the Car Service Division of the American Railway Association shows that on Jan. 1, 1923 **nearly 80 per cent of the road's locomotives were in good order.** Out of 7,249 steam locomotives on the system, the percentage of all classes out of service for repairs was only 21.44. On Jan. 1, 1923, fewer locomotives requiring heavy repairs were out of service than on Jan. 1 a year ago. In the same period the out put of the company's shops increased to such an extent that the number of freight cars requiring repairs was reduced to about 7 per cent of the cars on the line. Fewer freight cars were out of service under and awaiting heavy repairs on Jan. 1, 1923, than on Jan. 1, 1922.

The Montana Coal & Iron Co. has filed with the I. C. C. exceptions to the proposed report of Attorney-Examiner M. A. Pattison, in what is known as the "Western Coal Rate" case (Docket 13588). The report recommends many revisions in the rates on anthracite and bituminous coal from mines in New Mexico, Montana, Wyoing, Colorado and other western states. Hearings were held in many western cities and extended over several months.

Authority has been granted by the Interstate Commerce Commission to the Van Sweringen group of Cleveland, which now controls the New York, Chicago & St. Louis R.R. and other lines in the Middle West, **to take over control of the Chesapeake & Ohio** by assuming seven places on its board of directors. O. P. Van Sweringen and six of his associates, who recently announced they had acquired a majority of the common stock of the Chesapeake & Ohio, may now become directors of that raliroad, and will control seven out of nine votes upon the board. Commissioner Eastman dissented from the commission's action, but all other members of the commission approved the order. M. J. Van Sweringen, J. J. Bernet, Otto Miller, J. R. Nutt, C. C. Bradley and W. A. Colston are the others permitted by the order to go on the board.

Preliminary action has been taken by several companies operating in smokeless territory and served by two railroads **to annul the recently adopted rules and regulations governing the rating of mines known as joint-service mines.** Parties to such an action are the New River Coal Co., the White Oak Fuel Co., Stuart Colliery Co., Dunloop Coal & Coke Co., Beckley Coal & Coke Co., Mabscott Coal & Coke Co. and the Cranberry Fuel Co. These companies have filed suit in the U. S. Court for the southern district of West Virginia against the Chesapeake & Ohio Ry., the Virginian Ry., the United States of America and the Interstate Commerce Commission. The plaintiffs in this case seek to have the new rule which prohibits joint service mines from receiving 150 per cent car supply set aside and annulled. Heretofore, mines in a position to ship by two roads have been entitled to a 75 per cent car supply from each road as against a 100 per cent rating for mines shipping one way. The first hearing on the case was held at Richmond, Va., on Feb. 6.

Association Activities

Northeast Kentucky Coal Association

The fifth annual meeting of the Northeast Kentucky Coal Association held at Ashland, was one of the most successful and most largely attended in the annals of the association, 85 per cent of the tonnage of the district being represented. All of last year's officers were re-elected as follows: C. W. Connor, of Esco, president; E. R. Price, of Van Lear, first vice-president; E. L. Bailey, of Hellier, second vice-president; George B. Archer, of Prestonburg, treasurer; C. J. Neekamp, of Ashland, secretary.

Many subjects of vital interest were discussed, among the most important being that having to do with car supply. J. D. Battle, traffic manager of the National Coal Association, in an address stated that the Interstate Commerce Commission had approved in principle the mine-rating rules recently proposed by the joint conference of operators and railroad officials and that the carriers and the operators will carry out the suggestions made by the conference.

At the banquet of the Ashland Chamber of Commerce given in honor of visiting operators, over which John E. Buckingham presided as toastmaster, a number of officials of the Chesapeake & Ohio Ry. were present and made brief addresses, among them being F. M. Whitaker, vice-president in charge of traffic; J. B. Parrish, general manager; E. D. Hotchkiss, freight traffic manager. Another prominent railroad official present was W. G. Curren, general superintendent of transportation of the Baltimore & Ohio, who pointed out the steps being taken by his company toward bettering transportation conditions. J. D. A. Morrow, former executive vice-president of the National Coal Association, discussed the trend of radical legislation, and Lawson Blenkinsop, chief of the State Department of Mines, addressed himself to the efficient operation of mines. President C. W. Connor, of the association, spoke of the rapid development of the Big Sandy region and of the certainty of further development in view of the quality of coal produced in the region.

Monongahela Coal Association

At the annual meeting of the Monongahela Coal Association held in Morgantown on Jan. 12, largely attended by members, officers were elected and directors chosen. Operators on the Monongahela River between the Pennsylvania State line and Fairmont on the south constitute the membership of this association The new roster of officers includes: John Hay Johns, of Pittsburgh, Pa., president; E. H. Gilbert, Morgantown, vice-president; J. B. Hanford, Morgantown, treasurer. In the list of directors chosen were B. M. Chaplin, Morgantown; Whitney Warner, Cleveland; W. H. Soper, Morgantown; A. O. Davis, Uniontown; Robert Grant, Boston, Mass.;; George S. Connell, Connellsville; Samuel D. Brady, Fairmont; Vincent E. Gocke, Clarksburg; R. N. Davis, Morgantown; Dr. W. R. Mitchell, Morgantown, and W. E. Watson, Fairmont. Mr. Watson was president of the association last year.

Obituary

Rastus S. Ransom, Jr., president of the Ransom Engineering Company of Hazleton, Pa., a graduate of Colorado School of Mines, Class of 1913, was accidently killed while cleaning his revolver on the afternoon of Jan. 18. Funeral services were held from his late home in Hazleton. Interment was in Rosedale Cemetery, Orange, N. J. After his graduation he practiced his profession in Utah and Colorado. In 1915 he returned to the East and became interested in research work and invented a new type of coal jig which he manufactured and was meeting with marked success in the Pennsylvania coal fields. He was a member of the American Institute of Mining Engineers. He is survived by his wife and a daughter.

William P. Waugh, consulting engineer for the H. H. Robertson Co., of Pittsburgh, and known from coast to coast through his development of skylights and the solution of ventilation problems for many of the country's greatest industrial plants and public buildings, died at his home at Sewickley, Pa., on Jan. 15. He is survived by his wife and two daughters.

Frederick Schwaim, formerly head of the F. Schwaim Coal Co., Sioux City, Ia., died Jan. 13 at his home in Sioux City. He was born in Germany, May 2, 1848. He came to the United States at the age of seventeen and first lived in Champaign, Ill. In 1887 he located in Sioux City and for years had been identified with the coal trade there, retiring fifteen years ago.

Henry Melville Whitney, known as one of the greatest captains of industry of his time, died at his home in Brookline, Mass., Jan. 25, at the age of 84 years. Until his retirement several years ago from active affairs he was an international figure as capitalist and transportation magnate. As organizer of the Dominion Coal Co., from which grew the present coal and iron industry of Cape Breton, N. S., it had been said of him that "no American ever did more for Canada."

Western Kentucky operators, jobbers and many consumers have heard with regret of the death of **A. C. Lackey,** of Nashville, Tenn., on Jan. 29, death being due to asthma, from which he was a chronic sufferer. Mr. Lackey was president of the Douglas Coal Mining Co., western Kentucky; the Phoenix Coal Mining Co., which he just recently acquired, also in western Kentucky, and the Dixie Fuel Co., jobbers, with offices at Louisville, Nashville and Chicago. Louisville was the headquarters of the two mining companies. Mr. Lackey is survived by his wife, a daughter and a son.

Coming Meetings

Northern West Virginia Coal Operators' Association will meet Feb. 13 at Fairmont, W. Va. Secretary, G. S. Brackett, Fairmont. W. Va.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

National Foreign Trade Council will hold its annual conference April 25-27 at New Orleans, La.

Pittsburgh Vein Operators' Association will hold its annual meeting Feb. 12 at the Hotel Cleveland, Cleveland, Ohio. Secretary, D. F. Hurd, Cleveland, Ohio.

The Upper Potomac Coal Association will hold its annual meeting Feb. 10 at Cumberland, Md. Secretary, J. F. Palmer, Cumberland, Md.

Northwestern Pennsylvania Coal Operators' Association will hold its annual meeting March 6 at the William Penn Hotel, Pittsburgh, Pa. Secretary, T. F. Diefenderfer, Butler, Pa.

Canadian Institute of Mining and Metallurgy's annual meeting will be held March 7, 8 and 9 at the Mount Royal Hotel, Montreal, Quebec, Canada. Secretary, George C. Mackenzie, Montreal, Quebec, Canada.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

Indiana Bituminous Coal Operators' Association will hold its annual meeting March 14 at Terre Haute, Ind. Secretary, P. H. Penna, Terre Haute, Ind.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

American Institute of Mining and Metallurgical Engineers, New York Section, will hold its annual meeting at the Chemists' Club, 52 East 41st St., New York City, Feb. 14. The subject will be: Present Anthracite and Bituminous Coal Situation. Secretary, E. L. Gruver, 20 Broad St., New York City.

Southern Appalachian Coal Operators' Association will hold its annual meeting Feb. 23 at Knoxville, Tenn. Secretary, R. E. Howe, Knoxville, Tenn.

The executive board of the **Coal Mining Institute of America** will meet in Pittsburgh, Pa., Saturday, March 3.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10. Meetings of the National Council will be held morning and afternoon of the first day for nomination of directors. Seventeen directors are to be elected for a term of two years each. On the mornings of May 8, 9 and 10 and on the afternoon of May 10 there will be general sessions devoted to the subject of "Transportation in All Its Phases in the United States." On the evening of May 8 a general session will be devoted to European conditions from the American viewpoint, and in the afternoon there will be group meetings on civic development, domestic distribution, fabricated production and finance. On the afternoon of May 9 there will be group meetings on foreign commerce, insurance, natural resources, production, and transportation and communication.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Pooling Coal and Cars

WAR-TIME experience in pooling coal and railroad cars has not made enthusiasts of either coal men or railroad men for this theoretically beautiful system. Transportation was conserved by the tidewater pools in coal distribution in 1918 and to a lesser degree in 1920 and the same end has been sought and attained to some extent by the pools in effect at different times on the Lake front. By operating an open-top car pool during the period of government control of railroads there were certain objects gained during times of great stress. But then in those days nearly everything that could be pooled was thrown into the general pot by everyone to help the great cause of the war.

A proposal to pool the railroad equipment of the country is being pushed by the National Association of Owners of Railway Securities. The matter is now before the Interstate Commerce Commission for consideration and the railroads have submitted a report to that body that in general expresses opposition to the idea. It is pointed out by the roads that much that is claimed for the scheme is already being done by the present managements of the carriers and that it is only the restrictions that are placed on them both by law and through repressive public sentiment that prevents carrying the admirable features into fuller effectiveness. The railroad officials, although they do not say it in so many words, appear to have an old-fashioned idea that they know considerable about running the transportation machine, perhaps more than tinkerers from the outside. This is an idea that is common to most American business men with respect to their own particular activities.

Some of those who have noted the economies effected by pooling coal are persistent in advocating general pooling of coal, standardization into grades and distribution through governmental prescription. Pooling has its objections as well as merits and the objections on the part of coal and of railroads are much the same in general outline.

One common objection that must be given first place is in the fact that a large, expensive organization must be set up to administer the pools, an organization, as pointed out by the railroads, "duplicating many of the facilities and operations" now conducted by the present officials. No compensating saving has been shown in either instance. The free play of competition is hampered if not eliminated by such methods. Coal shippers find in the pools a loss of individuality and trade prestige, and buyers have complained that they have found in pooled coal the slate for which no one in particular could be held to blame.

The purpose and object—namely, elimination of waste—of those who favor pooling as a sort of panacea are beyond cavil. It behooves everyone to work with them toward this common end. Their formula of centralization must be modified before they can expect to get the fullest support, however. The war brought some experiences in how not to do things, as well as how to do some better. It were more profitable to seek the redevelopment of the right economic environment in which individual initiative may thrive and produce wholesome fruits than endlessly to encourage commission and centralized bureaucratic control of industry.

Who Wants Nationalization?

MORE than passing interest attaches to the development within the United Mine Workers of a division into left and right wings. The liberals or radicals, or whatever they may properly be termed, headed by John Brophy and guided by the Bureau of Industrial Research, constitute the left wing. They stand for a nationalization of the coal industry. On the other side are the conservatives, the old school, typified by such men as John L. Lewis, president of the international organization, and Frank Farrington, president of the Illinois miners.

At the Cleveland convention in 1919 the United Mine Workers adopted an out and out program of nationalization of the coal mines. They called on the federal government to acquire title to the mines and to operate them, giving the miners equal opportunity in the management. This demand and that for the 30-hour working week are interpreted as vague expressions of faith on the part of the workers that thus overdevelopment and the short work year could be corrected. At Indianapolis two years later, in the fall of 1921, they receded somewhat from their previous extreme position and created a Nationalization Research Committee, of which John Brophy was made chairman. Rock-bottomed sentiment was not so strong for nationalization and the conservative element in the miners' organization, gaining strength, withdrew a part of its support of the plan and let Brophy and his followers play with it.

And now, Brophy, having started his propaganda for nationalization of the mines, finds that even that measure of support is taken away. He is grieved to find that Mr. Lewis does not take his pet theories seriously and is undertaking to "smoke him out" on the question. Brophy has resigned from the nationalization committee and in an open letter to John L. Lewis demands that Mr. Lewis speed up the campaign for nationalization, and that Lewis assume the leadership in that which he several years ago asked the committee to undertake—the dissemination of propaganda among the members of the union and among the public. Mr. Brophy will carry the matter to the next convention, where he will test his radical strength with the conservative strength of the national officers.

The proposal for nationalization is nothing less than a plea for the elimination of the profit motive in industry, for the substitution of communistic control and management in place of private enterprise. Mr.

Brophy has had the effrontery to call it the American plan, whereas it is nothing but the Russian plan. The labor movement in this country has accomplished what it has and that has been much, by frankly recognizing the merits of individual enterprise, the "acquisitive instinct," as Mr. Robert Bruére indicts it in his book on the "Coming of Coal," and by organizing powerful unions to meet owners and managers in collective bargaining.

The urge for socialization or nationalization—they are one and the same—comes from abroad—it is an imported idea. In England labor has frankly declared war on private enterprise and seeks the nationalization of coal and transport—other things to follow, of course—and the practical conscription of capital. Brophy and the intellectuals who hold up his hands are following the lead from abroad.

Nationalization in any form would result in completely unionizing the coal fields, a condition sought by the organized workers. This end is held out as an added inducement for support and as a short cut to the solution of the big problem of the union in this country. It is certain to appeal strongly to those in central Pennsylvania who tried so hard last year to organize Somerset and Connellsville, and to those who lost New River and Kanawha.

In Continental Europe the tide of sentiment for nationalization of industry is reported to be waning. In Great Britain it is dangerously near the crest, with the Labor Party under control of clever socialists at the height of their power in Parliament. The movement, both as respects the railroads and the coal mines, is in its ascendancy here. As in England, there are in this country those outside the rail and coal industries who are most active in promoting nationalization. That is why the development of a left wing in the United Mine Workers and the pushing of active propaganda for nationalization of the mines is of more than passing moment. The professional radicals will continue to feed the discontent of mine workers.

Is Creosoted Timber a Menace?

OFFHAND judgments, made without experience or tests, have declared that creosoted mine timbers constitute a menace to the mines in which they are introduced. Reasonable enough is the idea that to soak a timber with oil, no matter how high is its flash point, is a sure way to make it a ready prey to flame.

However, this idea, like many others, does not appear to have any substantiation in actual practice. Some mine officials who have had such experience find that creosote helps to smother out the fire in a mine timber rather than to aid it. When a committee on treated fence posts made its report at the convention of the American Wood Preservers' Association at New Orleans, last January, it stated that experience on the Missouri, Kansas & Texas R.R. showed that creosoted yellow-pine fence posts were less subject to fire than posts that were untreated.

That railroad had 2,030,911 fence posts of which 1,651,333, or 81.3 per cent, were untreated and 378,578, or 18.7 per cent, were treated. In two years that railroad lost 5.795 untreated posts and only 76 treated posts. Thus 351 untreated posts in 10,000 were burned whereas only 2 in an equal number of treated posts were thus destroyed. The report adds that "a direct comparison of the relative fire-resisting qualities of treated and untreated posts cannot be made, as many of the untreated posts were partially decayed, making the wood readily susceptible to the flames." With this dictum one cannot feel in hearty agreement. Surely the fact that the timber which had been treated was not rotted and that which had not been treated was rotted did not militate against the fairness of the test. One reason why creosote is fire-resisting is that it greatly delays rotting. Of course, the comparison resulting from this experience is not between newly treated and untreated posts but between posts under normal conditions.

However, the chairman of the report may have known, as he is connected with the railroad, that the untreated posts had for the most part been longer in the ground than those which had been treated. The report fails to make a statement of any kind regarding this important element in determining the risk.

As counterbalancing the supposition that the treated posts were newer than the untreated must be cited the fact that the treated posts were of inflammable pine and the untreated posts were largely of less inflammable material.

The report goes on to say: "The fact that less than one hundred posts burned out of a total of more than 378,000 in service is evidence that they are not easily ignited and therefore are desirable in territories where there is danger of fire." This evidence should allay the fears of those who hesitate to put creosoted timber underground or to use it in surface construction.

The Market Softens

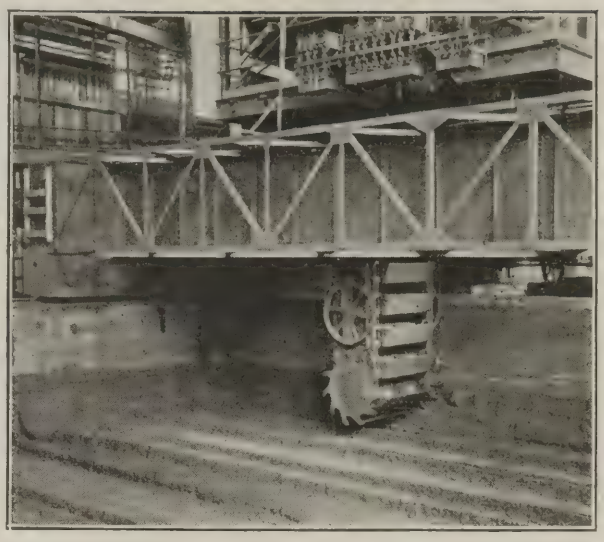
STOCKS of bituminous coal are increasing while production and prices drag. The end of the winter is in sight and householders are feeling easier. In the area where the lack of anthracite caused by the strike of five and a half months was most seriously felt, substitutes have saved the day and no one has gone cold. Within a month after the miners returned to work production of soft coal was in excess of consumption and that of hard coal climbed to its highest level and has been maintained there.

A survey of the stocks of coal in the hands of consumers and retail coal dealers just completed for Federal Fuel Distributor Wadleigh discloses that on Jan. 1 there were 36,000,000 tons of soft coal in reserve piles, a gain since Sept. 1 of 14,000,000 tons. Around 10,000,000 tons appears to have gone into reserves in September and October and 4,000,000 tons in the last two months of 1922. Statements that the coal crisis is passed are not correctly based on the assertion that production is now in excess of consumption, for that was less true at the end of the year than in the fall. They are true because the level of stocks has been raised sufficiently to relieve anxiety. It has been demonstrated time and again that when reserves approach four weeks' requirements demand falls to match consumption and prices settle at a low level.

The figures released by the Fuel Distributor indicate that by Feb. 1 reserves were approaching four weeks' average requirements. Consumption of bituminous coal around 39,000,000 tons in October, steadily increased through the winter and now probably is around 43,000,000 tons per month, or about 9,800,000 tons per week, exclusive of exports. As an indication of where the coal is going it may be noted the production of pig iron gained 600,000 gross tons from October to January, or 40 per cent.

Rosedale Uses Bumping Tables to Wash Its Product, Mixing It for Coking Purposes with Gas Coal

By George Atwell Richardson*
Philadelphia, Pa.



Cambria Steel Co's Washing Plant Cleans Coal with Bradford Breakers and Riffled Tables—Coal Is Dried in Big Draining Pits for Four Days, After Which It Is Excavated by Reclaiming Bridges

THE Rosedale coal-washing plant of the Cambria Steel Co., at Johnstown, Pa., forms an integral part of a group comprising: (1) The Rolling Mill and Rosedale mines, from which the coal is hauled and hoisted direct into the coal-washer building; (2) the coal washery and subsidiary buildings where the coal is washed and then mixed with coal from other mines to form the proper coking mixture; (3) the byproduct plant where the mixed coals are converted into coke for use in the manufacturing plants and into byproducts for outside consumption.

The coal washery is of interest because it is the largest and most modern of its type in the country. Construction of the development of which it forms a part was started in 1917 and completed in the spring of 1922.

*Midvale Steel & Ordnance Co. and Cambria Steel Co.

Note—This article deals with coal-washing equipment recently installed at the Rosedale byproduct plant of the Cambria Steel Co., at Johnstown, Pa. The present article is the third in a series of four describing an unusually interesting combination of modern mining methods and byproduct-plant practice. The first two, entitled "Cambria Steel Co. Drops Coal Down Well, Loads It at Bottom and Hauls It to Ovens" and "Haulage, Hoisting and Dumping Practices at Rosedale Mines," appeared in the issues of *Coal Age* for Aug. 31 and Sept. 22, 1922, respectively.

Note—The headpiece shows the leg of the "digger crane" removing washed coal from a drainage pit. The bins are ten in number and each holds 1,500 long tons.

In previous articles the modern methods of mining, hauling and handling the coal were taken up in detail, ending with a description of the 175-ft. steel headframe from the top of which the coal is dumped automatically into storage bins at the top of the coal-washer building.

The movement of the coal in the coal washery is in one general direction from the incoming to the other end. At this point is located a subsidiary building, or addition, which houses coal-mixing and handling equipment, which will be described in detail later. Gas coal must be mixed with the local coal to obtain a proper coking material, and this is brought in by rail from mines at a considerable distance. The total distance from the incoming end of the coal-washer building to the track hopper where gas coal is unloaded is 841 ft., the washer building itself being approximately 564 ft. long by 100 ft. wide. Concrete is used for all foundation work, and the superstructure is of brick and steel.

As has already been mentioned, the coal from the local mines is hoisted and dumped into storage bins having a capacity of 1,000 gross tons of coal. From the storage bins the coal passes down into two 12x17-ft. Bradford breakers. In the original plans it was provided that the coal should pass through crushers, and



FIG. 1—INCLINED CONVEYOR LOOKING DOWN SLOPE

This 30-in. belt brings the coal from the Bradford breakers to the top of the washery and delivers it at that point to a horizontal belt, which carries it to the bins over the washers.

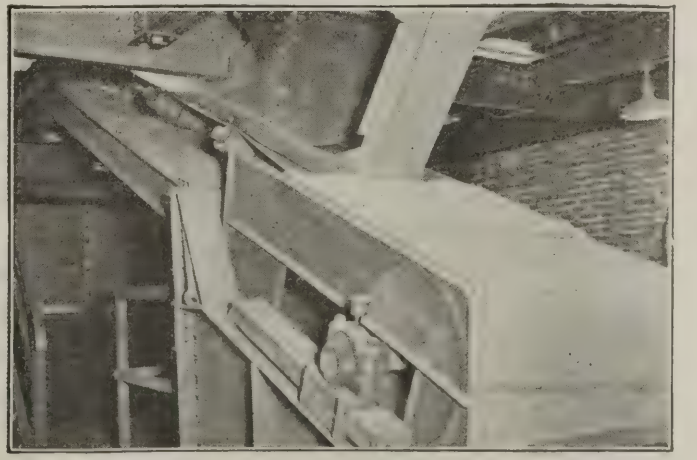


FIG. 2—JUNCTION BETWEEN CONVEYORS NOS. 1 AND 2

Coal to be washed drops onto a 30-in. inclined conveyor belt known as No. 1 and is taken up to the top of the washery, where it is dumped on a conveyor belt known as No. 2.

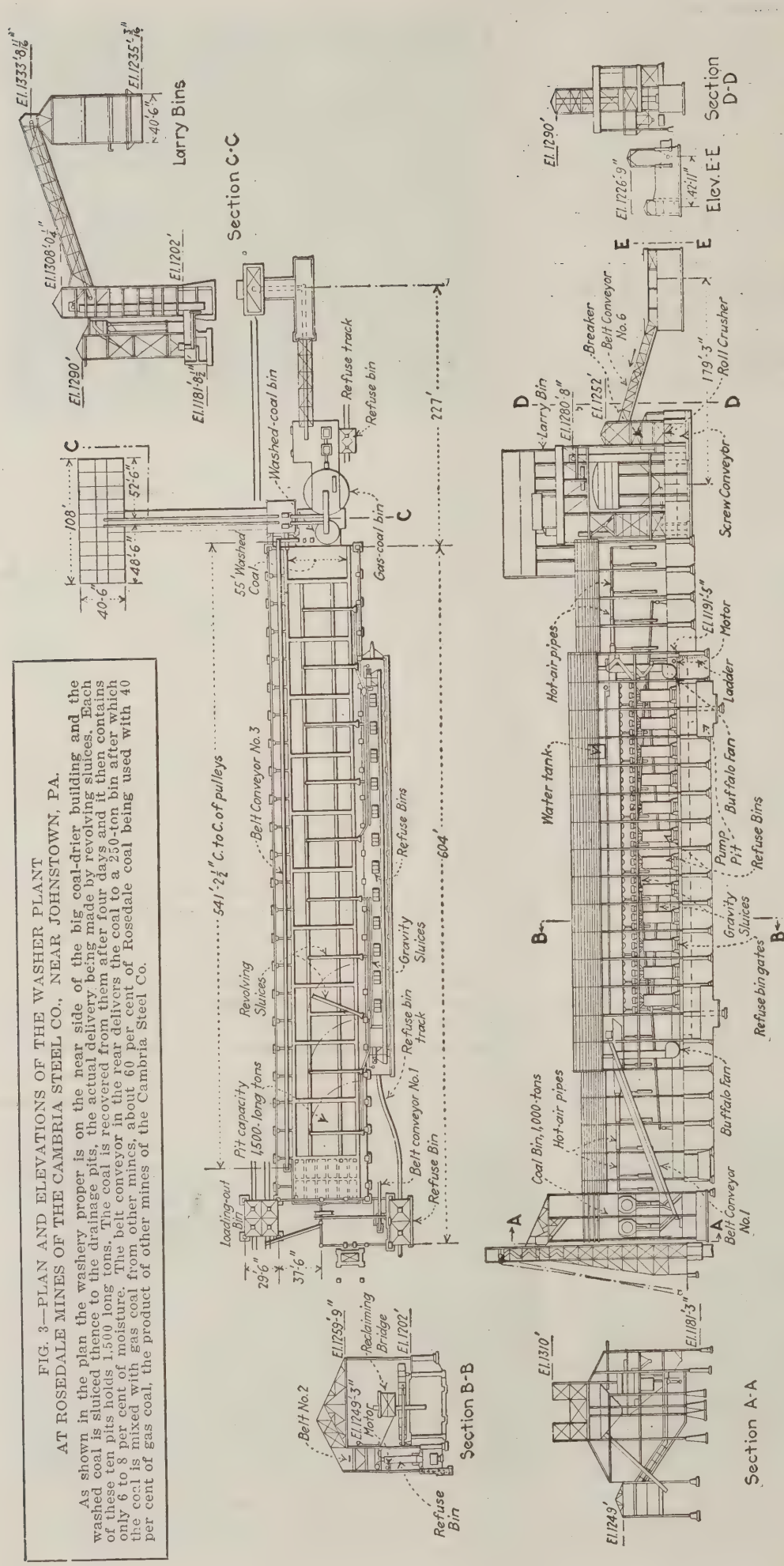


FIG. 3—PLAN AND ELEVATIONS OF THE WASHER PLANT AT ROSEDALE MINES OF THE CAMBRIA STEEL CO., NEAR JOHNSTOWN, PA.

As shown in the plan the washery proper is on the near side of the big coal-drier building and the washed coal is sluiced thence to the drainage pits, the actual delivery being made by revolving sluices. Each of these ten pits holds 1,500 long tons. The coal is recovered from them after four days and it then contains only 6 to 8 per cent of moisture. The belt conveyor in the rear delivers the coal to a 250-ton bin after which the coal is mixed with gas coal from other mines, about 60 per cent of Rosedale coal being used with 40 per cent of gas coal, the product of other mines of the Cambria Steel Co.

space has been left for these.

Part of the crushed coal was to be used in the boiler house, and all of the finer material was to go to the washer tables. The Rosedale coal, as it is mined at present, breaks readily, however, and no crushers are required. In fact all of it breaks up so fine without crushing that it is suitable for the washer tables, and as a result the present practice is to use one of the breakers for supplying boiler fuel, the other supplying all the coal the washery needs.

Coal for the boiler house and similar uses passes down from the breaker onto a flight conveyor which carries it up into a 250-ton loading-out bin. Coal also can be carried direct from the storage bins to the loading track by a gravity chute. (See Fig. 5.)

The coal that is to be washed drops onto a 30-in. inclined conveyor belt known as No. 1, and is taken up to the top of the washery, where it is dumped on conveyor belt No. 2. This second belt passes over the bins that supply the coal to the washer tables, the coal being deposited uniformly at any desired point by an automatic tripper. (See Figs. 1, 2 and 8.)

The product of the Rolling Mill and Rosedale mines contains large quantities of foreign matter, and after breaking it up, in which operation there is a cobble loss of 1 per cent, the coal is washed to eliminate as much refuse as possible. This entails a further loss of about 9 per cent, the ash and sulphur contents being reduced materially.

The thoroughness of the washing is checked constantly by means of analyses of the coal supplied to the washing tables and also of the coal and refuse which the washing tables deliver. Samples are taken, mixed, quartered and dried, results being tabulated as shown in the following table abstracted from the daily operating records of the plant. All figures shown are based on analyses made of material dried at 105 deg. C.



FIG. 4—SIDE VIEW OF CAMPBELL BUMPING TABLES
In this view can be seen indications of the seventy-two bumping tables and chutes. A cam which pushes the table forward and the springs which return it, as also the bumping block which suddenly brings that return motion up with a jerk, can be clearly seen, all being to the right of the line of tables.

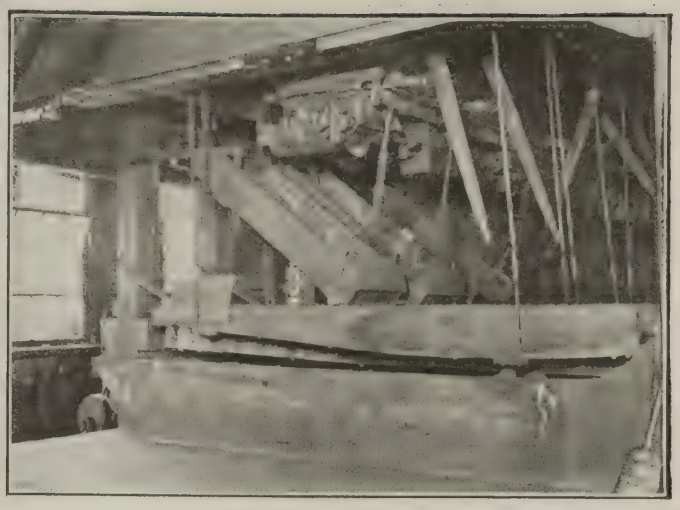


FIG. 6—QUARTERING VIEW OF TABLE FROM FRONT
The worm feed above the tables regulates the supply of coal to the chutes. In practice all the bevel gears are covered up by a sheet-iron box. The gates in the bottom of the raw-coal hoppers are opened and closed by hand levers which are never used to adjust the feed.

These analyses, of course, will vary from day to day but the figures given afford a good idea of the conditions that are encountered.

That part of the coal washery given over to the actual washing equipment consists of a series of galleries on which the various pieces, parts and controls are located, the materials being handled by gravity as far as possible.

The top gallery is little more than a runway paralleling No. 2 conveyor and extending across the top of the coal bins. This gives convenient access to the automatic tripping equipment and to the incline which follows down alongside No. 1 conveyor. At each end of this gallery are water tanks into which the washing water is pumped. Adjacent to each tank is a 50-hp. induction motor, these motors being used to operate the No. 1 and No. 2 conveyors.

Washing water is used over and over again as far as possible, fresh water being added only in quantities sufficient to replace losses. The water drains down into sumps located on the basement level and from that point is pumped back to the tanks. For this purpose 100-hp. continuous-duty induction motors are used, these being direct connected to two-stage centrifugal pumps designed to operate against a head of 115 ft. (Fig. 10.)

Seventy-two Campbell washing tables are used to clean the coal, these being capable of handling 4,000 gross tons of coal per 10-hr. day. These tables are

FIG. 5

Washery and Headframe

On the right in the foreground is the headframe of the shaft; on the left in the rearground is the washery. In the center is the 250-ton bin with the shed over the flight conveyor by which that bin is supplied. This bin is used for loading railroad cars with coal for use in the boiler house and for other purposes. A large storage 1,000-ton bin is ranged alongside the headframe for direct loading by the shaft skips, and if desired, coal can be run direct from that bin to the railroad cars, the gravity chute in the foreground being used for that purpose.



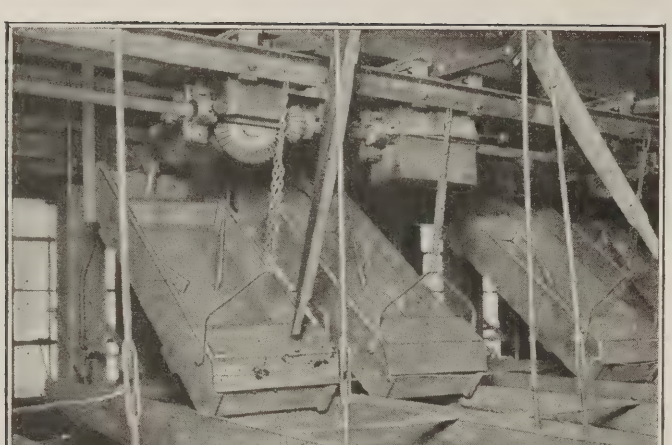


FIG. 7—FRONT VIEW OF BUMPING WASHING TABLES

Seventy-two of these tables clean the coal, their aggregate capacity being 4,000 gross tons per 10-hr. day. Each table is suspended by two stirrups. They are pushed forward to the limit of their travel by the action of cams. Aided by springs they are brought back with a sharp jolt against the bumper post in the rear. The tables are corrugated, and the coal is readily sluiced over the corrugations, but the refuse stays in the miniature traps till the sharp jolt causes it to slide backward. Repeated jolts bring it to the rear of the table and to the refuse chutes.

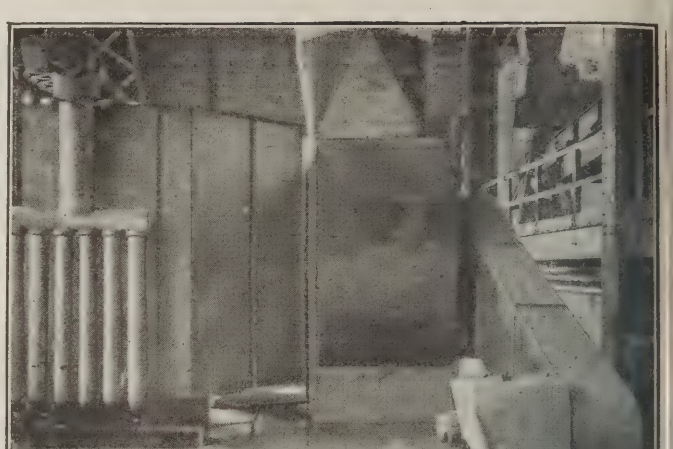


FIG. 9—MOTOR-DRIVEN FAN AND HEATING EQUIPMENT

Two units like this, one at either end of the gallery behind the refuse bins, provide the hot air by which the building is warmed in cold weather. One difficulty in drying slack by the slow process of drainage is that in winter it may freeze rather then drain. For this reason the house where the slack is dried must be kept warm during the winter season. The piping system is outlined in part in Fig. 3 and can be seen also in Figs. 17 and 19. The pipes travel near the roof of the drier shed with branches at short intervals descending toward the floor.

operated in units or batteries of twelve each. On a gallery immediately below the washing-table floor or gallery are six 15-hp. induction motors, each motor operating one unit. From the motors silent chain drives connect with the cam shafts on the washing floor, the cams themselves being used to cause the bumping action which is the essential part of the washing operation.

COAL ANALYSES OF COAL WASHED AT ROSEDALE PLANT, PER CENT

	Before Washing			Washed Coal			Refuse		
	Volatile	Ash	Sulphur	Volatile	Ash	Sulphur	Volatile	Ash	Sulphur
1.....	16.41	10.23	2.98	16.56	7.33	1.40	16.03	61.04	24.85
2.....	16.50	10.26	3.02	16.60	6.84	1.37	15.95	59.75	24.45
3.....	16.61	11.32	2.60	16.68	7.88	1.29	15.46	62.84	21.92
4.....	16.59	11.97	2.12	16.62	8.43	1.21	15.85	64.28	18.68
5.....	17.07	12.51	2.11	17.15	8.76	1.12	16.40	61.28	15.13

A chain drive operating from the camshaft in series with a second turns a line shaft hung in front of and under the coal hoppers. On this line shaft are bevel gears which turn the worms in feed cylinders at the bottom of each hopper. Each battery or unit has its own independent drive. Gates in the bottom of the hoppers are opened and closed by hand levers. These are never used for adjusting the feed. (See Figs. 4, 6 and 7 for details; also a cross-section of a typical unit, Fig. 13.)

When the equipment is operating, coal from the hoppers passes through the worm feed and drops onto the feed chute, which is suspended at an angle of about 40 deg. In this chute, by means of a dam and suitable baffles water from the tanks above is intimately mixed with the coal, and this mixture in turn spills over and down onto the washing table proper.

The general arrangement of the washing tables and equipment is clearly indicated in the diagram. The individual tables are suspended on two rockers, or stirrups, the front one being adjustable for height by a hand lever. In this way the operating position of the table can be varied to meet conditions. The exact angle depends on the character of the coal being washed. Ordinarily it will be determined by the appearance of the table, the coal having a tendency to pile up if the proper angle is not being used. On the other hand, the analyses may show that the refuse is too high.

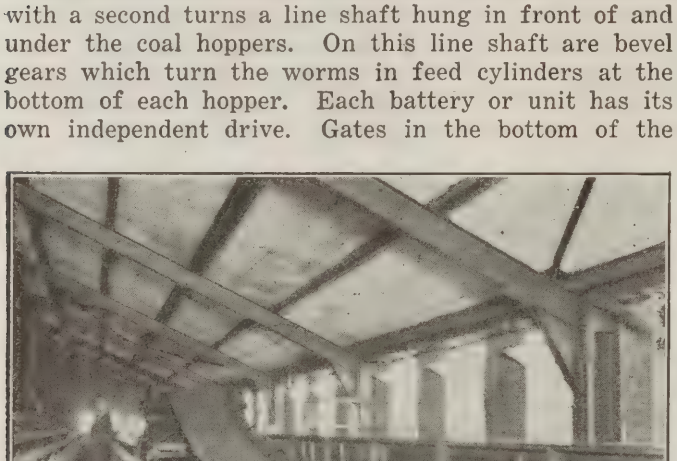


FIG. 8—AUTOMATIC TRIPPER OVER WASHER-TABLE BINS

The tripper can be moved to any point over the row of bins, where, by deflecting the belt, the load is discharged into the bin desired. This system used for many years for the handling of coal to the bunkers over boilers and by metal mills for the bedding of ores is well suited for distributing coal to a row of washer tables.

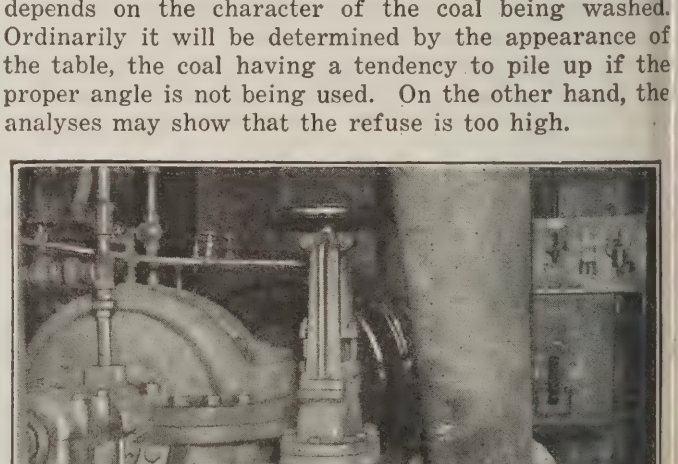


FIG. 10—CENTRIFUGAL PUMPS RESTORE WASH WATER

Wash water drains down the sumps, at each of which is a pump like that shown, which delivers the water back to tanks near the roof of the building. The pumps are driven by 100-hp. continuous-duty induction motors to which they are direct connected. The pumps have two stages and are designed to operate against 115-ft. head.

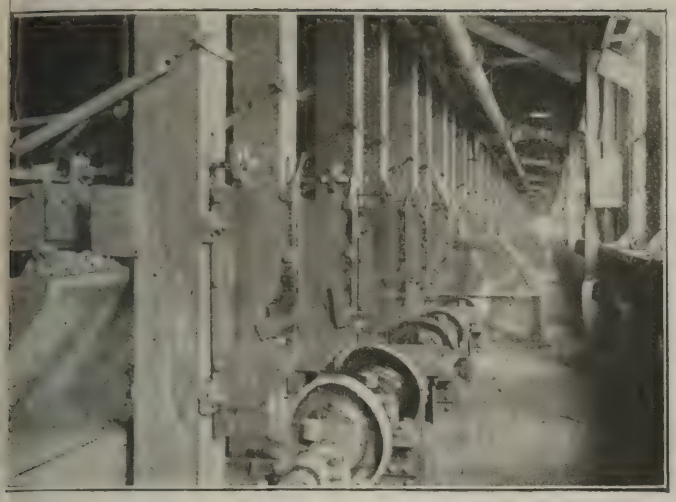


FIG. 11—CAMS BY WHICH WASH TABLES ARE OPERATED
Six 15-hp. induction motors, each driving a battery of twelve units, are placed in a gallery below the wash tables. and through a silent chain drive revolve the cams by which the washery tables, in turn, are actuated. As will be noted, these cams are placed near the level of the washery floor.



FIG. 12—REFUSE BINS REST ON CONCRETE PIERS
The waste chutes and refuse bins are of wood, as the waste has a high sulphur content. Consequently only a non-corrodible material could be used in their construction without frequent replacement. The bins taper gently from top to bottom, losing 6 in. of width in the 28 ft. of their depth.

In the bottom of the tables are corrugations, or riffles, in which the refuse is caught and gradually worked back. At the back end of the tables rods project and connect with rocker arms by means of a slotted joint, these rocker arms being actuated by the cams, which can be seen clearly in the illustrations.

The actual washing of the coal is accomplished by a combined rocking and jolting action. As the cams rotate the tables are pushed forward to the limit of their travel, and then, aided by the springs, are brought back sharply with a jolt against the bumper posts at the back. The refuse, being heavier than the coal, tends to settle in the riffles and gradually works back while the light coal is slopped over with the water into the

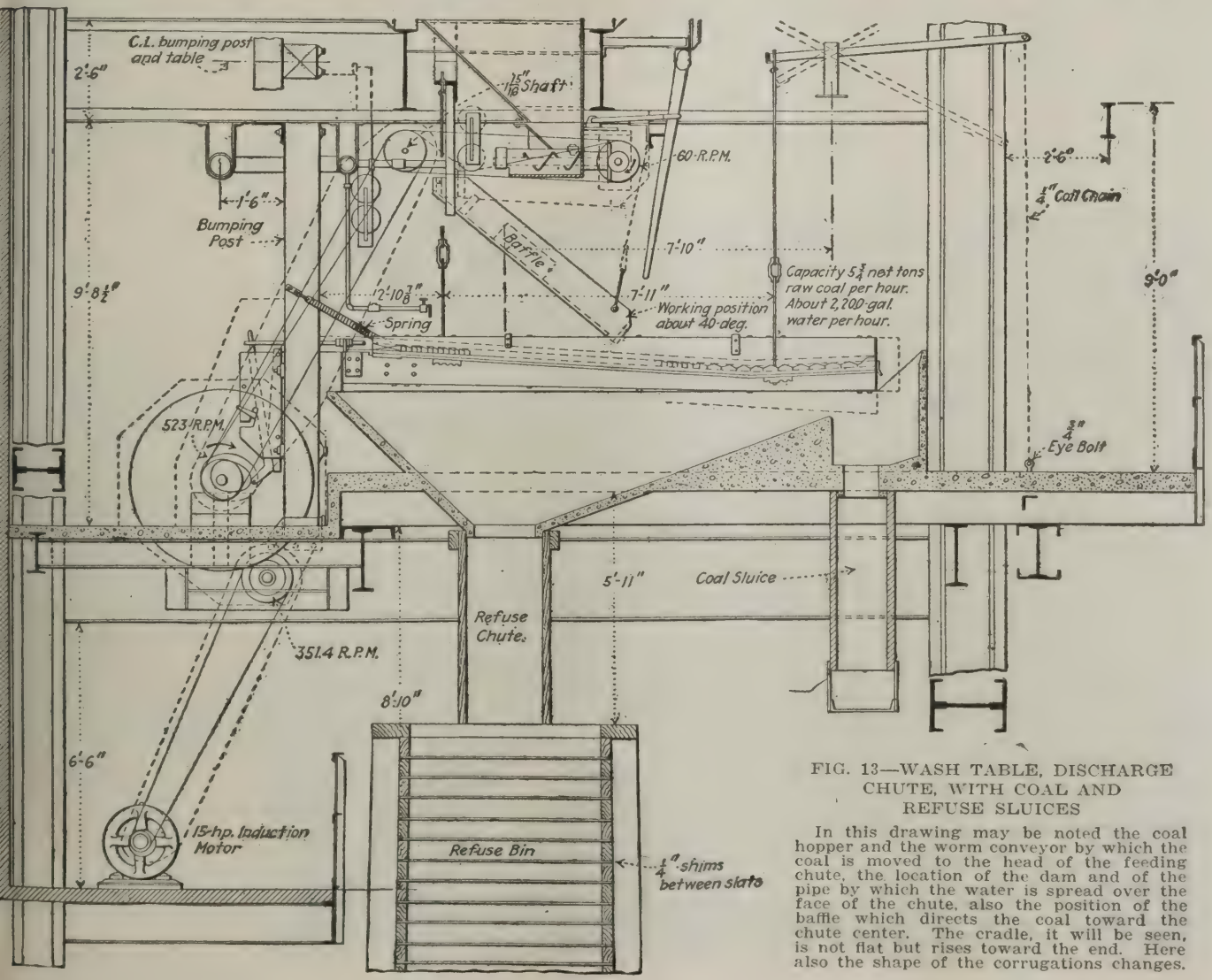


FIG. 13—WASH TABLE, DISCHARGE CHUTE, WITH COAL AND REFUSE SLUICES
In this drawing may be noted the coal hopper and the worm conveyor by which the coal is moved to the head of the feeding chute, the location of the dam and of the pipe by which the water is spread over the face of the chute, also the position of the baffle which directs the coal toward the chute center. The cradle, it will be seen, is not flat but rises toward the end. Here also the shape of the corrugations changes.

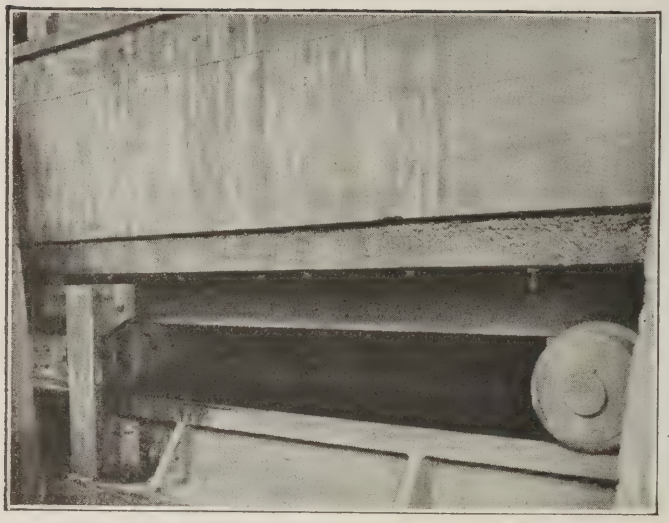


FIG. 14—GATE CLOSING BOTTOM OF REFUSE BIN
Mechanically operated horizontal gates mounted on wheels close the gates of the refuse bins, being propelled by a motor-driven rack-and-pinion movement. The refuse is dumped into railroad hopper cars as shown in Fig. 21.

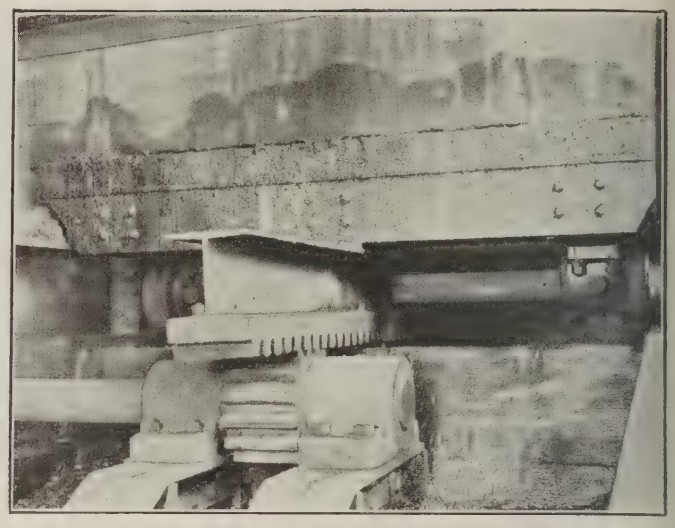


FIG. 16—ANOTHER VIEW OF GATE OF REFUSE BIN
This shows the pinion and the long girder on the underside of which is a rack. Through this girder pass the axles of the wheels by which the gates are supported and on which they roll forward or backward.

coal sluices. On the way back the refuse meets a second stream or spray of water which aids in removing any coal that may remain. After this the refuse drops down into the refuse chutes.

Sulphur forms a large percentage of the refuse, as shown by the analyses given above. For this reason it is necessary to construct the refuse chutes of wood if a reasonable length of life is to be insured. There are thirty-six refuse chutes in all, or one chute for every two tables. These dump in turn into wooden refuse bins which are tapered from top to bottom, there being a total of twelve bins, or one for every six tables.

The refuse bins rest on concrete piers which project above the floor level of a gallery which is below the level of the floor surrounding the drainage pits on the other side of the building (Fig. 12). These piers provide the necessary clearance for the insertion of mechanically operated gates which close the bottoms of the refuse bins. The gates are horizontal and mounted on wheels so that they can be moved back and forth on a short track by means of a motor-driven rack-and-pinion movement (Figs. 14 and 16). Individual safety switches and motors are provided for each gate.

At each end of this same gallery are located the heaters by which the building is warmed during cold weather. Motor-driven fans circulate the hot air to various parts of the building, as shown in the longitudinal elevation. (Fig. 3.)

The refuse is dumped into hopper cars which are run into the washer building on the lower ground level.



FIG. 15

Drainage Shed

Illustration is from a photo taken of the drainage pits before the belt was installed or the pits used. Note the sluices by which the coal from the washery is directed into the pits, of which there are ten. The coal remains in them at least four days before it is removed by the reclaiming bridges. It has then lost so much water through the cracks between the boards at the bottom that only 6 or 8 per cent of water remains. The pits are filled with coal to the level of the tops of the walls and each holds when filled 1,500 gross tons.

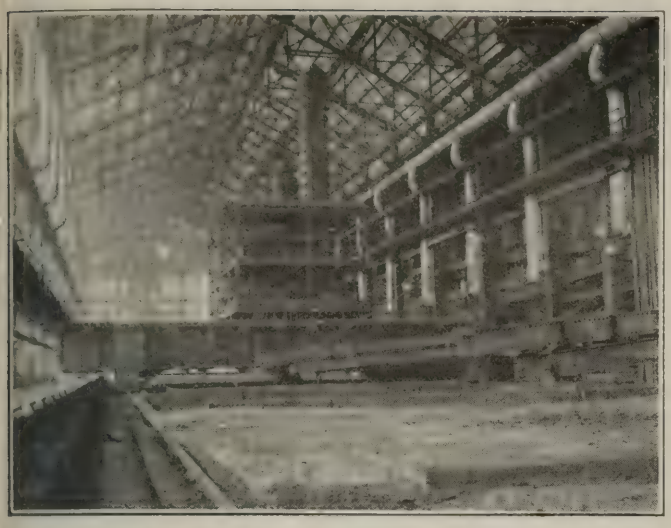


FIG. 17—DRAINAGE SHED WITH TWO DIGGER CRANES

In front of the reclaiming bridges with their buckets lifted clear of the drainage pits are three separate sluiceways from which the coal is discharged when the pits in the foreground are being filled. Note the belt on the left, which receives the dried coal from the digger cranes and carries it to the mixing plant.



FIG. 19—VIEW OF SHED WITH FORE PITS FILLED

The Cambria Steel Co. always has exhibited a preference for drainage as against mechanical methods of ridding the coal of its moisture, a similar system of draining having been installed many years ago at its Franklin plant. It is slow but effective and economical.

This is the lowest gallery. The coal-washer building is on the side of a hill so that the ground levels on the two sides are quite different, the washers being on the downhill side. (See section BB, Fig. 3.)

Halfway up the side of this gallery (Fig. 21) is the trimmers' platform and at each end are the rooms which house the motors and pumps by which the washing water is circulated. The refuse, which is loaded into the cars, is hauled to the dumps, for it has no commercial value. The disposal of the refuse is of interest but the most important part of our discussion has to do with the handling and disposal of the coal, and its path will now be followed to the coke ovens.

The coal and water from the washer tables pass down through gravity sluices into the drainage pits. There are ten of these, each having a capacity of 1,500 gross tons. They are so designed that the coal recovered from them contains only from 6 to 8 per cent moisture. (Fig. 15.) The sluiceways are so arranged that the flow of water and coal can be diverted to any pit and to any part of the pit so as to fill it uniformly to a level with the top. Ordinarily four days should be ample for draining off the water, which would be the usual period with all ovens operating at capacity. This period will be greatly exceeded when plant demands are not heavy.

The drainage pits are served by two reclaiming bridges, or, as they are locally known, "digger cranes," which are equipped with continuous bucket diggers which deliver the washed coal to a 36-in. conveyor belt (No. 3) running the entire length of the building (Figs. 15, 17, 19 and headpiece). This belt in turn delivers the coal to the mixing plant.

Rosedale coal is low in volatile constituents and must be mixed with high-volatile coal in order to obtain a mixture suitable for coking. Coal of this character is brought in from other mines of the company and is not washed at this place.

The Rosedale coal is carried from No. 3 conveyor by

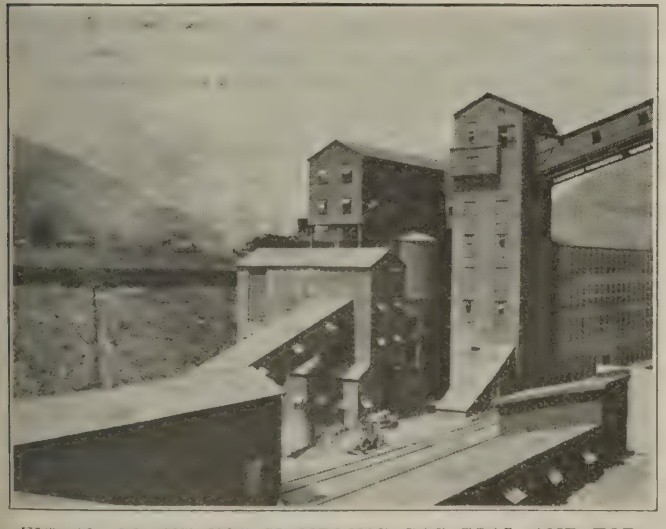


FIG. 18—PLANT FOR HANDLING GAS COAL AND FOR MIXING LATTER WITH LOCAL PRODUCT

Hopper cars are discharged in the shed to the left. The coal is elevated by a belt conveyor in the crusher shed to the right of that building. The next structure to the right houses the elevator equipment, and to the side at a lower level may be seen the gas-coal storage bin. Under this bin are the coal mixers. The building still further to the right covers the elevators by which the mixed coal is hoisted and dumped onto the conveyor operating in the gantry to the extreme right. This conveys the coal to the bunkers at the ovens.

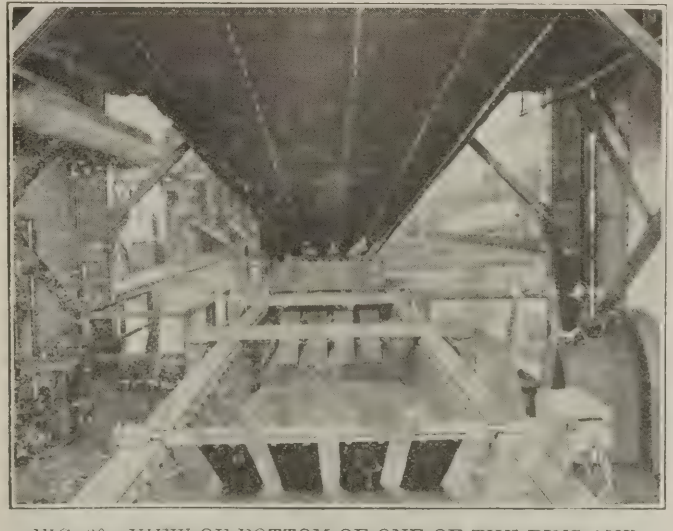


FIG. 20—VIEW OF BOTTOM OF ONE OF THE BINS AND BELTS OF PROPORTIONING FEEDERS

The fingers shown on the belt are part of the apparatus which controls the character of the mixture. When the coal feeds improperly the fingers drop and establish electrical contacts which stop the equipment immediately. The washed-coal bin, the hopper bottom of which can be seen in the illustration, has a capacity of 250 gross tons and the gas-coal bin of 1,250 gross tons. A view of the tops of the drier pits can be seen in the rear. This will give a suggestion as to location in the building of the proportioning feeders.

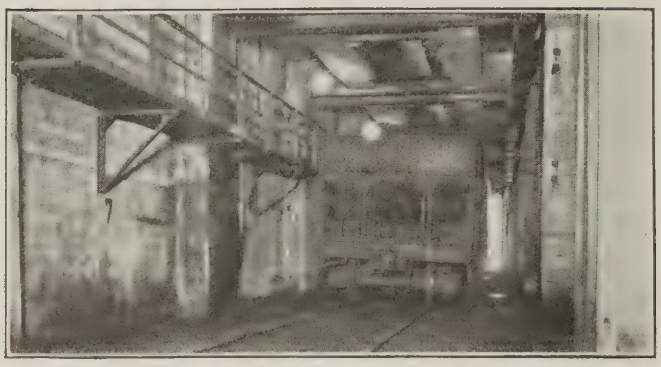


FIG. 21—HOPPER CAR PASSING UNDER WASTE BIN
Note the trimmers' platform on the left. The gallery is on the lower side of the washery and is the lowest part of the structure, which is built on a side hill.

a second conveyor and bucket elevators to the washed-coal bin. This cannot properly be called a storage bin as storage capacity is not required and the quantity that it will hold is less than 250 gross tons.

The high-volatile, or gas, coal comes in at the east end of the plant and is dumped directly into a railroad hopper and onto reciprocating gates which feed the coal uniformly onto a conveyor belt (Fig. 18). From this point the coal is elevated in two stages to roll crushers. Before entering these it passes through a Bradford breaker. From the crushers the coal is carried to a bucket elevator by a screw conveyor and lifted into the gas-coal storage bin which has a capacity of 1,250 gross tons. The crushing reduces the gas coal to a size uniform with that of the washed coal. This is necessary, as otherwise the coals would separate in handling, and it would be impossible to maintain a uniform coking mixture.

From the bins the gas and low-volatile coals feed by gravity onto proportioning feeders. These are nothing more than two short belt conveyors moving toward each other and dumping the coal at the middle (Figs. 20 and 22). The supply to each conveyor can be so regulated that any desired mixture can be obtained, ranging in high-volatile coal from as low as 20 per cent to 80 per cent. Under normal operating conditions the usual mixture is about 40 per cent high-volatile and 60 per cent low-volatile. The quantity depends, of course, upon the analysis of the coal.

Automatic stops are provided on the proportioning feeders so that the apparatus is brought to a stop if the coal is not being fed properly. The fingered gates shown in the illustration drop down when the supply diminishes, and in so doing establish the necessary electrical contacts to operate the controls.

A paddling, or pug-mill, arrangement receives the coal from the proportioning feeders and plays its part in forming what is finally an unusually thorough mixture of the two grades of coal.

Two spiral screw feeders which receive the coal from the pug mill serve the double purpose of aiding in thoroughly mixing the coals and delivering them to two bucket elevators and thence to two conveyor belts which deliver the coal into a 3,000-ton coal bunker above the coke ovens (Fig. 23). In practice only one of these screw feeders is used, the other being held in reserve.

The electrical installations form an interesting feature of the coal washery. More than 350 motors are located in the washer and byproduct plants and fully 10 per cent of this number are located within the limits of the washer plant. Equipment of the most modern type has been installed. This includes inclosed safety switches and emergency switches for shutting down equipment from any point in the plant. High-tension current is brought to a rotary transformer station and stepped down to 220 volts. From these facts it will be seen that the Rosedale coal washer plant forms a most interesting example of modern coal-washing practice.



FIG. 22—END VIEW OF MIXING EQUIPMENT
The gas coal is crushed to the same size as the washed low-volatile coal so that when mixed they will not tend to segregate by sizes. Both coals are dropped into separate bins and then fed by gravity onto proportioning feeders, which are two short belts moving toward each other and dumping coal in the middle.



FIG. 23—CONVEYOR BELTWAY TO COKE OVEN
The coal being washed, 60 per cent of it is mixed with 40 per cent of gas coal. That, at least, is the usual mixture. It then goes to the ovens by the beltway, or bridge, shown.

ON DEC. 1 THERE WERE IN EFFECT, under the terms of the general leasing laws, 362 coal-prospecting permits, licenses and leases covering 281,818 acres of Government lands in certain western states, according to the U. S. Bureau of Mines. There were in operation on these lands 77 mines, which had reported to date a production of 833,000 tons of coal. Of a total of 313 coal-prospecting permits issued, the largest number, 78, was in Wyoming, 62 permits had been issued in Colorado, 43 in Montana, 29 in Utah, 26 in Oregon, 22 in Nevada and 20 in Washington. Of 44 leases for the production of coal, Utah, with 15 leases, led; Wyoming, with 8 leases, was second; Colorado, with 7, was third. The total minimum annual production of coal required under the leases granted amounts to 1,559,525 tons. It is estimated that there are 311,905,000 tons of coal in lands so far leased. The growth of coal production on leased public lands is shown in the following tabulation of output: 1920, 117,619 tons; 1921, 322,596 tons; 1922 (eleven months), 388,330 tons.

Municipal Water-Purification Plant Erected and Operated by an Illinois Coal Company

Plant Designed to Purify Half Million Gallons Daily—Will Store Enough Water to Afford Twelve Days' Supply at That Rate—Soda-Alum Solution Throws Down Solids—Chlorine Destroys Germs

By Frank H. Kneeland*
New York City

MANY modern coal-mine villages differ in little or nothing, so far as living conditions and domestic conveniences are concerned, from communities of equal size and population located outside the mining regions. There was a time, well within the memory of men now living, when almost "any old shack" was considered good enough for a coal miner and his family to live in. Even within the past two decades the most popular dwelling that mining companies could erect in certain localities was a three-room cottage. In such places larger, more convenient and more pretentious dwellings went untenanted so long as any of the smaller houses were available.

Miners Looking for Improved Surroundings

Much of this is now changed. For almost ten years this country has been cut off from the influx of foreign labor which formerly sought our shores. This lapse of time has done much to Americanize the foreign population of isolated communities. This transition doubtless has been stimulated in no small measure by such other unheralded though powerful agencies as the "movies" and more recently "radio." The result is that the miner of today demands conveniences in his home and surroundings of which his predecessors of a generation ago never dreamed. The American standard of living has gained a firm hold upon him.

In any community, regardless of its size or character, sanitation is the first requisite to public health, and the provision of an adequate supply of potable water is the first and most important step in any scheme of municipal sanitation.

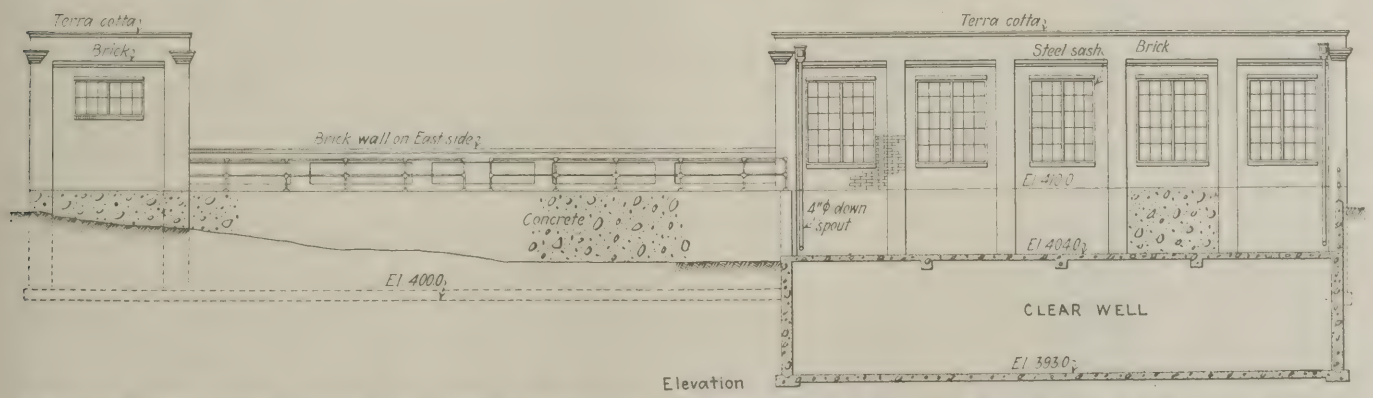
Years ago the town of Zeigler, Ill., was owned by a coal company. Today it is an incorporated city, with a city government entirely independent of the coal firm that made its existence possible. It is, nevertheless, a "one-industry town" in perhaps the strictest sense of the word. Inasmuch as it is highly important that the Bell & Zoller Mining Co., the mine owner, should have in its employ men that are in a strictly healthy condition, this firm has undertaken to supply the town with suitable water for both house use and fire protection.

To this end, a water-treatment and filtration plant of more than a half million gallons daily capacity is being built by this company near its No. 1 mine. The filter equipment for this plant is manufactured by the Roberts Filter Manufacturing Co., of Darby, Pa., and the plant is being installed by the Baumes-McDevitt Machinery Co., of St. Louis. The plant is constructed of concrete, reinforced concrete, brick, steel, glass and similar permanent and fireproof materials.

Water from the Big Muddy River is pumped to a 6,000,000-gallon storage reservoir adjacent to the plant. Thence it gravitates to the automatically controlled chemical mixing plant, where it is mixed with a soda-and-alum solution, the quantity of which is determined by the rate at which the water enters the plant. A series of baffles in the chemical tanks insures a thorough and intimate mixture of the raw water with the treating solution.

The water then flows to one or the other of two subsidence or settling basins. These are concrete tanks of comparatively large size. As two such tanks are employed, one may be cleaned while the other is in operation. Suitable drain pipes have been provided so that either tank may be emptied and washed out with a hose or even scrubbed with a broom, if necessary. The chemicals introduced into the raw water reduce to a flocculent condition the dissolved impurities carried by it. Individual masses of this nature, for the most part, settle out of the water in the subsidence basin.

*Associate Editor, *Coal Age*.



WATER PURIFICATION PLANT AT TOWN OF ZEIGLER, IN WHICH BELL & ZOLLER MINING CO.'S EMPLOYEES LIVE

On the left is the chemical room, where soda and alum are added, which causes a softening of the water. The impurities, being in a flocculent condition, have to be passed through one of two settling basins, the concrete and brick wall of which may be seen in the illustration. On the right is the building which houses the pumproom and filters. The subsidence basins, being used alternately, can be conveniently washed out with a hose or scrubbed with a broom.

In order to assure complete removal of this material, however, the water, upon leaving the settling tank, is passed through a sand filter. Two of these units are provided. The water normally flows through them from the top downward. Provision is made, however, for washing these filters by forcing clean water upward through the sand, thus not only violently agitating it but by this means dislodging, removing and carrying away the material which has been removed from the water and which adheres to each sand particle. This process requires only a short time.

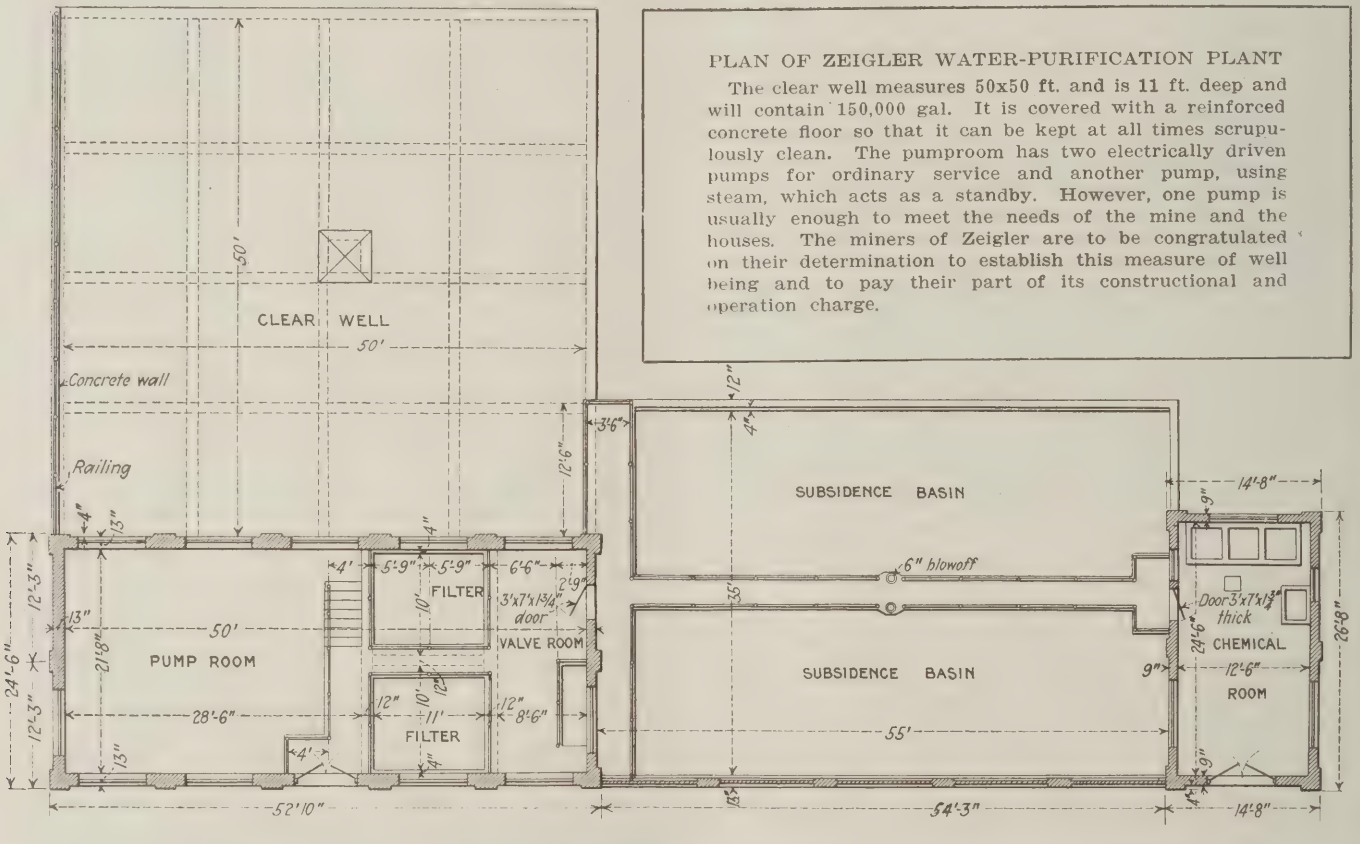
From the sand filters, of which, like the chemical and subsidence tanks, there are two, so that one may be kept in use while the other is being cleaned, the water goes to the clear well, where the requisite amount of chlorine is introduced. This is a 150,000-gallon concrete tank built immediately alongside the pump and filter plant. It is covered by a reinforced-concrete floor, so that all foreign material, such as dust and dirt, is effectively excluded.

Two electrically driven pumps are provided for ordinary service and one steam pump for emergency. The ordinary or house service pumps are Manistee Roturbo centrifugals, direct connected to 40-hp. three-phase 440-volt 60-cycle alternating-current electric motors operating at 1,750 r.p.m., with full automatic control. The capacity of each pump is 600 gallons per minute against a 150-ft. head. Ordinarily one pump will supply the needs of the entire water system.

These pumps are connected to the mains in such manner as to "float" upon them. That is, the mains lead from an elevated tank to the mine and the various house-supply lines, the pumps being connected to them at an intermediate point. The pumps thus supply water to the mine and houses at tank pressure, any surplus going to the tank and any deficiency being made up from it. The elevated tank thus acts as an equalizer between pump and mains.

A duplex steam-driven piston pump is installed alongside the two centrifugals. This pump is arranged to take care of the regular service between the clear well and mains, furnishing filtered water to the tank and houses, as well as the mine. In case of fire this pump can be used, if need be, the connection being arranged so that in case of failure of filtered water from the tank and basin, raw water from the larger reservoir can be pumped directly into the mains for fire service.

The steam-driven pump was installed as auxiliary to the centrifugals because the transmission lines from the mine power house might fail to deliver the needed current. Steam under any ordinary circumstances always would be available and it was therefore deemed wise to install both types of pumping machines to insure continuous service at all times. This arrangement, therefore, insures maximum reliability in service and that the supply of water will never fail.



PLAN OF ZEIGLER WATER-PURIFICATION PLANT

The clear well measures 50x50 ft. and is 11 ft. deep and will contain 150,000 gal. It is covered with a reinforced concrete floor so that it can be kept at all times scrupulously clean. The pumproom has two electrically driven pumps for ordinary service and another pump, using steam, which acts as a standby. However, one pump is usually enough to meet the needs of the mine and the houses. The miners of Zeigler are to be congratulated on their determination to establish this measure of well being and to pay their part of its constructional and operation charge.

Coal cost at any mining operation is made up of many factors, among which the general health of the community cannot be overlooked. For a mining company to undertake the construction and operation of water-works to furnish water to a municipality is perhaps somewhat unusual, but that such a procedure is financially warranted under the conditions existing at Zeigler can hardly be doubted. The return to the mining company on such a venture will not in any wise be direct. In other words, it will not consist in the direct revenue derived from furnishing the town with water but in the indirect and somewhat intangible returns obtained because of the better health of the mining community and the consequent greater contentment, higher efficiency and better morale of the company workmen.

Safe and Economical Ways of Hanging Electric Cables In Mine Shafts or Boreholes

Danger of Stretching Copper and Lowering Capacity Thereby—Zigzagged Copper May Be Brought Down by Falling Material—Protecting Lashing by Cable Clamps—Cable Supports Which Bend Cable

By Frank W. Cramer*
Johnstown, Pa.

ONE of the first problems to be solved when electricity is to be installed in a mine is that of placing the feeder lines. It has been demonstrated many times that the electrified mine is more economical than one where the work of haulage is done by a steam hoist and drainage is effected by steam pumps with their long lines of pipe and the important heat losses consequent thereon.

It must be borne in mind, however, that it is essential to efficiency that the electrical feeders be properly designed and installed. If they are so planned and erected they may be forgotten with safety, but if haphazard construction and the wrong cable be used, the feeder system may be a source of continuous trouble.

Feeder cables necessarily follow routes which differ widely, for the means of reaching the mine may be anything from a drift to perhaps a 1,000-ft. shaft. Consequently the support or suspension of these cables cannot have a common solution. Slope or drift mines offer few difficulties, but where the approach is by shafts or boreholes of considerable depth the suspension or supporting of the feeders must be given careful thought. In many installations in the mining field such consideration was not given before the feeders were installed, and, as a result, the cable was either pulled apart or so stretched by its own weight that the cross-sectional area of the copper was considerably reduced.

Cable if Wrongly Strung May Fall Later

If this break occurred after the haulage had been electrified, it delayed or shut down the operations, with much consequent expense. If the cable was stretched, its carrying capacity was reduced and the voltage drop in the line increased. For some reason or other data for installing such cables has not been given wide publication, and the manufacturers, knowing the difficulties of this class of work and not being familiar with the particular mine, usually inform the purchaser, if he asks them how the cable should be installed, that the cable must be supported at certain distances and then leave it to him to devise the means of support.

This information may not mean much to the mine superintendent, for the design of the shaft may be such that it is impossible to support the cable at such intervals, and in other instances the cable having to be placed in a borehole, a top support is all he can provide. The purpose of this article is to describe briefly two successful methods of supporting cables, one for shafts and the other for boreholes.

Fortunately, most hoisting shafts are used also for airways and a space for air is left at either side of the cageway. In this part of the cross-section cables can be placed. For this work they should be of the lead-covered armored type with a layer of jute over the armor that has been impregnated so as to resist the attacks of mine water. The armor will protect the lead from mechanical injury. The usual size for the direct-current feeder used for this class of work is 1,000,000 cm. A cable of this kind weighs about 8 lb. to the foot. If a 2,200 or 6,600-volt 3-phase alternating-current cable of 0 wire is used, the weight will be about the same. An effort usually is made to set supports at about 30-ft. intervals. These supports are fastened to the cross timbers and are so designed that each of them will throw a bend in the cable at the point of attachment.

Several shaft installations have cables of this sort zigzagged across the bracing of the cageway. This is satisfactory so long as a heavy load does not fall down the shaft and hit them or so long as none of the timbers supporting the cable rots away and falls. If either of these accidents should happen the cable would be likely to be torn loose from its supports and break, with the ultimate result perhaps that the cable would be found later at the bottom of the shaft.

To avoid accidents such as this, much consideration was given to the design of the cable supports prior to the suspension in a 500-ft. shaft of four 1,000,000-c.m. direct-current feeder cables and one 3-phase 2,200-volt 0 cable. In installing a cable in a shaft of such a depth it was evident that support must be afforded not only at the top but at several points in its length, for fear that the weight of the cable itself would either break or stretch the lead and copper and perhaps ruin

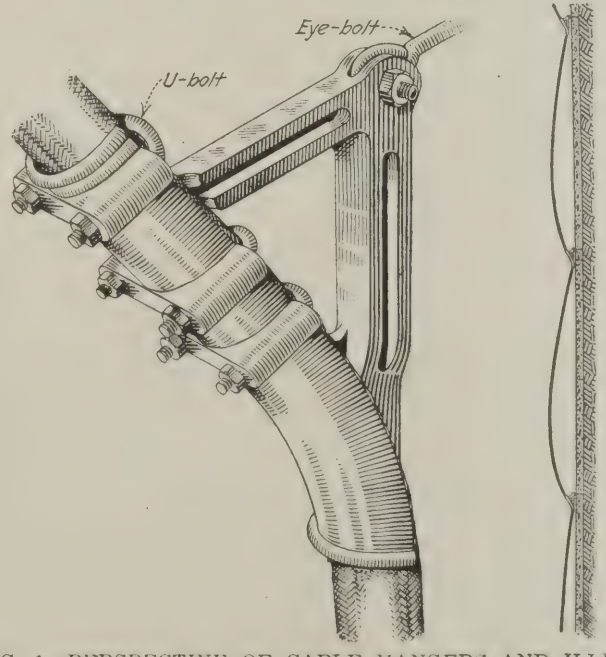


FIG. 1—PERSPECTIVE OF CABLE HANGERS AND ILLUSTRATION SHOWING CABLE IN MINE SHAFT
The grip on the cable is not sufficient to injure the lead sheathing but is enough in conjunction with the wavelike shape of the clamping groove to hold the cable without slippage.

*Assistant electrical engineer, Cambria Steel Co.

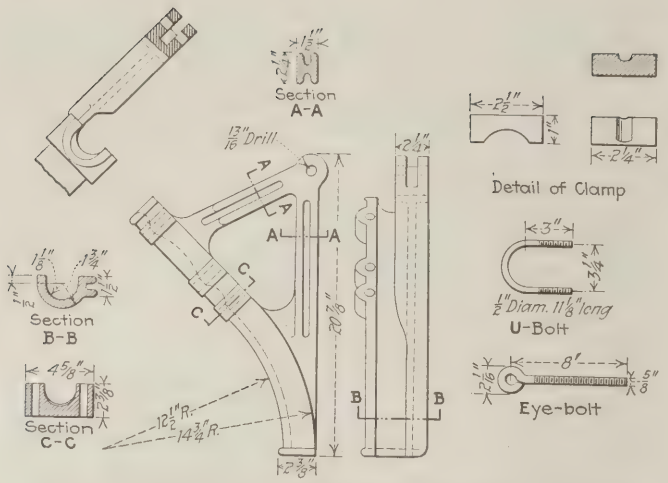


FIG. 2—DETAILS OF HANGER FOR SHAFT CABLE

When these hangers are set 25 ft. apart they effectually and without undue compression hold the cable in place and would do so even should a hanger be knocked loose. They serve both to suspend and to support the cable.

the feeder before it was installed. To avoid this, a $\frac{7}{8}$-in. steel cable was wound around the drum of a hoisting engine and used as a support in lowering.

The reel of feeder cable was placed on trunnions, rigged up with a brake and located on the opposite side of the shaft from the hoist. The two cables were then fed over bull wheels until they met at the top of the shaft, where they were tied together with half hitches of $\frac{1}{2}$-in. rope. To prevent this rope from slipping cable clamps were fastened on the steel cable below each hitch. Both cables were then lowered 30 ft. and tied again. This process was continued until 750 ft. of the lead cable was lowered, which was long enough both to go to the bottom of the shaft and to reach the distributing point in the mine.

Prior to this the cable supports shown in Figs. 1 and 2 were fastened to the side of the shaft airway, five of them in a row, one for each cable, spaced 2 ft. apart and supported by $\frac{5}{8}$-in. expansion eyebolts and jackets. The rows of brackets were placed at 25-ft. vertical intervals. As this shaft is concreted throughout its entire depth, the eyebolts which fit in the clevis of the hanger have a solid bearing in the side of the shaft. The groove in which the cable lies is not a smooth curve, but a series of valleys and rises so designed that when the cable is fastened with the three clamps provided for each hanger, it cannot slip.

After the cable had been lowered it was moved into position at the bottom hanger and the clamps put on. Little pressure need be put on these clamps, for a light grip on the jute will prevent the cable from slipping and a tight grip may crush the lead. After the clamps were put on, the steel-wire support was removed at that point and the two cables were raised or lowered by the engine, so that the lead cable could be put into its place in the second hanger from the bottom of the shaft. This method enabled the several feeders to be set in proper alignment and made handling easy. The process was continued to the top of the shaft, where the last hanger curved the cables into position to enter the conduit lines which passed to the substation.

As can be seen in Fig. 2, the support is so designed that the cables do not rest against the wall of the shaft, and in consequence no water pockets can form. The cables are so placed that falling material is not likely to hit them, and as they are supported by concrete instead of by timbers, which are likely to rot, this is a safe method of anchoring. Dirt will not harm them, as cables of this nature are designed with the expectation that they will be buried in direct contact with the earth. Water dripping down the shaft likewise will leave them unharmed. Each hanger supports just 25 ft. of cable, as is shown by the bend in the alignment of the cable. If an eyebolt should break or rust off no injury will be done, as the next hanger above will easily carry the double load, for the weight of 50 ft. of the feeder will not stretch the lead.

As it usually is difficult and expensive to run high-tension circuits for any long distance inside the mine the policy is to put them down a borehole near the point where the power is needed. Consequently at boreholes it usually is alternating-current lines, which require 3-phase cable, that have to be installed. The mine laws of Pennsylvania compel mine owners to put an oil switch, disconnecting switches and lightning protection at all high-tension boreholes, and if more than 500 ft. from the substation, similar equipment for low-tension circuits. This makes it desirable to build a small house over each borehole, and provisions can be made in the design of this house for the support of the lead cables that go down into the mine. Such a design is shown in Fig. 3.

A corporation contemplating several borehole installations will find it advantageous to prepare a standard design for these houses, as this will not only reduce their cost but also give the field man definite instructions as to what is required of him. With a design such as shown the overhead lines can be dead-ended from any direction, and the house and the equipment always is arranged in the same way. These houses are kept locked, and if the circuit breaker in the mine is properly set the only time the one on top will open is for trouble on the lead cable. The houses are inspected at least once a week to make sure everything is in working order.

In boreholes up to 300 ft. in depth it is safe to clamp this type of cable with a long wooden clamp at the

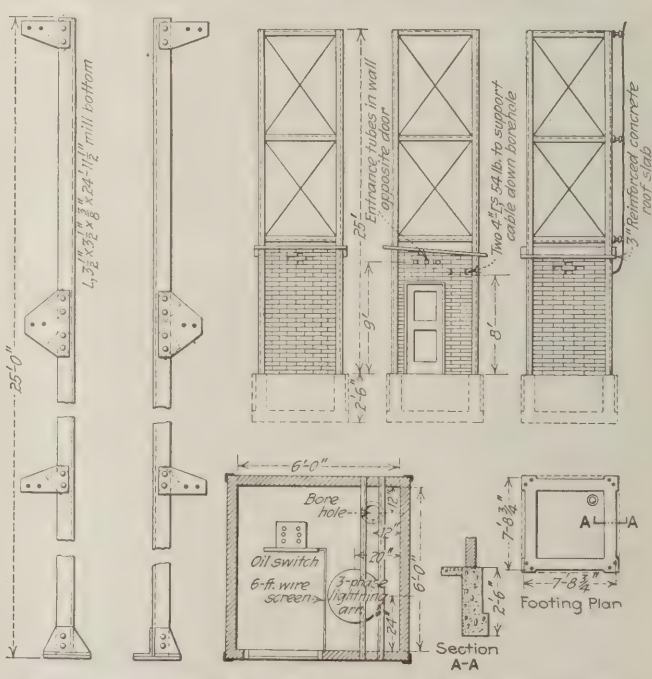


FIG. 3—HOUSE OVER CABLE-CARRYING BOREHOLE

Standard construction for housing oil switch, disconnecting switches and lightning protection over boreholes drilled for power purposes. Note also the channel support for the hanging of feeder cables and the ventilation holes near the roof of the room. The foundations may be made deeper if necessary to reach solid earth.

top and to use this as a top support. In addition to this two L condulets should be used on the lower end of the conduit. With this combination the cable is suspended from the top and also is supported on the bottom by turns which prevent it from slipping. This has the effect of literally standing the cable on end, as the bottom support takes most of the weight.

If only a top support is used the weight of the cable may either break the lead or at least stretch the copper near the support, thus reducing the carrying capacity. Several successful installations of this kind are now in use. If the engineers desire to support the cable entirely from the top, the manufacturers may be able to furnish a special cable that will have, in addition to the armor, a layer of supporting steel wire around the outside. They should be consulted as to the length that can be hung in this manner.

In conclusion it is well to emphasize again the necessity of careful thought and engineering in the installation of the feeder cables of mines. The operation is always dependent on the continuous functioning of these lines. A haphazard job always will be a source of trouble, but a well-planned and well-executed installation can be depended upon for service at all times.

Two Explosions, One in Dawson, N. M., and One in Dunsmuir, B. C., Kill Many Men

IN AN explosion, the cause of which possibly may never be determined, 120 men were killed, on Thursday, Feb. 8, in Mine No. 1, operated by the Stag Canyon Branch of the Phelps Dodge Corporation and located at Dawson, N. M. Apparently 141 men had checked into the mine and of these 19 had left when, at 2:30 p.m., a terrific explosion occurred, only two of those underground managing to escape. The concrete mine portal was demolished by the force of the explosion, thus hampering the rescue work.

Most of the men were at some distance within the mine, only two, a motorman and a nipper, being found near the mine mouth. The two men who walked out were in the pillar work to the left of the main entry.

The time at which the explosion occurred would suggest at once in most mines that a shot had blown out, fired by a man who was preparing to go home, but at these mines of the Phelps Dodge Corporation the miners do not so much as charge their own shotholes, and, after they are charged by "shotfirers"—or should they be called "shot loaders"?—they are fired from the surface by a system of wiring and then only after every man is out of the mine. It is interesting to record what safety precautions are taken at these mines, where the humidity, it must be remembered, often is extremely low. In this respect conditions are much worse in the states of Utah and New Mexico than in any Eastern mines, and the Phelps Dodge Corporation has gone as far as, or further than, any other mining company in its endeavor to maintain the safety of its employees.

Though the mine has no gas—on that both the state mine inspector and the company are in agreement—no naked lights are used, the men carrying battery lamps. The shot loaders are instructed that no shots are to be fired unless the holes are drilled 6 in. in the clear and 12 in. or over from the rib. All shots are to be tamped with adobe to the collar and not more than 1½ lb.—three sticks—of explosive may be placed in each hole. No shot which is on the solid may be fired, and all machine cuttings must be loaded out of the entry or the room before a charge is exploded. The miner drills his own holes but is not allowed to charge them.

The shot loader in making his rounds takes with him the necessary powder and in accordance with his judgment charges each blast with the quantity of explosive he deems necessary, keeping an account of the quantity used at each place and charging the miner accordingly. All explosives are taken into the mine in a closed box which is asbestos-lined. When being transported to the workings the box is placed in a mine car and taken to the distributing points by one special motorman. All explosives not used during any shift are promptly returned to the magazine, and the shot loader is credited with them.

The mines would be as dry as tinder were it not for an extensive sprinkling system, the piping being carried even into the rooms. The coal—at least some of it—is cut by machine and gathered by storage-battery locomotives.

It is possible that the explosion came from a blown-out shot, a hole being charged by some miner who wanted to get a little more coal than the previous shot had afforded. If so it must have been done with "bootleg" powder. It is within the bounds of possibility also that some man connected up with the trolley wiring a shot that had failed in the previous night's firing. If he did, the act was a violation of the company's rules.

The probability that the explosion was due to a blown-out shot makes it interesting to know whether the pockets of the mine workers are carefully inspected as they enter the mine, as was stated in a dispatch to the *New York Times*. The officials at the New York office are not able to confirm or question this statement. It seems that it must have been an unauthorized shothole which was the cause of the explosion, for the New York office fails to recall a single case where an explosion has been caused by the nightly practice of firing all the shots by a current from the surface—a severe test of the general safety of the mine and of the freedom of authorized shots from blow outs.

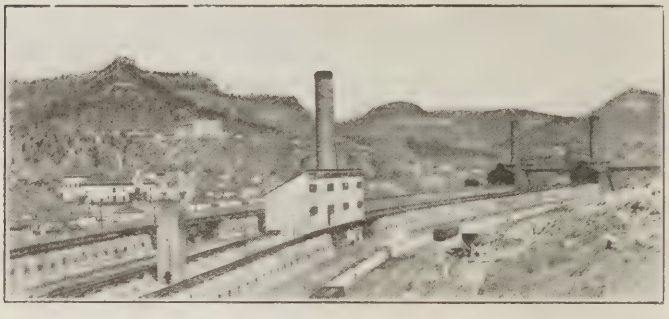
Nearly ten years ago—Oct. 22, 1913—an accident occurred in Mine No. 2 of the same company and 263 men, including 2 rescue men, were killed. This accident doubtless was caused by an unauthorized shot. The jury so decided, for the evidence was overwhelming. Of course, a short-circuit resulting from a fall of the trolley wire or from a broken or stripped cable might have started the explosion, but it is not likely that the disaster was thus caused.

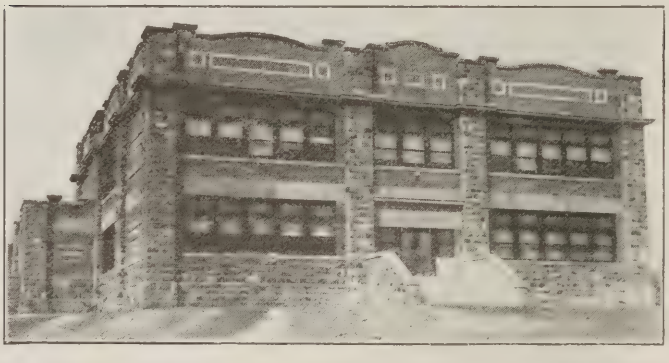
Another explosion occurred on the same day but at the mine of the Canadian Collieries (Dunsmuir) Ltd., Dunsmuir, B. C., on Vancouver Island. A night shift of 300 men was at work. The explosion occurred in No. 2 east drift, fifteen men being killed by the force of the explosion and eighteen others probably from afterdamp. Six are in the hospital hovering between life and death. It is said that many of the men would have been saved if they stayed in their places. As it was, they ran out and tried to pass through the afterdamp at the entrance of No. 2 west drift. About 20 of the men killed were Chinese.

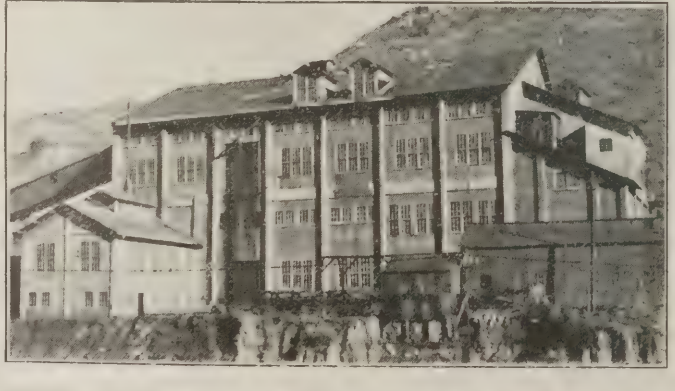
The mine workings were badly caved by the explosion, and the rescue work much hampered. Arthur Watson, one of the four firebosses, managed to bring out two Chinese with him and then re-entered the mine with others and brought out alive two of six Chinese whom he found huddled in a heap on one of the levels. The other four were dead.









SCENES AROUND THE MINES OF THE PHELPS DODGE CORPORATION, STAG CANON BRANCH, DAWSON, N. M.

From top to bottom on left: (1) Tipple for mines Nos. 1 and 2; (2) Village for Mines Nos. 1, 2, 3 and 6; (3) Underflue coke ovens and boiler house heated by waste gases; (4) Douglas school at Dawson; (5) Hospital and dispensary. From top to bottom on right: (1) No. 1 mine entry (the portal that was demolished); motor barn on right; (2) Surface works of mines Nos. 1, 2, 3 and 6; (3) Business district of Dawson; (4) Main Street, Dawson, N. M.; (5) Washery.

Mining Two Beds at Gray Slope with Heavy Parting

Methods Adopted in Extracting Two Thin Seams, One 28 In. and the Other 30 In. Thick, Having Two to Six Feet of Intervening Rock—All Coal Recovered

By D. C. Ashmead*
Kingston, Pa.

IN ORDER to maintain production not only at individual collieries but throughout the anthracite field, operators are being forced year by year to turn to the thinner beds of the region. In 1882 Lackawanna County first began to mine beds of coal thinner than 3 ft., and by 1922 about 25 per cent of the beds being mined were of this thickness.

A prominent engineer in the anthracite region has pointed out that every colliery has a certain stand-by operating expense. No matter what the output is, this expense remains constant, unless, indeed, the production is forced beyond that for which the plant was designed. To get this large output would, however, require the installation of a larger plant, whereupon the stand-by expense would be increased proportionately.

If the production of a colliery is low compared with the output for which it is designed the cost of producing the coal is high, even without regard to this stand-by expense. When to this cost is added a stand-by charge which has to be distributed over a small tonnage the cost of production is found to be unreasonably high.

If the production is increased, the stand-by charge per ton is decreased. When the production of a colliery is brought nearly up to the maximum production for any given stand-by charge, the colliery will be operated at maximum economy.

In a colliery that is continually increasing its output it would be found, if the figures were available, that the cost of production changes in cycles, for before such increase in tonnage could be obtained more machinery would have to be installed and more cost for supervision would have to be incurred and the cost while the tonrage was being brought in line with the stand-by cost inevitably would be excessive.

Let us consider, therefore, a colliery the production of which has reached a maximum and has begun to decline due to the exhaustion of the better beds. The stand-by charges in this case remain constant, but, the production decreasing, the cost per ton increases. It may well reach a point where the stand-by charges and the operating charges per ton of product are higher than can be realized by the sale of the coal.

Thinner Beds Bolster Declining Tonnage

These conditions force the operator and the engineer to turn to new sources of supply so that production may be maintained at a desirable constant. The only way in which to increase the tonnage in many mines is to turn to the thinner beds of coal. The question arises, therefore, can the coal from these thin beds, the mining of which is so expensive, be combined with the mining of thicker coal so that the average cost of all the coal, taking into consideration the stand-by charges per ton, will be lower than the price per ton which the coal will bring? It is necessary always to consider whether operating the thin beds will or will not make the cost per ton greater than it would be if only the thicker coal was mined and the tonnage of coal was accordingly lowered.

As it usually costs more to produce coal from thin beds than from thick and as the conditions outlined are causing operators to undertake the mining of those that are thin the engineer is interested in learning what new

*Assistant editor, *Coal Age*.

FIG. 1

First Mining, Both Beds

The solid lines show the workings in the upper of the two beds and the dotted lines outline the excavations in the lower seam. The rooms, the ungobbed width of which is 10 to 12 ft., are driven on 50-ft. centers. It will be noted that much more coal has been removed in the lower than in the upper bed. This is done so that the rock between beds can be gobbed in the widened portion of the lower room. Whatever coal is left in the pillar of that room—and it is heavily cut into by crosscuts—can and will be removed from the roadway of the next room inby.



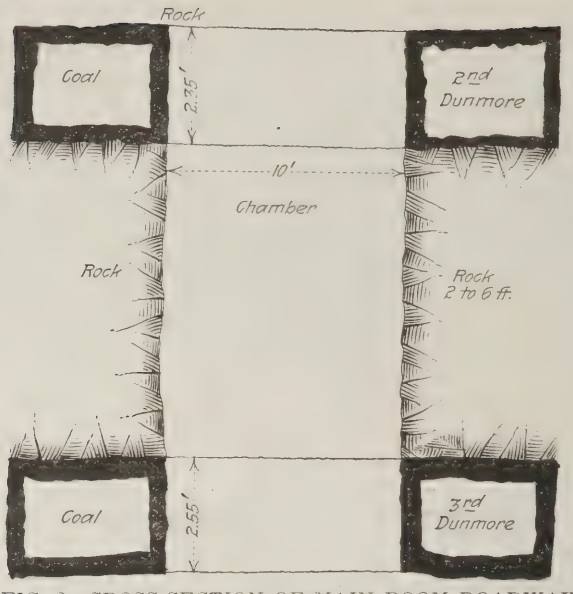


FIG. 2—CROSS-SECTION OF MAIN ROOM ROADWAY

The roadway is driven through the coal of both beds and the rock is between them. This is done, however much rock there may be in the parting. The lower seam is the Third and the upper seam is the Second Dunmore. In some parts of the field the Second and Third Dunmore beds are one, but in the Forest City section the parting has become so big that they are regarded as two separate seams.

methods the coal companies are using to extract these thinner seams.

The Pennsylvania Coal Co. and its sister corporation the Hillside Coal & Iron Co., have done much experimenting in this direction, and this article will deal with the mining of the Second and Third Dunmore beds at the Gray Slope of the Forest City Colliery of the Hillside Coal & Iron Co.

Both beds lie comparatively flat. The Second Dunmore bed is 2.35 ft. thick and the Third Dunmore seam is slightly thicker, and will average 2.55 ft. in thickness. A parting of rock from 2 to 6 ft. in thickness lies between the two beds.

About every 500 ft. a heading and airway are turned at right angles to the main roadway and a pillar of not less than 50 ft. is left between each heading and its airway. This, it is true, is only the theory of operation, for, owing to the irregularity of the level of the coal seam, it cannot be followed strictly. Instead the heading and airway are driven along the contours of the coal or slightly uphill, so that the water in them will be self-draining. Consequently the pillar between the heading and airway may be greater than 50 ft., but in no place is it allowed to be less than that. In driving the heading and airway the parting is taken down, and the height of the heading is that of the thickness of the two beds of coal plus that of the parting. Sufficient coal is taken from the bottom bed to allow all the rock encountered to be gobbed in the excavation made in that seam except in some cases where it is thought advisable to haul the rock to the surface.

From the pair of headings, chambers are driven on 50-ft. centers and extended till they come within 25 ft. of the airway of the next parallel set of headings. These chambers are only from 10 to 12 ft. wide, in the Second Dunmore bed as is shown in Fig. 1. They are driven in both the Second and Third Dunmore beds, the rock parting between the seams being removed to a width of 10 to 12 ft. and the Third Dunmore bed being widened in the coal to a depth of at least 25 ft. Fig. 2 shows a cross-section of the two beds of coal and the dimensions of the roadways.

As the latter are driven up, sufficient coal is taken out of the Third Dunmore bed to provide for the stowage of rock from the parting between the beds. If in order to gob the rock it is not necessary to remove all the coal between the roadway and the center line of the pillar the space that is needed is not provided along the line of the roadway but in wide crosscuts driven through the pillar. The work in the Third Dunmore bed is delineated in Fig. 1 by broken lines. In shooting the coal care is taken to place the shot so that it will throw the coal in the direction of the track, which thus will need only a minimum of handling.

The rock parting thus filled into the voids of the lower bed acts as a support for the one above. In Fig. 4 it will be noted that in some places it was necessary to remove all the coal from areas as large as 200x350 ft. in order to provide adequate space for the gobbing of the rock parting.

FIG. 3

Second Mining, Upper Bed

This also shows a large area where first mining alone has been done. It will be noted that all the coal ultimately is taken out and that in the first mining only 20 per cent is removed. This coal is relatively easy to load as it lies well above the top of the mine car.



FIG. 4

Second Mining, Lower Bed

This shows how complete is the extraction of coal. In the whole area shown all the pillars have been extracted except along airways and haulageways which have to be maintained for future work and a line of pillars along a room road which is being used as a subsidiary roadway. The area, however, includes some first mining, and that accounts for some of the pillars.



When the chambers are driven to their limit, second mining can be started, but usually nothing further is done until eight or nine rooms have been driven their full length. In the second mining all the coal in the Second Dunmore bed is removed and loaded into mine cars. As these are below the level of the coal in this upper bed, the difficulty of loading is reduced and simplified, for the coal can be shoveled into the mine cars without being lifted from the bottom. As second mining progresses the coal that was left in the pillars on the first mining of the Third Dunmore bed is removed and loaded out. This coal is handled with more difficulty, for the top of the mine car is above the top of the Third Dunmore bed. This coal in many cases has to be reshoveled. This pillar-drawing operation continues until the pillars are drawn back to within 25 ft. of the heading. Fig. 4 shows the area of coal removed in the second mining of the Third Dunmore bed and Fig. 3 shows that extracted from the Second Dunmore bed.

The roof above this latter bed is allowed to cave, but the rock packing in the Third Dunmore bed tends to hold up the rock parting. Thus the total settlement is much reduced. It is the intention ultimately to pull back the pillars left to support the headings and airways.

By this method of mining all the coal from two thin beds is loaded out and none lost except by spillage. By the mining of these two beds of coal the production of the Forest City colliery is maintained and its stand-by charges per ton thereby reduced.

Dangers in Shaft Mines and Their Cure

"LESSONS from the Granite Mountain Shaft Fire," by Daniel Harrington, Bulletin 188 of the U. S. Bureau of Mines, 50 pp., is a remarkable record of a mine fire, its disastrous results and its important lessons. It is a welcome addition to the literature of fire handling and prevention. The Bureau of Mines does not usually publish reports such as these, but in this instance the North Butte Mining Co. consented, not unwillingly, to have all the details made public for the benefit of industry. To this public-spirited act the mining fraternity is greatly indebted. A well-managed mine was greatly damaged and, worse yet, 163 men were killed by this fire due to a misfortune in the handling, perhaps even to the ill-handling, of an electric cable during installation.

The book recommends that not only hemp lashings but a positive clamp also be placed on a cable when it is being lowered, even if the clamp should crush and destroy the length of cable occupied by that fastening, the placing of cables in boreholes, the latter to be drilled in ground that will not move and to be reached for support and supervision at the several levels by cross roadways, shut off by airtight doors. If boreholes are not used the cable should be put in a downcast shaft. If the cable in an upcast should fire, the fan should be reversed so as to exhaust the gases from the cable to the open air. The hoisting shafts should be lined with concrete and, if sliding ground renders this impracticable, all timbering should be coated with cement, a cement gun being a suitable method of performing that work.

Connections should not be made between mines except for drainage and fire extinguishment. Where made they should be closed by steel or concrete on concrete frames and with edges sealed with concrete. Doors should not be hung inside concrete frames where movement of the measures may make them inoperable. They should be hung so as to lay flush against the smooth surface of the concrete frame. Other advice given relates to signboards, making doors which will not open when the ventilation is reversed, double doors, signboards, maps, leakage of gas through doors, signals, fire protection, fire warnings, organization of rescue work, the building of safety chambers by men imprisoned and so forth.

THE COLLECTION OF SAMPLES from tipples for the various coal exchanges, performed by the Bureau of Mines, showed the need of a portable coal-crushing and sample-reducing plant to obtain mechanically a laboratory sample from the gross sample. A sample crushing plant mounted on a Ford truck has been constructed and will be tried out in connection with the fuel-economy survey now being conducted in the District of Columbia, and any defects found in the apparatus will be remedied.



Problems of Operating Men

Edited by James T. Beard



Standard Rule for Estimating Available Tonnage Per Acre

Need of Standard Rule in Estimating Acre Tonnage —Percentage of Extraction Varies in Each Case—Percentage of Screenings Also Variable

AWHILE ago a question was asked by a Colorado engineer, as to the method of estimating the available tonnage contained in a seam of coal. The answer given by the editor of *Coal Age*, at that time, referred to the common rule of thumb for estimating the tonnage of coal per acre, on a basis of 1,000 tons, per foot-acre, which was later increaesd to 100-tons per inch-acre, in the seam.

This increase in estimating available tonnage was owing to improved methods of mining giving a larger percentage of extraction. The question was brought up again by another inquirer, Dec. 14, p. 961, who referred to certain tables giving the tonnage of coal underlying an acre of land, for varying thicknesses of seam.

Since reading the explanation given in answer to this second inquirer, it has occurred to me that there is no good reason why we should not have a standard rule for estimating the acre-tonnage of coal. For example, the old rule of thumb makes no allowance for percentage of extraction and amount of screenings, as it can hardly be assumed to refer to mine-run coal.

Formulating a Standard Rule

In seeking for a standard rule, let us assume the weight of bituminous coal underlying an acre of land, in a flat seam, as stated in the reply, will average 1,800 short tons per foot-acre. Also, it is assumed that the same weight expressed in long tons (2,240-lb.) is the average for anthracite coal, per foot-acre. It is difficult to understand, however, why anthracite coal is always estimated in long tons, in the mining of the coal. To the consumer, a ton of this coal is 2,000-lb.

Now, taking the basis of computation for average bituminous coal as 1,800 short tons, per foot-acre; or 1,800 long tons of anthracite, per foot-acre, it should be easy to multiply this weight by any assumed percentage of extraction, which would give the possible available tonnage, per foot-acre, assuming mine-run coal. For screened coal (lump) there should be another deduction allowing for the percentage of screenings. This, to my mind, would give a good standard rule for estimating acre-tonnage in a flat seam. As has been stated, if the seam is inclined, this result must be divided by the cosine of the angle of inclination.

Apparently, there is a great deal of bunk in connection with the coal trade, not alone in items of this kind, but in others. For instance, there is a very acute shortage of cars throughout the coal fields of America at this time, though it is not clear whether this affects the anthracite field.

Again, whenever there is a holiday, great stress is laid on the loss of tonnage by reason of the holiday. Now, if a mine receives but two supplies of cars a week and loaders are idle half the time, how can an occasional holiday have any serious effect on the result?

Many other kinds of bunk are being put over in these times. Indeed the instances are so numerous that the period from the beginning of the great war till now might well be called the "Age of bunk" and people who are chiefly concerned in the results that follow might well be classed as "bunkers."

J. F. Healy, Chief Engineer,
Omar, W. Va. Main Island Creek Coal Co.

Still Mine Disasters Continue

Recent mine disasters call attention to need of more stringent laws—Responsibility for conditions in Pennsylvania—Increasing safety in mines.

IT IS painful to be reminded, by the frequent recurrence of mine disasters, that there is something lacking in our administration of affairs in the operation of the mines. Following every great disaster, investigation places the blame on someone's disregard of rules and regulations, or emphasizes the need of greater stringency in our mining laws.

Whatever the reasons given for these occurrences, we are compelled to take the stand that the lives of brave men have been sacrificed and widows and orphans left without material support. I am not going to refer here to explosions in Alabama, Illinois or any state other than of our own Pennsylvania.

According to the most recent report of the explosion at the Reilly Mine No. 1, Spangler, Pa., which occurred Nov. 6 1922, seventy-seven lives were lost. The question comes home to us, Why could not this terrible disaster have been prevented?

Does the Pennsylvania Law Invite Disaster?

While I agree with the decision reached by those who investigated that disaster, and placed the blame for the occurrence on the shoulders of the mine owners and the management of the mine, the fact remains that there was no violation of the law. Under the revised mining statutes of Pennsylvania, the mine operator is made the supreme judge of what is safe and what is unsafe in the operation of the mine.

In my opinion, this feature of the Pennsylvania law invites mine disasters, inasmuch as it authorizes every mine superintendent to follow his own sweet will or, in other words, to do as he pleases in the selection of a competent mine foreman, to take charge of his mine.

Viewed from another angle and considering the responsibility of the State Department of Mines and its staff of state mine inspectors, one is led to ask, Why did not this branch of the government act in its capacity to safeguard the Spangler mine? The answer would seem to be that the Department of Mines could only act in an advisory manner, the authority of the mine superintendent being supreme, in the eyes of the law.

Would that this disaster could teach us a lesson and cause the enactment of a law that would properly safeguard the work and insure the largest percentage of extraction of the coal. In plain words, the weakness of the Pennsylvania law is responsible for the Spangler disaster.

In concluding, allow me to ask one or two questions that I would like to see presented for the consideration of readers of *Coal Age*, in the hopes of getting expressions of their opinion.

1. In what respects can our state mining laws be improved? 2. Should firebosses and safety inspectors be employed by the company or by the state or federal government? 3. Can mine explosions be prevented and, if so, by what means? C. W. ATKINS

Parnassus, Pa.

Improved Status of Company Stores

Former dissatisfaction replaced by growing popularity —Better business methods employed—The mine foreman a booster for the store.

NOT many years ago, it will be remembered, the company store and everything connected with it was particularly distasteful to the average miner. That this individual was, in most cases, a bad business man and prone to regard the store where he did his trading as one of the "pluck-me" type cannot be denied.

To overcome these hindrances has required much study of human nature and the exercise of diplomacy on the part of the store manager. As a result, however, much of this former dissatisfaction has been steadily disappearing and trading at the company store is now, with few exceptions, more than ever popular.

One thing that has contributed to this condition is the fact that the wise manager is learning how to help the miner, by insisting on better business methods between the store and the miner's family. Again, on the other hand, the store manager is learning that it pays him to compete with the outside stores, in his neighborhood, by keeping on hand a small line of the "cheap-John" goods.

These cheaper goods serve their purpose well by enabling the customer to compare their quality and price with goods of a more substantial make. There are few customers but who wisely conclude that money will be saved by buying the better grade of merchandise at a slightly higher price.

Putting the Store on a Paying Basis

Only recently, I became much interested in a young fellow who had undertaken the job of putting seven very unpopular company stores onto a paying basis. Knowing that I came into daily contact with many successful store managers, he assumed that I could give him some valuable points in reference to getting the miners to patronize these company stores.

In response to his many inquiries, I unfolded to him how many successful stores had come into their own. In this respect, one of the chief points to be emphasized, I assured him, was getting on good terms with the mine foreman. At times, that individual would look for some return favor, in proportion as he was able to boost the trade among his men.

A little talk along this line convinced my friend that it would be good policy to grease the way; and the trial that he made, a little later, proved his conclusion correct. Many mine foremen, in loyalty to the company's interests expected nothing in return for their efforts on behalf of the stores. Others became boosters, through the application of a little grease.

Though the plan has been working but a comparatively short time in these stores, the new manager informed me a while ago that he is sure that more has been accomplished through the mine foremen than he could ever have hoped to accomplish himself. In my opinion, he is quite right and the greasing of an occasional foreman was merely a business proposition when it became necessary.

Speaking of ways of improving mining practice to which reference has been made by some recent writers, in *Coal Age*, it appears to me that the company-store proposition comes in for its share of careful consideration. It does not pay any company or management to attempt to run a company store, unless it can hold its own in competition with other similar stores, both in respect to prices and quality of goods.

In some instances, to my knowledge, inducements have been offered mine foremen, by outside stores, to secure their goodwill and get them to trade there. However, any foreman who will use his good offices, in favor of an outside store, in preference to the store operated by his company, is guilty of disloyalty to the company. GEORGE EDWARDS.

Pikeville, Ky.

Personal Touch in Management

Influence of management on accident rating—Observations on visit to mine—Capable management and working plan—Power of personal touch.

FROM time to time, in *Coal Age*, different writers have referred to the effect produced by a few kind words and expressions of appreciation on the part of the management, in the daily operation of a mine. I have been deeply impressed with the same thought which conforms to my own observation.

A few months ago, I visited a mine that had always enjoyed a wonderful accident record. No fatalities had been reported from that mine for many years. Whenever a visitor alluded to that fact, the old boss would simply answer that he only employed experienced workmen. That he claimed would account for the absence of fatal accidents in the operation of the mine.

It always seemed to me that another factor has played a part in reducing the accident rating in that mine. However, there is now an opportunity of testing the truth or accuracy of the claim set forth by the foreman. Some time ago, the mine experienced a long strike and was finally compelled to resume operations with workmen having little or no mining experience and training.

Seven months have since passed and the results seem to prove that my surmise was correct. The records still show that they have been able to operate without special injury to any of their employees. The natural conclusion is that, as I had thought, there was something in the management of the mine that was more responsible for the safety of the workmen employed, than the experience and training of the men themselves.

Turning the matter over in my own mind, I have been asking myself, Why do accidents continue to occur at some mines and not at others working the same seam and under similar natural conditions? My conclusion is, there are two responsible factors—capable management and the adoption of a proper working plan.

Just here, let me make an allusion that, at first may not seem to be relevant. We hear of horse races being won owing to the peculiar ability of the jockey to keep in touch with the animal he rides and to whisper the proper word of encouragement when the horse's best efforts are needed.

Turning now from the jockey to the mine management, I have wondered if there is not such a thing as "touch," in the handling of difficult situations, when the best efforts of mine workers are needed. It is my belief that the speaking of the right word at the right moment has often won the day in mine management.

An instance that comes to my mind just now is one in which the management of a large corporation is of the most unassuming brand with which I have ever come in contact. The quiet consideration of all matters would appear to be the most noticeable characteristic. This feature is so sadly lacking in other large mining operations that in the case mentioned, it attracted my attention most forcibly.

Frequent visits to the place showed me that extra efforts were being made, at no small expense, to insure discipline. Believing that a bad practice once started was hard to stop, the management had placed in the hands of every employee a copy of the company's rules.

Special attention was given to see that each worker became familiar with the general plan of operations, and his efforts were carefully supervised and his work inspected to see that he complied fully with the regulations and practice of the company.

In all my experience, which includes five years in the coke regions of Pennsylvania, I have never seen better timbering of the working places and better roads, or a more thorough distribution of supplies than was observable in that mine. Evidently, the management was in close touch with the situation in every branch of the work. As a result, there was no confusion and everything moved smoothly and quietly.

Pikeville, Ky. GEORGE EDWARDS.

Inquiries Of General Interest

Reading Water Gages in Mines

Three Types of Water Gages—Differ Only in Graduation of Scale — Purpose of Water-Gage Readings in Mining Practice

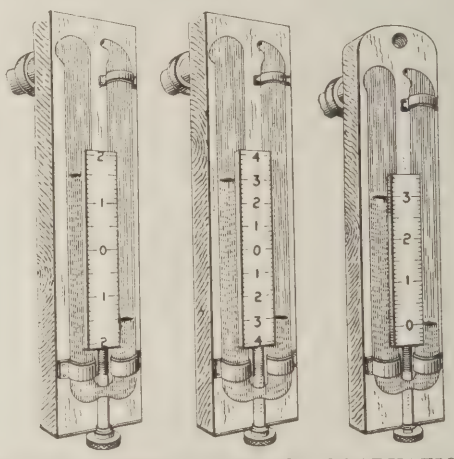
RECENTLY we have been having considerable trouble in obtaining a satisfactory reading of the water gage in our mine. The gage is quite different from the one I have been accustomed to use in other mines. The general form of the gage is the same as other gages that I have used, consisting of a bent glass tube mounted on a wooden frame and having a scale graduated in inches.

The attempt to read this scale in our mine caused some dispute, which we have been unable to settle. I want to ask, If the water level is down one inch in the intake arm and up one inch in the return arm of the gage, does not this make a reading of two inches of water gage? But the scale on our instrument does not read two inches.

In my opinion, the measurement between the two water levels, taken with an inch rule, should show the correct water-gage reading. What puzzles me, however, is the fact that the scale does not read but half this amount, either at the upper or the lower level. Kindly explain where the trobule lies and how this scale must be read? FOREMAN.

McDonald, Pa.

There are three types of water-gage scales. As shown in the accompanying figure, two of these scales have the zero at the center and read both up and down. The third type, shown on the right of the figure, is by far the more common one in use. This scale has the zero at



SHOWING THREE STYLES OF GRADUATIONS

the bottom and reads upward, being graduated in full-length inches. The inconvenience of this scale is the fact that it must be set after the water gage is in position. By means of the adjusting screw, the zero of the scale is brought to correspond with the lower level. The reading of the upper water level is then the correct reading of the gage.

NO ADJUSTMENT AFTER GAGE IS IN POSITION

The advantage of having the zero in the center of the scale, as shown in the two gages on the left of the figure, is that no adjustment is needed after placing the water gage in position. Before doing so, however, it is important to adjust the scale so that its zero corresponds with the water level in both arms of the gage.

The scale on the left of the figure, like that on the right, is graduated in full-length inches. Therefore, in reading this scale, it is necessary to take the sum of the two readings or twice the reading at the upper or the lower level. These two readings should correspond, if the scale has been rightly adjusted before being placed in position, as the fall of the water level in the intake arm is always equal to the rise in the return arm of the gage.

Now, in order to overcome the necessity of taking the sum of the two readings or twice either of them, the scale shown in the center of the figure is graduated in half-length inches, so that the reading at either the upper or the lower level is the true reading of the gage. Many prefer this form of scale as being the most convenient for use in practice. There are some, however, who prefer the scale shown on the right, as giving the exact measurement between the two water levels, in inches. All of the scales shown in the figure read three inches of water column.

Examination Questions Answered

Mine Foremen's Examination Lexington, Ky., 1922

(Selected Questions)

QUESTION—*Butt entries are turned off to the right and left of the main heading every 300 ft. Assuming a block of coal 2,000 ft. long and 300 ft. wide, the height of the seam being 4 ft. and the coal having a specific gravity or weight of 80 lb. per cu.ft.; if it is necessary to take down 2 ft. of top on all entries, at a cost of $2 per yard, what will be the cost per ton-yard to extract this entire block of coal?*

ANSWER—Assuming the main headings are driven three abreast, 10 ft. wide and extend the entire length of the block, while the cross-entries are driven in pairs, there will be 2,000 yd. of top to be taken down in these three headings. Deducting 30 ft. for the combined width of the headings leaves a total of 270 ft. or 90 yd., for each double pair of cross-entries turned right and left from the main heading. We will assume five double pairs of butts or cross-entries. Each double pair will require $2 \times 90 = 180$ yd. of top to be taken down; or $5 \times 180 = 900$ yd. of top on the cross-entries, making a total of 2,900 yd. of top on the main headings and butts. At $2 a yard, the taking down of top will be $2 \times 2{,}900 = \$5{,}800$. Again, assuming a 90 per cent extraction of the coal, in this block 4 ft. thick and 2,000x300 ft. in section, the coal weighing 80 lb. per cu.ft., gives a tonnage of $0.90 \times 80(4 \times 300 \times 2{,}000) \div 2{,}000 = 86{,}400$ tons. We understand this question as asking for the cost of yardage, in taking down topping, per ton of coal mined, which is $5{,}800 \div 86{,}400 = 0.067$, or 6.7 cents per ton of coal mined.

QUESTION—*What is the weight of 100 cu.ft. of air, at a temperature of 60 deg. F., the barometer being 30 inches?*

ANSWER—The weight of dry air, at a given temperature and barometric pressure, is calculated thus

$$W = 100\,\frac{1{,}3273 \times 30}{460 + 60} = 7.65\ lb.$$

QUESTION—*A five-inch pipe line on a slope of 45 deg., has a length of 480 ft. and is full of water. How many gallons of water is in the pipe?*

ANSWER—Assuming the diameter of the pipe is 5 in., its sectional area is $0.7854 \times 5^2 = 19.635$ sq.in. Then, since the volume of a gallon is 231 cu.in., the number of gallons in this pipe, 480 ft. long, is $(480 \times 12 \times 19.635) \div 231 = 489.6$ gal.

QUESTION—*The ventilator produces 60,000 cu.ft. of air per minute in a mine, what volume of air would you expect to find at the working face, and how many men would you employ to conform with the law?*

ANSWER—Assuming the stoppings were well built and the air current divided so as to properly distribute the air in each section of the mine, the volume of air reaching the working faces should not fall below, say 55,000 cu.ft. per min. With this volume of air sweeping the working faces and allowing 100 cu.ft. of air, per man, per minute, to comply with the state mining law, the number of men employed may be 550.

QUESTION—*What special attention should a mine foreman give in the drawing of room and entry pillars?*

ANSWER—For this work, the foreman should employ only experienced miners. Before starting the work in any particular section of the mine, he should study carefully the conditions in respect to possible damage on the surface, inflow of water into the mine and the probable effect produced on adjoining workings. No pillars should be withdrawn until all the coal to be reached in that section has been taken out. The line of pillarwork should be kept as straight as possible, in order to avoid excessive roof pressure on the ends of any one of the pillars. It is important to see that the miners are kept supplied with what timber is needed to make them safe. The work should be carefully supervised by the foreman and his assistant and the falls should be examined daily for gas.

QUESTION—*What maps should be kept at the mine? What data should be shown thereon and how often should an extension be made on said map? If the map is drawn to a scale of 100 ft. per inch and the main heading, as measured on the map is 6 ft., what is the length of the entry in the mine?*

ANSWER—There should be kept at the mine, an accurate map showing the general plan and extent of the workings, together with the buildings and natural features on the surface and the boundary lines of the property. The elevation of many important points on the surface and in the mine should be marked on the map, which should also show the position of any drill-holes, giving the depth of hole and the thickness of coal in each. The map should be extended twice a year, by making an extension survey in the mine and marking this on the map, giving the date of the survey and the thickness of the coal at the working faces and at different points in the mine.

The scale of the map being 100 ft. per inch, a map measurement of 6 ft. would represent an actual distance of $100 \times 6 \times 12 = 7{,}200$ ft. of entry in the mine.

QUESTION—*What precautions would you adopt to reduce to a minimum the production and distribution of coal dust in a mine?*

ANSWER—In the first place, if the coal is blasted, only permissible explosives should be used, taking due care that the limit of charge is not exceeded in any one shot. Every shot should be carefully inspected by a competent person appointed for that purpose. A better plan is to have all holes drilled by the miners examined, charged and fired by shotfirers after the men have left the mine. Shotfirers should be authorized to refuse to fire any shot that, in their judgment, is unsafe. All fine coal and dust should be loaded out in dustproof cars and no accumulations of dust allowed at the working face. Strict rules and regulations should be adopted and enforced with suitable penalties, in respect to blasting, defining the kind and weight of powder to be used and the tamping of the holes.

QUESTION—*What points in a hoisting plant should be examined and how often, to insure yourself they are in a safe condition, in shaft openings?*

ANSWER—All hoisting equipment, including ropes, couplings, sheaves, brakes, winding drums and engines should be examined carefully, each day, by a reliable man appointed for that purpose and who should make any needed repairs that have to be made.

Resigning from Nationalization Committee Brophy Charges Lewis with Evasion

John Brophy resigned as chairman of the Nationalization Research Committee of the United Mine Workers of America, in a letter to President John L. Lewis, dated Feb. 5. In his letter of resignation Brophy demands that Lewis come out openly for nationalization of the coal mines, appear before the U. S. Coal commission and in public during the next eleven months and speak for nationalization before the miners and open up the columns of the *United Mine Workers' Journal* to a discussion of the question.

Mr. Brophy's resignation comes two weeks after that of C. J. Golden, who retired from the Nationalization Committee when Ellis Searles, editor of the *Mine Workers' Journal,* in a statement said that the Nationalization Committee's report was inspired by a radical element in New York and had not been officially adopted by the miners' convention. Brophy's letter follows:

"I submit my resignation as chairman of the Nationalization Research Committee of the United Mine Workers of America. We have done our job. We have drawn up a concrete plan for nationalizing coal.

"Recent events have made plain to you and me as to every other miner that nationalization is the master current of the United Mine Workers of America. The tide gathers volume and will sweep irresistibly into the next International Miners' Convention in January, 1924. Who is the King Canute that will sit on the beach and tell the tide to quit rising? It will splash him and float away his chair of office. The miners are feeling the power of an idea, and they see the driving force of a detailed plan.

"The International Miners' Convention of 1921, and you, as president, outlined the duties of our committee. You bade us familiarize ourselves with the problem by 'consulting with authorities'; you asked us to formulate a 'detailed practical policy to bring about the nationalization of the coal mines.' And you ordered us to 'aid in the dissemination of information among our members and the public.'

"We could not better your instructions, because they are all inclusive. But we fulfilled them with results that surpassed our hopes. We consulted miners, labor men in other industries, economists, statisticians, government officials, lawyers, administrators, technicians, engineers—every type of expert opinion. In accordance with your order we drew up the plan as the result of this prolonged investigation. The only other ways of making the plan would have been to let it drop into our mind as a perfect abstraction from a timeless world, or else to turn over the job to some group of professional liberals and let them project a theory.

"We did neither. We preferred the method of hard work and expert advice. We have presented the American plan for nationalizing coal in a pamphlet, 'How to Run Coal,' in which every detail is hammered home and the full union strength and bargaining power of the United Mine Workers of America are maintained and safeguarded for all time. Your committee challenges critics of the plan to point out a weak place. The only possible opponents of the plan are those who are opposed to the principle of nationalization. All such opposition we desire to locate and to face in the open. We offer the American plan for nationalization as the only adequate solution for the present chaos of coal. We submit that in it we have met your conception of our duties.

"As to the disseminating information 'among our members and the public,' we have obeyed your orders. The miners' American plan for nationalization has been published in newspapers throughout the country. Editorial comment is almost universal. Every prominent union official is being flooded with inquiries.

"The time has come for a united front and a spirited advance. Will you as a leader give us the lead?

"Will you throw open the *Mine Workers' Journal* to our plan? The newspapers of the country are willing to devote columns to our findings, but our own official organ refuses to carry a paragraph. The editor, Ellis Searles, attempts to discredit our efforts by using a 'Red' herring. Our plan was not 'in part prepared for the committee by some well-known New York radicals.' They would be the last to claim any connection with the matter under discussion, because the facts reveal their innocence. To permit outside organizations to butt into labor policy is the destruction of trade unionism. The methods of the Nationalization Research Committee, in preparing a case, have been the same as your own methods—no recognition of outside organizations in union affairs, consultation with individual experts on details, a trade union decision on policy.

"Will you mail copies of the American plan to the 600,000 union miners? If the plan does not embody their aspirations in concrete form this test will kill it. Replies we have received from miners in every coal district of the United States show that the plan is the answer to their unrest and the rallying point for the larger policy of the union.

"Will you urge upon the officials of the twenty-six districts of the United Mine Workers of America a powerful intensive campaign of education, district by district, in support of nationalization?

"Will you appear before the coal industry Fact-Finding Commission in support of the miners' nationalization plan?

"Will you take the platform in behalf of nationalization in miners' meetings and public meetings, through these next crucial eleven months?

"Will you aid in drawing up a bill for nationalization, to be presented at the next international convention? We can promise you support from the rank and file, and an overwhelmingly favorable vote.

"These are six important next steps in the miners' program. The coal operators are discredited and defeated in the court of public opinion. The public is disgusted by the overdevelopment, mismanagement and waste of the coal industry, and is ready for a large-scale solution.

"The miners are determined. The movement waits on you. But it will not wait long for any leader. It will create its own leaders.

"Hampered by the silence of the *Mine Workers' Journal* and by the lack of hearty official support, our Nationalization Research Committee hereby appeals directly to the rank and file. We have done the work you ordered, but we have not received the support you promised. We shall continue to carry on the work outlined in the American plan. We shall demand speeding up the campaign for nationalization in the ways specified in this letter. We enter the last stages of this fight, which will end victoriously in the International convention not as a committee but as miners representing the rank and file.

"So I submit my resignation as chairman of the Nationalization Research Committee. And I urge you, as International president, to aid the miners in their American plan."

Sees Opportunity for Big Work by I. C. C. In Assigned Car Case

An opportunity to do big, constructive work is presented to the Interstate Commerce Commission in the assigned-car case, it is declared by attorneys for the Southern Ohio Coal Exchange, in a brief which they have submitted to the commission. In their proposed rules the carriers, says this brief, have assumed that because the commission has recognized their need for a fuel supply, they can obtain that supply regardless of the manner in which it is transported. A paragraph from the brief reads as follows:

"Constantly recurring miners' strikes arising from insistent demands for higher wage returns; the yearly runaway coal markets arising from fear of inadequate coal supply, or inability to transport the product, are matters that vitally concern the public. The outstanding cause for this unrest and uncertainty in the coal business is the preference that is given certain operators through the assigned car as now used by the railroads. That cause the commission has power to correct. Having the power, we respectfully and earnestly insist that we have shown that there is need for its exercise if the conditions that annually vex the coal business of the country are to be changed for the better, and the recurring agitation and unrest ended."

New York Wholesalers Seek Reduction of Freight Rates to Tidewater

Efforts are being made to enlist the members of the Wholesale Coal Trade Association of New York, Inc., in a movement the purpose of which is to present arguments to the Interstate Commerce Commission in favor of a reduction of freight rates to tidewater, reducing or abolishing the "trimming charge" and to recover from the railroads the difference between what should have been charged under the increases authorized and the higher rates which were put into effect, as well as recovering the "trimming charge."

The circulars have been mailed to all members of the association by Charles S. Allen, its former secretary, explaining the purpose of the movement. In his report to the Board of Directors of the association Mr. Allen says that in 1918 the Railroad Administration by its General Order No. 18 advanced the rates on practically all commodities 25 per cent, but saw fit to discriminate in the adjustment of rates on tidewater coal in such a manner that the increase amounted to about 28½ per cent as follows:

	Original Rate	28½ Per Cent Increase	25 Per Cent Increase	Overcharge
Clearfield	$1.65	$2.15	$2.09	$0.06
Greensburg	1.75	2.25	2.19	0.06
Westmoreland	1.90	2.40	2.34	0.06
Pittsburgh	2.05	2.55	2.49	0.06

In 1920 by ex parte 74, the Interstate Commerce Commission granted an increase of 40 per cent, says Mr. Allen, and in applying the 40 per cent increase, but not in the manner directed by the commission, there was produced a set of rates which returned an increase of 43.6 per cent on the then improper rates in the $2.15 scale, as follows:

	Base Rate	43.6 Per Cent Increase	40 Per Cent Increase	Overcharge
Clearfield	$2.15	$3.11	$3.05	$0.06
Greensburg	2.25	3.21	3.15	0.06
Westmoreland	2.40	3.36	3.30	0.06
Pittsburgh	2.55	3.51	3.45	0.06

Mr. Allen contends that the association can successfully establish before the commission that the scale of rates beginning with $2.15 from the Clearfield region was an improper basis for the 40-per cent increase, but that the scale beginning with $2.09 should have been used, in which case rates would have been produced as follows:

	Base Rate	40 Per Cent Increase	Rates as Published	Overcharge
Clearfield	$2.09	$2.97	$3.11	$0.14
Greensburg	2.19	3.07	3.21	0.14
Westmoreland	2.34	3.22	3.36	0.14
Pittsburgh	2.49	3.37	3.51	0.14

The claim also is made that under the order issued by the I. C. C. in 1922 and popularly referred to as a 10-per cent reduction in rates, the order really provided that where the previous order had authorized an increase of 40 per cent that increase should be reduced to 26 per cent. The figures produced by that order are as follows:

	Base Rate	26 Per Cent Increase	Rates as Published	Overcharge
Clearfield	$2.15	$2.73	$2.74	$0.01
Greensburg	2.25	2.83	2.84	0.01
Westmoreland	2.40	2.98	2.99	0.01
Pittsburgh	2.55	3.13	3.14	0.01

With respect to the 40-per cent increase, Mr. Allen contends that the proper base rate should have been the $2.09 Clearfield scale, producing figures as follows:

	Base Rate	26 Per Cent Increase	Rates as Published	Overcharge
Clearfield	$2.09	$2.66	$2.74	$0.08
Greensburg	2.19	2.76	2.84	0.08
Westmoreland	2.34	2.91	2.99	0.08
Pittsburgh	2.49	3.06	3.14	0.08

In referring as to how the new rates were arrived at, Mr. Allen says it is significant that in the application of the 25 per cent (28½ per cent) increase, in 1918, the carriers used the Pittsburgh rate as the basis; that in 1920, when the 40 per cent (43.6 per cent) increase was made, the Westmoreland rate was used; and, in 1922, when the so-called reduction of 10 per cent (26 per cent increase) was made, the Greensburg rate was used as the base, the rates from the other regions being arrived at in each instance by either adding or deducting the previously fixed differentials.

The present rate, he says, beginning at $2.74, are 8c. per ton more than they should be. Add to that the unwarranted "trimming" charge of from 3c. to 8c. per ton, and shippers using these rates are now compelled to overcome a disadvantage of at least 11c. per ton.

Taking the most unfavorable aspect of the case, namely, that the commission will not agree to the contention that the base rate for the 40-per cent increase should have been the scale beginning with $2.09, but rather should have been that beginning with $2.15, shippers would be entitled to a refund of 6c. per ton, plus the trimming charge.

Lehigh Valley Files New Segregation Plan

The modified plan for the segregation of the coal and railroad properties of the Lehigh Valley Railroad Co., as ordered by the United States Government, was on Feb. 7 filed in the District Court of the United States, Southern District of New York. Hearings on the plan will, it was said, be held some time after Feb. 15.

The plan was filed through E. H. Boles, counsel for the railroad company, and other signatures are F. W. Wheaton, counsel for Lehigh Valley Coal Co. and Coxe Brothers & Co., Inc., and George W. Field, counsel for Lehigh Valley Coal Sales Co.

Although the modified plan was changed in several particulars from the original one, there is a likelihood that further minor changes will be made in view of the fact that Attorney General Daugherty stated a month ago that while the revised draft was in the main satisfactory, he would offer to the court a few "wholesome suggestions."

The plan provides that its stockholders shall have the right to subscribe for certificates of interest in the ownership of the Lehigh Valley Coal Co. at the rate of $1 per share, on the basis of one certificate, equivalent to one share of no par value, for each share of railroad stock owned.

Capital stock of the coal company at present is pledged under the railroad company's general consolidated mortgage and on that account it is necessary to distribute certificates of interest instead of actual shares of stock, but these certificates will carry full voting powers, dividend rights, etc. Upon the termination of the mortgage actual shares will be issued for the certificates.

To meet the government's requirements, it is proposed that subscribers for the coal company certificates will agree to dispose of these certificates, if they continue to hold railroad stock, by Dec. 31, 1927. Dividends are to be withheld by the coal company until stockholders have disposed of either their coal shares or their railroad shares. Subscribers to the coal company certificates will not be permitted prior to Dec. 31, 1927, to increase their holdings in either company until they have disposed of their ownership in the other.

To compensate the railroad company for advances made the coal company for capital expenditures, etc., in the past, the coal company will sell $15 000 000 in bonds of a new $40,000,000 issue. Part of the balance of the issue will be used to retire outstanding bonds maturing in 1933, and the rest, estimated at approximately $18,500 000, will be available for improvements by the coal company when occasion demands.

Stock of Coxe Brothers & Co., Inc., pledged under the railroad company's collateral trust agreement, maturing in 1926, in view of the proximity of this date, is undisturbed under the plan, except that the voting power is assigned to a trustee, to be appointed by the district court. A similar arrangement is offered with regard to the stock of the Delaware, Susquehanna & Schuylkill Railroad Co., pledged under the same agreement. The Lehigh Valley, in the meanwhile, will ask the Interstate Commerce Commission for authority to merge this line in accordance with the Interstate Commerce Act.

Bituminous Output Lower Since Jan. 1, But Is in Excess of Consumption

Since the first week in January, according to the report of coal stocks as of Jan. 1 undertaken by the Bureau of the Census and the U. S. Geological Survey, under authority of the Federal Fuel Distributor, the trend in the rate of bituminous coal production has been downward, but the total output during the month was in excess of consumption and stocks increased. Stocks on the Lake docks on Jan. 1, classed as coal in transit, were 3,129,206 tons. Reports from a group of producers indicate that there were nearly 750,000 tons in storage at the mines or at points between the mines and ultimate destinations.

Retail coal dealers' stocks of anthracite on Jan. 1 were considerably more than on Oct. 1, but were less than on any

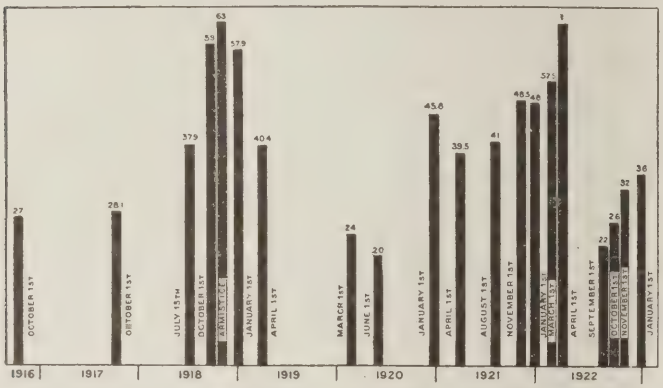


FIG. 1—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO JAN. 1, 1923

Figures represent million net tons and include coal in hands of railroads, industrial consumers, public utilities and retailers. Coal for steamship fuel, on Lake docks, and in transit is not included. Figures for 1922 and 1923 are subject to revision.

corresponding date for which records exist. Stocks of anthracite on the Lake docks were but 13 per cent of those on Jan. 1, 1922.

ESTIMATED TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL
(Net Tons)

Oct.	1, 1916	27,000,000	April	1, 1921	39,500,000
Oct.	1, 1917	28,100,000	Aug.	1, 1921	41,100,000
July	15, 1918	39,700,000	Nov.	1, 1921	48,500,000
Oct.	1, 1918	59,000,000	Jan.	1, 1922	48,000,000*b*
Day of Armistice		63,000,000	March	1, 1922	52,500,000*b*
Jan.	1, 1919	57,900,000	April	1, 1922, at least	63,000,000*bc*
April	1, 1919	40,400,000	Sept.	1, 1922	22,000,000*b*
March	1, 1920	24,000,000	Oct.	1, 1922	26,000,000*bd*
June	1, 1920	20,000,000	Nov.	1, 1922	32,000,000*b*
Jan.	1, 1921	45,800,000	Jan.	1, 1923	36,000,000*b*

a The figures for 1918 in this table are based upon an actual count. Beginning April 1, 1919, the figures are estimates based upon reports from a selected list of 5,000 consumers whose stocks in 1918 bore a known relation to the known total stocks.

b Subject to revision.

c No canvass of consumers was made on this date. The total stock was estimated from the stock on March 1, ascertained by questionnaire.

d Revised from last report.

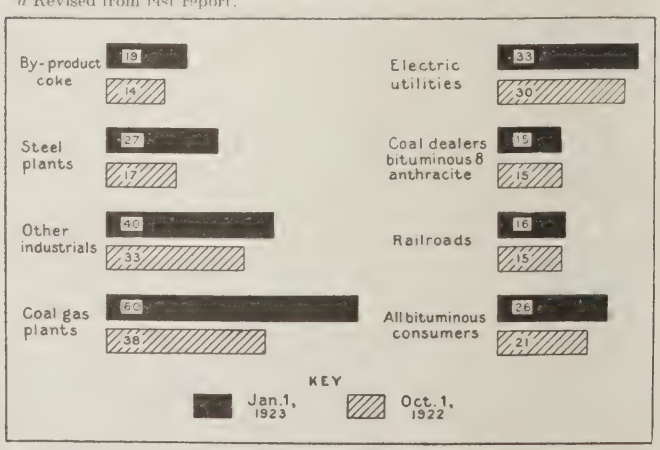


FIG. 2—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON JAN. 1, 1923 AND OCT. 1, 1922

At the rate coal was being burned in November and Deecmber, 1922, the stock of soft coal on Jan. 1, 1923, were sufficient to last 26 days. On Oct. 1, 1922, the stocks were sufficient to last 21 days and on June 1, 1920—when stocks were at the lowest point on record—they were sufficient for only 15 days. There are indications that stocks have continued to increase since Jan. 1.

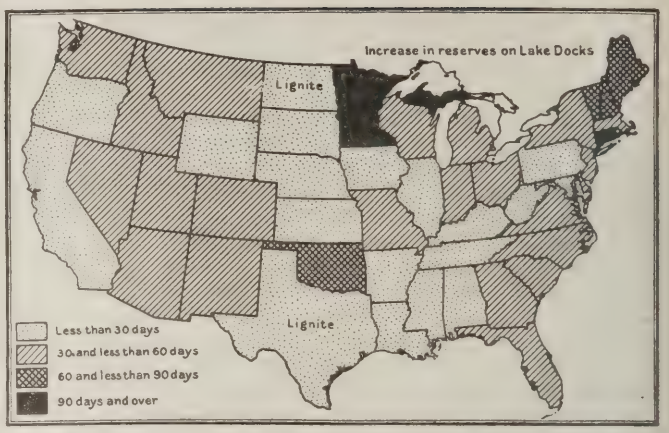


FIG. 3—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON JAN. 1, 1923

At the rate of consumption prevailing in November and December, stocks at industrial plants other than steel and by-product coke would last on the average 40 days. How the supply varied from state to state is shown in the diagram. The darker the shading the heavier were the stocks. Any change in business activity affecting coal consumption would be reflected in the days' supply. Based on reports from 2,265 plants.

From Fig. 1, it is seen that coal flowed into storage much more rapidly during October than at any time since the ending of the miners' strike. During that month stocks increased at the rate of 194,000 tons per calendar day against 66,000 tons in November and December.

Fig. 2 and the table below show consumers' stocks in terms

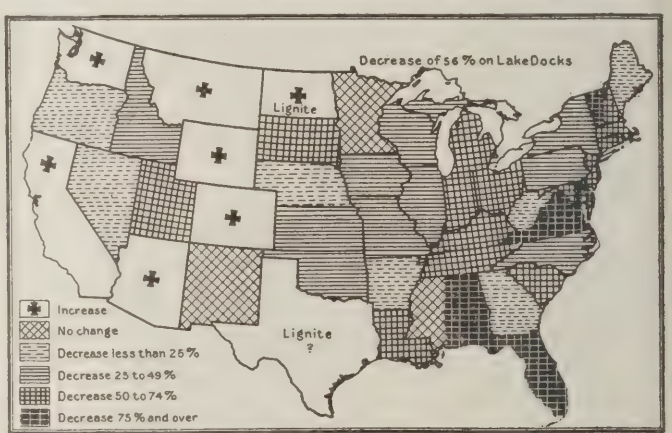


FIG. 4—HOW RETAILERS' STOCKS OF ALL COAL—ANTHRACITE AND BITUMINOUS—ON JAN. 1, 1923, COMPARED WITH THOSE ON JAN. 1, 1922

Stocks of bituminous coal in retail yards on Jan. 1 were approximately three quarters what they were a year ago. Stocks of anthracite were not quite 30 per cent of last year's stocks. The total stocks of retailers—including both hard and soft coal—showed a decrease of 52 per cent when compared with 1922. The map shows that many of the Western States had larger stocks and that the decrease was most accute in the territory east of the Mississippi.

of days' supply, based upon reports of tons on hand and actual consumption received from about 5,000 consumers, so selected as to be fairly representative of all commercial consumers.

DAYS' SUPPLY OF BITUMINOUS COAL IN HANDS OF VARIOUS CLASSES OF CONSUMERS, NOV. 11, 1918, TO JAN. 1, 1923

(Figures represent number of days supply would last at current rate of consumption at time of stock-taking.)

	Nov. 11, 1918	Jan. 1, 1919	Mar. 1, 1920	June 1, 1920	Jan. 1, 1921	Apr. 1, 1921	Jan. 1, 1922	Mar. 1, 1922	Sept. 1, 1922	Oct. 1, 1922	Nov. 1*b*, 1922	Jan. 1*b*, 1922
Byproduct coke plants	35	32	15	8	29	28	42	39	11	14	18	19
Steel plants	45	42	9	11	42	38	48	48	12	17	21	27
Other industrials	71	65	27	24	64	47	51	56	32	33	39	40
Coal gas plants	85	81	31	22	55	66	89	82	34*a*	38*a*	55	60
Electric utilities	49	49	21	22	44	48	51	54	26*a*	30*a*	32	33
Coal dealers, bituminous	37	39	13	10	30	26	33	23	11	18	21	18
Railroads	31	32	11	10	23	24	35	42	13	15	13	16
Total bituminous	45	42	18	15	39	36	41*a*	43*a*	17*a*	21*a*	23*a*	26*a*

a Estimated from incomplete data. Subject to revision.

b See text for rate of consumption at which these figures are calculated.

Work of U. S. Coal Commission Handicapped by Dilatory Tactics of Congress

By Paul Wooton
Washington Correspondent of *Coal Age*

Washington, Feb. 13.—The vacancy on the Coal Commission caused by the resignation of Judge Alschuler probably will not be filled, it was announced at the White House this morning. It is understood that the President conferred with members of the Coal Commission and reached the conclusion that it would be inadvisable to go to the trouble of appointing a new man with so much of the work already done. Attention was called at the White House to the fact that it was not obligatory to have seven men on the Coal Commission, the resolution providing that the membership shall not exceed seven.

Congress, in characteristic fashion, has failed lamentably to hold up the hands of the Coal Commission which it created. Because of its dilatoriness, the services of Judge Alschuler, one of the commission's most valuable members, were lost. Early in its term the commission asked also for legislation to make compulsory and provide penalties covering the returns submitted on questionnaires. As this is written there still is much uncertainty as to when that legislation will be forthcoming. It still remains to be seen whether or not the same dilatory policy will prevail in the handling of the legislation carrying $400,000 for the commission's expenses.

The procrastination and the lack of interest on the part of Congress is handicapping the commission in its work and lessening its possibilities for usefulness. The attitude of the legislative bodies toward the Coal Commission cannot be attributed to any displeasure with the work the commission has done. On the contrary, opinion on Capitol Hill is generally favorable to the commission. The personnel of the commission is universally admitted to be strong. Most certainly there has been no unfriendly sentiment against Judge Alschuler.

Consistent Legislative Policy Lacking

The failure to uphold the hands of the commission is simply another indication of the lack of consistency in carrying forward legislative policies. When the commission bill was passed the country was face to face with an emergency with coal. Public opinion was inflamed. Under those conditions Congress was prompt to pass the bill and apply the counter-irritant. In the meantime the emergency has passed. The strike danger has been postponed for a year. The price of coal is falling and the full requirements of the country are in a fair way to be met. Public interest no longer is focussed on coal. As a result the legislation held to be necessary to the commission's maximum accomplishment goes over from day to day and week to week. Even Chairman Winslow, of the Committee on Interstate and Foreign Commerce, coming as he does from New England, where the fuel situation has been most acute, ranks the coal bill as eighth in importnace among the measures that his committee will bring before the House. When his committee has its day, under House rules, seven other pieces of legislation must be disposed of before the coal bill is laid before the House.

During the conference with Washington correspondents, on Feb. 10, Chairman Hammond was asked if there is any truth in the report that he would finance some of the commission's activities in case Congress should fail to provide additional funds. This amused Mr. Hammond greatly. The question reminded him, he said, of the case of the Mexican peon who struck a bonanza and acquired such a reputation for wealth and generosity that he is said to have contemplated the payment of the Mexican national debt. The bononza ran out, however, and it finally became established that Don Pedro was in no position to live up to his reputation.

It was announced at the conference that the commission would give consideration to the proposed legislation perscribing standards of quality for anthracite. The commission's program of precedure is not as yet in final form, it was stated.

The stock report, issued under the authority of the Federal Fuel Distributor, showing only 36,000,000 tons of coal in storage on Jan. 1, reveals how unprepared the country would have been to withstand a strike this year. With stocks at that level and with demand much increased over that of a year ago, it is apparent that the country could not have built up stocks to equal those of April 1, 1922, when 63,000,000 tons was in storage. The stock report explains clearly why prices are 50 per cent higher than they were a year ago.

Slack Retires by Request; Conspiracy Case Shows No Sign of Life

Word received in Indianapolis from the Department of Justice in Washington, D. C., substantiates rumors of a week concerning the retirement of L. Ert Slack, of Indianapolis, who has seen service as a special assistant attorney general of the United States in charge of what has become known as the government's coal conspiracy case. It was said Mr. Slack had resigned at the request of the Attorney General. The request for the resignation was sent last month and Mr. Slack ceased to be a government official Jan. 31. He was ordered to turn over all records and papers in the cases to Homer Elliott, U. S. Attorney for Indiana. Denial was made at the Department of Justice that any significance was to be attached to Mr. Slack's retirement. It was ordered, it is said, in the interest of economy. The work, it was said, could be handled without extra cost by the U. S. Attorney for the district.

Soon it will be two years since 226 operators, miners and corporations were indicted in the District Court for violation of the Sherman Anti-Trust Law. Mr. Slack was U. S. Attorney before he became a special assistant attorney general.

Ford Organizes $15,000,000 Coal Company

The Fordson Coal Co. was incorporated at Dover, Del., Feb. 9 with a capitalization of $15,000,000, to operate coal properties purchased by Henry Ford in Kentucky and West Virginia.

The organization of the coal company may result, it was said, in Mr. Ford selling coal to the public. This depends upon the quantity of fuel produced and the requirements of the Ford plants. The Ford Motor Co. has for some time been selling fuel to its employees in Detroit at prices considerably lower than those asked by retailers, the present price for bituminous being $8.50 a ton.

Statements by Mr. Ford during the recent mine strike indicated that the public might expect a cut rate if the Ford fields yield a surplus. During the strike Mr. Ford attacked the retailers as well as the operators and mine union chiefs, declaring that a conspiracy existed for the purpose of retarding production and inflating prices. Coal could be sold at a profit to all handlers, he said, at prices considerably lower than were then demanded.

Since the transfer of the Pond Creek company to the Ford interests, on Jan. 1, the mines have been operated temporarily by the Banner Port Coal Co., a Ford subsidiary.

The charter filed at the State Department in Dover for the Fordson Coal Co. includes among the incorporators Douglas Brown, of Huntington, W. Va.

Enjoins Union from Organizing in Logan

Judge Robert Bland, in the Circuit Court at Logan, W. Va., on Feb. 10 granted two identical injunctions forbidding officers or members of the United Mine Workers from compelling or persuading miners in Logan County to break the individual contracts under which the Logan coal field is kept in a non-union status. The injunctions were granted in separate but similar equity cases, one brought by a score or more of miners who declared they were suing not only for themselves but for the other non-union miners of the county, and the other by the non-union coal companies in the county, making up the Logan Coal Operators' Association.

After presenting the two petitions, A. M. Belcher, counsel for the plaintiffs, told the court that 95 per cent of the mines in Logan County had written contracts with their employees by which they agreed not to become affiliated with the United Mine Workers and the operators agreed not to employ union men. C. Frank Keeney, president of District No. 17, United Mine Workers, in an address at Fairmont on Feb. 8, according to Mr. Belcher, declared the union was getting ready to organize Logan County.

C. J. Van Fleet, counsel for the union, told the court the defendants made no appearance and asked that any order entered in the case show that there was no appearance for the officials of the international district and local union who were named as defendants in the bill. He was in court, he said, to ask for bail for Jesse Covert, recently arrested on charges in connection with the armed march of 1921.

Phelan Resents Picturing of His Coal Bin

Publication of an article in a Boston newspaper criticising the state emergency fuel administrator, James J. Phelan, for the amount of coal held in the bins at his home for his personal use has led that official to issue a formal statement pointing out that he had in his bins on Feb. 8 five tons of buckwheat coal, one and one-half tons of furnace coal, one ton of range coal, and a cord of wood. He points out that the buckwheat coal was purchased as a substitute to use with the small amount of furnace coal which he had purchased last March.

Mr. Phelan denied that he "is a director of one of the largest soft-coal corporations in the country." He denies that he is a director of the New River Coal Co. and states that he has no interest, direct or indirect, in that or any other coal company. He does call attention to the fact that he is a director of the U. S. Smelting, Refining & Mining Co., which does own a coal mine in Utah, but since none of that coal is marketed in New England, he feels that this interest in no way could prejudice his administration of fuel matters in Massachusetts.

Alex Is Out Again—for a While

Alex Howat's monkey-and-parrot time of it with Kansas jails continues merrily on from laugh to laugh. Last week the deposed Kansas miners' union district president, languishing comfortably in the Cherokee County jail, was pardoned by his new friend Governor Jonathan Davis, recently elected. But since Alex wouldn't pay the court charges, the pardon didn't "take." So at the end of the week Alex was still languishing in the warmth of the donjon keep, enjoying good Kansas fodder and doing no work whatever. The Kansas Attorney General insists Howat should serve out his various and sundry jail sentences in both Cherokee and Crawford counties for defying the Kansas Court of Industrial Relations. At that time he still had 46 days coming to him in Cherokee County and 99 or so in Crawford County, from whose jail he was paroled by a Davis-appointed judge Jan. 20. The miners of District 14 raised $500 to pay the costs of prosecution, as demanded by the judge, and Howat was released Feb. 12.

Ruhr Occupation May Hasten Wind-Up of Rhenish-Westphalian Coal Syndicate

That the occupation of the Ruhr district has brought about a momentous phase in Germany's coal situation is evident when it is remembered that the Ruhr district contributed to the total German production of bituminous coal about 80 per cent and of the coke output 85 per cent. As the first consequence of the occupation the Rhenish-Westphalian Coal Syndicate, situated in Essen, has removed its headquarters and all records to Hamburg.

This move, which manifestly was caused by the desire to keep the syndicate out of the sphere of interference, was coupled with the decision to wind up the syndicate at the expiration of the term for which it was organized, March 31. In the latter respect the Ruhr occupation has most likely provided to the men of the syndicate a welcome opportunity. During recent years its members have given ample evidence that they regard the syndicate as an obsolete and superfluous institution. Almost at every occasion since the end of the war, the negotiations for its renewal have broken down and had it not been for the governmental pressure threatening to make the renewal compulsory, it would, no doubt, have come to an end at a much earlier date. By the process of trustification the membership of the syndicate has virtually if not actually dwindled to a small number.

The few men who actually control the coal production in the Ruhr district do not need a syndicate, having long ago established close relations of a more effective nature. Through the establishment of the National Coal Commissary, in whose hands the distribution of coal rests, and the formation of the National Coal Association, in which the Rhenish-Westphalian Syndicate is the leading member, it has lost a good deal of its former importance. As there is no competition among the producers and cannot be while the control of coal lasts and every ton finds a ready market, it has lost its original chief function. At present it is only a clearing house of sales and an important part in the mechanism of distribution. Other business it had is now mostly transacted outside of its realm among a small circle of men.

Sign Scale Agreements in Southwest

Scale committees of Districts 14, 21 and 25, in Kansas, Missouri, Oklahoma and Arkansas, signed an agreement at Kansas City Feb. 8 for one year from April 1 at $7.50 a day and a tonnage scale of $1.15 to $1.92. In a separate conference the Kansas district is trying to work out its first machine scale, made necessary by the steadily increasing number of machines.

Second Herrin Trial On; Choose Jurors

The second Herrin trial started on Monday, Feb. 12, at Marion, Ill. Nine men are to be tried for the murder of Antonio Mulkavitch, one of the twenty-two non-union strip miners and guards shot and cut to death June 22, last, after they had surrendered to a mob which besieged Lester Mine near Herrin, Ill. Three of the nine—Otis Clark, Peter Hiller and Bert Grace—were among the five acquitted last month at the first trial growing out of the massacre. The other six are Hugh Willis union board member; Dallas McCree, Oscar Howard, Percy Hall, Philip Fontanetta and the one indicted negro James Brown. All are union miners except Hiller. The first days of the case will be spent in picking jurors. Since the prosecution's single slender hope lies in a fearless and unbiased jury, much time may be consumed in challenging salesmen. The union lawyers resumed obstructing tactics by moving the indictment be quashed.

Globe Company to Be Western Agent for Pennsylvania Coal Company

Chicago, Feb. 13.—The Globe Coal Co., of Chicago, will soon take the full sales agency for the Pennsylvania Coal Co.'s anthracite, otherwise known as Erie coal, west of Pennsylvania. This will abolish the Williams & Peters sales agency in Chicago. The change is expected to take place April 1, but will in any event be in effect not later than Nov. 1. Harry N. Taylor, the new president of the United States Coal Corporation, has been elected president of the Sheridan (Wyo.) Coal Co., succeeding Peter Kooi.

New York and New England Insistent on Embargo of Anthracite to Canada; I.C.C. to Hold Hearing

New York officials have joined forces with New England in trying to force the administration at Washington to embargo anthracite shipments to Canada. In response to this pressure the Interstate Commerce Commission has instituted on its own motion an investigation into the question, citing in particular the Hudson Coal Co., which company, according to Fuel Distributor Wadleigh, will not disclose to him any information as to the destination of its shipments of hard coal. The Fuel Distributor has requested the Commerce Commission to obtain this information for him.

New York and New England officials are intent on denying to Canada the small exports of domestic anthracite alloted to it. New York Administrator Goethals and Governor Al Smith have telegraphed President Harding asking that the exports be cut off. Canada, it is reported, has retaliated by threatening to cut off water-generated electricity from the Canadian side of Niagara.

Calls Attention to Power Supplied by Canada

Mr. Wadleigh has asked General Goethals whether the addition of this 4 per cent to the coal supply for New York State would compensate for the electric power now obtained from the other side, equivalent to more than 1,000,000 tons of steam coal per year. Mr. Wadleigh's letter to General Goethals reads as follows:

"Disregarding any other factors involved, I would call attention to the fact that shipments of household sizes of anthracite coal to Canada are now proceeding at the rate of approximately 188,000 gross tons per month, amounting to 2.1 per cent of the total anthracite shipments, and this amount is necessary in order to maintain health and life among tenement dwellers in Canadian cities, while shipments of similar sizes into the State of New York, from the last weekly figures available, were at the rate of approximately 1,300,000 gross tons per month. The above figures do not include shipments by the Hudson Coal Co.

"Coincident with this New York State received April 1 to Dec. 31, 1922, from the Canadian side 778,738,740 electrical horsepower, which would require at least 1,062,988 tons of coal in its replacement.

"The delivery of coal to Canada is in accordance with an agreement by which Canada exports electricity equivalent to 2,000 tons of coal a day into New York."

On Feb. 10 Governor Smith of New York added his request to that of General Goethals, who wrote a few days before to Mr. Wadleigh calling for immediate action.

General Goethals drew a picture of the people of upper New York State, short of anthracite, conscientiously using coal substitutes, shivering and discouraged as they saw their schools and churches closed for lack of heat and yet compelled to watch from their windows train after train of coal speeding toward Canada.

"I found deep resentment as to this on the part of all I saw on my trip, and there is no doubt that it is causing the strongest feeling of discontent in the whole country," he wrote Mr. Wadleigh.

"In a speech made by Representative Rogers on Jan. 11, in the House of Representatives, attention is called to the fact that the shipments of coal to Canada in 1921 exceeded those of any previous year; that the shipments into Canada in October and November of 1922 exceeded shipments in the corresponding months of 1921," he continued. "This information has been broadcast through the press. From figures given us, and which I believe are reliable, of the total shipments by the Delaware & Hudson in 1921, 9 per cent went to Canada, while in 1922 11 per cent went to Canada. The statement is also made, and I believe it to be true, that shipments were rushed to Canada at the end of 1922 because of possible weather conditions that might exist early in the year 1923. These shipments are still being made to Canada, while the weather conditions in northern New York are more severe than they have been for years past.

"The severe weather in the last half of January and so far this month has materially curtailed railroad operations through the northern portion of the state. Cars are tied up at sidings and consignments to various localities in the northern part of the state are held without any idea as to when the cars will reach destination.

"As I stated before, definite action must be taken, and taken at once; and I recommend:

"(1) That in view of the conditions existing in 1922, as compared with 1921, the present allotment be exceeded so that sufficient anthracite coal will be moved without delay into this territory, which, combined with the substitutes that are required under the district order, will give the people in that part of the state the fuel they need.

"(2) That in order to accomplish this, the Delaware & Hudson Railroad Co. be required to supply anthracite coal along its route in the upper part of New York State in lieu of making any shipments into Canada.

"(3) That until this is done and until the situation in northern New York is relieved as above recommended, an embargo be placed on the Delaware & Hudson shipments into Canada."

To the request of Governor Smith that an embargo be declared on exports of anthracite, President Harding replied that his information is that the situation is one of transportation failure rather than shortage of supply. He expressed the belief that the situation would be relieved as a result of a conference between Mr. Wadleigh and the New York Fuel Distributor.

Press reports from Ottawa last week were to the effect that a grave situation would develop in Canada if an embargo on Canadian-bound coal were placed on the Delaware & Hudson R.R., in the opinion of C. A. Magrath, a member of the Dominion Advisory Fuel Committee.

This section, he continued, now faced conditions even more severe than those in New York State, because it was further from American mines and must weather a harder winter.

He said he did not believe in thinking, let alone saying, disagreeable things about neighbors nor in discussing reprisals.

The hearing of the Interstate Commerce Commission was to be held at the Bowling Green Building, 11 Broadway, New York City, on Wednesday, Feb. 14.

Lodge Resolution Urges Anthracite Embargo

Senator Lodge has presented to the U. S. Senate the following resolutions adopted by the Massachusetts House of Representatives:

Whereas the Hon. John J. Rogers, Congressman from Massachusetts, has introduced a bill in Congress entitled "A bill declaring an embargo on anthracite coal," being H. R. No. 12827, which declares that the conditions at present prevailing in the production and distribution of anthracite coal constitute a national emergency; and

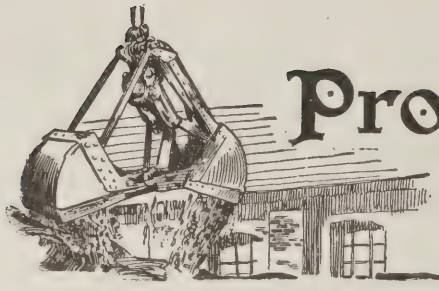
Whereas great distress and hardship exist in New England on account of such coal shortage: Therefore be it

Resolved, That the House of Representatives of the General Court of Massachusetts urgently requests that Congress take immediate steps for the passage of appropriate legislation to relieve the great distress existing in New England, and hereby records itself in favor of immediate passage of H. R. No. 12827; and be it further

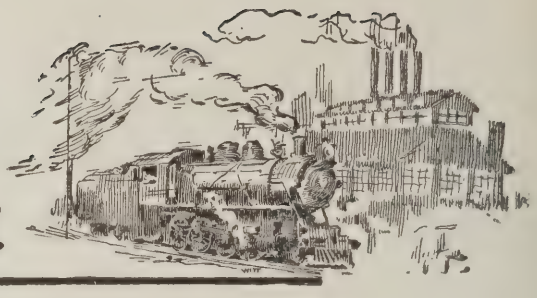
Resolved, That copies of these resolutions be sent by the secretary of the Commonwealth to the President of the United States, to the Presiding Officers of both branches of Congress, and to the Senators and Representatives in Congress from this Commonwealth

The Bituminous Operators' Special Committee has formally denied a report that it has raised a question as to the constitutionality of the Coal Commission law. A meeting of the full Special Committee in Washington on Feb. 15 has been announced.

A GOOD MANY FUEL COMPANIES can comply with the order to supply substitutes for coal without departing any from their former methods.—*New York Tribune.*



Production and the Market



Weekly Review

There is a persistent dullness in the bituminous coal market and a monotony in the anthracite trade relieved only by the effort of New York and New England to cut off anthracite shipments to Canada. Prices of soft coal are headed downward, production is slipping and thoughts are turning to spring.

Coal Age Index of spot prices of bituminous coal records 296 this week, a drop of 16 points from 312 on Feb. 5. This brings the figure back to that on July 1, 1922. The average price on Feb. 12 was $3.58, a decrease of 20c. compared with $3.78 on Feb. 5. Production of soft coal dropped to around 10,200,000 tons last week after hanging at 11,000,000 tons for many weeks.

Secretary Hoover on Feb. 13 said he did not believe it best to advise consumers of coal to add materially to stockpiles now. Until the transportation situation improves there can be no large movement of coal for future use. He intimated, however, that buying for storage should begin in spring just as soon as the carriers are available to handle it.

Buyers on the Lookout for Bargains

Buyers are taking little interest in the situation, save to pick up bargains. Contracts are being discussed in some quarters but among customers the feeling prevails that it will be possible to buy in the open market later at lower figures than those at which contracts can be negotiated at present.

The market for Pennsylvania coals in New England is being held firm through the continuance of embargoes against certain of the Hudson River gateways, which act as a prop to prices on cars for inland delivery, where quotations remain reasonably firm at $10 upward per gross ton delivered. These embargoes and those referred to in last week's review concern only the movement of bituminous coal into New England. While they have not operated to affect notably the total shipments, these embargoes are exceedingly troublesome to both shippers and consignees. Anthracite is not interfered with in any way by these embargoes.

The all-rail movement of coal to New England and eastern New York for the week ended Feb. 3 included 3,447 cars of anthracite and 3,265 cars of bituminous coal, forwarded through the principal gateways over the Hudson River and through Rouses Point. This was a decrease of 648 cars of anthracite and an increase of 375 cars of bituminous coal as compared with the previous week, but approximately the same as in the corresponding week a year ago.

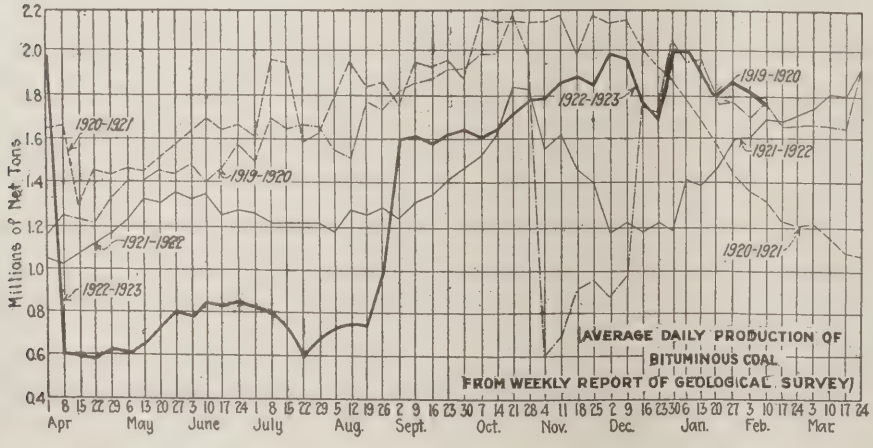
Heavy Oil Receipts in New England

In the calendar year 1922 New England got but 56 per cent as much anthracite as in 1921, which accounts for the active interest in coal in that part of the country. Of bituminous coal New England received 85 per cent as much in 1922 as in 1921, but some 2,000,000 tons of this was imported from abroad. Crude oil, however, poured into New England at the highest rate recorded. Against 112,779,100 gallons in 1918, 448,217,000 gallons in 1920, and 730,742,000 gallons in 1921, the receipts in 1922 were 767,323,000 gallons.

New England and northern New York as well have not suffered for lack of soft coal, however. Their trouble is that they do not know there was a strike last summer and that their inability to get the usual quotas of domestic anthracite is not the fault of the coal man but of the coal digger who would not work last summer. There is little sympathy elsewhere over the country with this effort to cut off Canada's hard-coal supply.

Production of anthracite remains close to the 2,000,000-ton mark. Producers have no difficulty in disposing of the domestic coals, including buckwheat, which continues to be used as a substitute for the larger sizes, but the steam sizes are slightly easier.

"Present estimates of soft-coal production in the week ended Feb. 3 indicate a total output, including coal



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Jan. 20	8,782,000	10,925,000
Jan. 27 (*b*)	9,615,000	10,985,000
Feb. 3 (*a*)	9,714,000	10,587,000
Daily average	1,619,000	1,765,000
Calendar year	43,889,000	54,662,000
Daily av. cal. year	1,291,000	1,607,000
ANTHRACITE		
Jan. 20	1,443,000	2,010,000
Jan. 27 (*b*)	1,607,000	2,119,000
Feb. 3 (*a*)	1,811,000	2,056,000
Calendar year	8,258,000	10,023,000
COKE		
Jan. 27 (*b*)	113,000	343,000
Feb. 3 (*a*)	122,000	345,000
Calendar year	577,000	1,648,000

(*a*) Subject to revision. (*b*) Revised from last report.

shipped, mine fuel, local sales and coal coked, amounting to 10,587,000 net tons," the Geological Survey says. "Revised estimates for the week before show 10,985,000 tons. Instead of nearly uniform rate of production at about 11,000,000 tons a week, as indicated by early returns, there is now indicated a gradual decline in the production since the beginning of the year.

"Preliminary reports of cars loaded during the present week (Feb. 5-10) show 41,540 cars on Monday, a drop to 30,975 on Tuesday, and further decline to 29,303 on Thursday. The indicated total output for the present week is therefore about 4 per cent less than for the week preceding, and will be between 10,100,000 and 10,200,000 tons."

Midwest Thankful for Cold Weather

Continued low temperature for several days kept the bottom temporarily under the domestic market throughout the Chicago and Midwest region. There is no buying beyond the immediate needs of the moment, but that is heavy enough to move with comparative ease all the larger prepared sizes in southern Illinois, the Fourth Vein Indiana field and eastern Kentucky. The other regions had to work a little to place everything they produced because such territories as central Illinois got better car supply than they wanted.

Southern Illinois ran between 2½ and 3 days during the week and stuck to the circular of $5.50 for lump a little more closely than during the last week of January, before the cold weather. Operators outside the association group sold down to $4 for 6-in. lump and from 50c. to $1 under the list on egg and nut sizes, those being the only prepared coals that are really dragging bottom. Screenings are in considerable volume just now while domestic production is healthy and Franklin County and Indiana Fourth Vein are holding to their $2.50 level quite consistently, with the likelihood of dropping no lower.

The Standard field east of St. Louis moved a considerable volume of coal because its car supply grew better. This prevented any change in prices. The St. Louis market took a great deal of both Standard and Mt. Olive coal during the coldest days but at the end of the week the weather had warmed, with the inevitable result. Both domestic and steam trade went back into a lull with the call being for cheaper coals. Retail yards are well cleaned up. Prices remain unchanged. Rail service through St.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

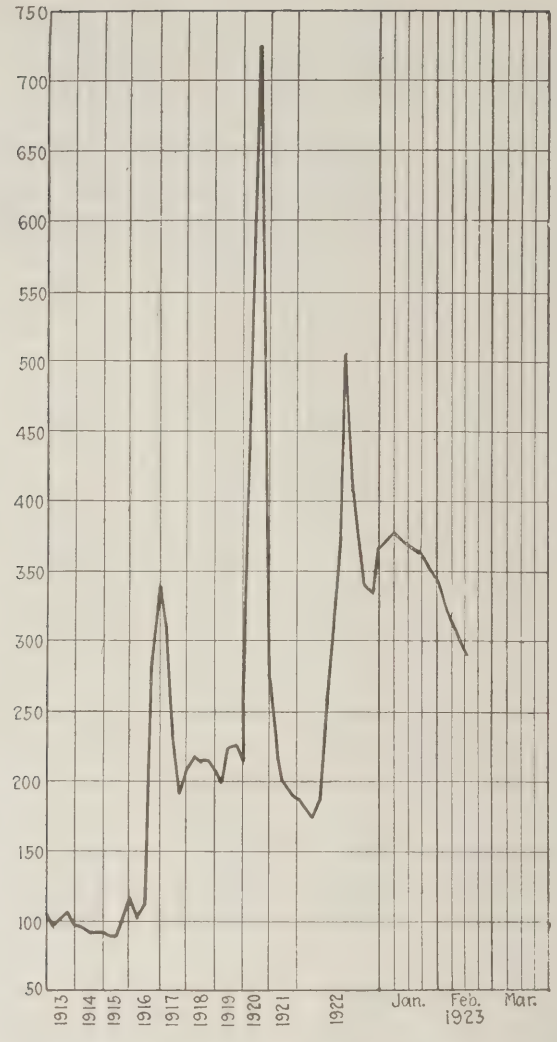
	Market Quoted	Feb. 13, 1922	Jan. 29, 1923	Feb. 5 1923	Feb. 12, 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.35	$7.25	$6.75	**$6.50@$7.50**
Smokeless mine run	Columbus	1.90	6.65	5.50	*4.50@ 5.00*
Smokeless screenings	Columbus	1.40	5.85	5.50	*4.50@ 5.00*
Smokeless lump	Chicago	3.15	7.75	7.75	*6.75@ 7.25*
Smokeless mine run	Chicago	2.25	6.10	4.85	*4.50@ 5.00*
Smokeless lump	Cincinnati	3.15	7.25	6.50	**6.75@ 7.50**
Smokeless mine run	Cincinnati	1.85	6.00	5.25	*4.00@ 5.50*
Smokeless screenings	Cincinnati	1.15	6.00	5.25	*4.00@ 5.00*
*Smokeless mine run	Boston	4.80	8.10	8.00	*6.90@ 7.40*
Clearfield mine run	Boston	1.95	4.35	3.85	3.50@ 4.25
Cambria mine run	Boston	2.45	4.85	4.15	**4.25@ 4.75**
Somerset mine run	Boston	1.90	4.55	3.90	**3.75@ 4.50**
Pool 1 (Navy Standard)	New York	3.00	5.50	5.35	*5.00@ 5.50*
Pool 1 (Navy Standard)	Philadelphia	3.05	5.45	5.45	*5.00@ 5.25*
Pool 1 (Navy Standard)	Baltimore	2.60	5.10	4.60	4.50@ 4.75
Pool 9 (Super. Low Vol.)	New York	2.45	5.00	4.75	*4.50@ 4.75*
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	4.80	4.80	*4.50@ 4.75*
Pool 9 (Super. Low Vol.)	Baltimore	2.30	4.85	4.35	*4.15@ 4.50*
Pool 10 (H.Gr.Low Vol.)	New York	2.10	4.25	4.10	3.75@ 4.50
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	4.30	4.30	*4.00@ 4.20*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.05	4.10	4.10	*4.00*
Pool 11 (Low Vol.)	New York	1.75	3.50	3.50	*3.00@ 3.75*
Pool 11 (Low Vol.)	Philadelphia	1.75	3.25	3.25	*3.10@ 3.25*
Pool 11 (Low Vol.)	Baltimore	1.75	3.35	3.35	*2.75@ 3.25*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	3.10	3.10	*2.85@ 3.00*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	3.25	3.15	*2.85@ 3.00*
Pool 54-64 (Gas and St.)	Baltimore	1.40	3.10	3.00	*2.75@ 3.00*
Pittsburgh sc'd gas	Pittsburgh	2.65	4.85	4.50	*4.00@ 4.25*
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.35	3.10	*2.75*
Pittsburgh slack (Gas)	Pittsburgh	1.65	3.35	3.30	*3.25*
Kanawha lump	Columbia	2.65	5.25	5.25	*4.25@ 4.75*
Kanawha mine run	Columbus	1.65	3.25	3.15	*2.50@ 2.75*
Kanawha screenings	Columbus	1.35	3.10	2.85	*2.25@ 2.50*
W. Va. lump	Cincinnati	2.65	6.10	4.60	*4.00@ 4.50*
W. Va. Gas mine run	Cincinnati	2.00	3.45	2.75	*2.50@ 2.75*
W. Va. Steam mine run	Cincinnati	1.60	3.25	2.75	*2.50@ 2.75*
W. Va. screenings	Cincinnati	1.30	3.25	2.25	2.00@ 2.50
Hocking lump	Columbus	2.75	4.60	4.50	4.25@ 4.75
Hocking mine run	Columbus	1.90	2.80	2.80	*2.40@ 2.65*
Hocking screenings	Columbus	1.35	2.60	2.60	*2.00@ 2.25*
Pitts. No. 8 lump	Cleveland	3.10	4.35	4.00	**3.90@ 4.50**
Pitts. No. 8 mine run	Cleveland	1.95	3.40	3.15	*3.15@ 3.20*
Pitts. No. 8 screenings	Cleveland	1.65	3.25	2.85	*3.00@ 3.15*
Midwest					
Franklin, Ill. lump	Chicago	3.65	5.35	5.35	5.25@ 5.50
Franklin, Ill. mine run	Chicago	2.50	3.85	3.85	3.75@ 4.00
Franklin, Ill. screenings	Chicago	1.95	2.65	2.60	*2.50@ 2.60*
Central, Ill. lump	Chicago	3.00	3.85	3.60	3.50@ 3.75
Central, Ill. mine run	Chicago	2.35	2.85	2.85	*2.50@ 2.75*
Central, Ill. screenings	Chicago	1.75	1.60	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.25	4.85	4.35	4.25@ 4.50
Ind. 4th Vein mine run	Chicago	2.50	3.60	3.10	3.00@ 3.25
Ind. 4th Vein screenings	Chicago	1.90	2.30	2.30	2.25@ 2.40
Ind. 5th Vein lump	Chicago	2.80	4.10	4.10	*3.50@ 3.75*
Ind. 5th Vein mine run	Chicago	2.25	3.10	3.10	*2.50@ 2.75*
Ind. 5th Vein screenings	Chicago	1.65	1.80	1.80	1.75@ 1.85
Standard lump	St. Louis	2.90	3.60	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.90	2.50	2.25	2.25
Standard screenings	St. Louis	1.05	1.60	1.45	1.40@ 1.50
West Ky. lump	Louisville	2.55	4.00	3.85	3.50@ 4.25
West Ky. mine run	Louisville	1.85	2.50	2.35	2.25@ 2.50
West Ky. screenings	Louisville	1.25	2.00	1.90	2.00@ 2.25
West Ky. lump	Chicago	....	4.25	3.85	3.75@ 4.00
West Ky. mine run	Chicago	.....	2.35	2.35	*1.90@ 2.10*
South and Southwest					
Big Seam lump	Birmingham	2.90	3.95	3.95	3.50@ 4.45
Big Seam mine run	Birmingham	1.85	2.35	2.35	2.25@ 2.50
Big Seam (washed)	Birmingham	2.10	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	6.00	6.00	*4.75@ 5.00*
S. E. Ky. mine run	Chicago	.....	3.25	3.25	*2.75@ 3.00*
S. E. Ky. lump	Louisville	2.75	6.50	5.75	*4.00@ 6.50*
S. E. Ky. mine run	Louisville	1.65	3.10	3.25	*2.25@ 3.00*
S. E. Ky. screenings	Louisville	1.15	3.00	2.85	*2.25@ 2.50*
S. E. Ky. lump	Cincinnati	2.65	5.60	4.35	*4.00@ 4.50*
S. E. Ky. mine run	Cincinnati	1.65	3.15	2.75	*2.25@ 2.50*
S. E. Ky. screenings	Cincinnati	1.05	2.85	2.25	*2.00@ 2.25*
Kansas lump	Kansas City	5.00	5.50	5.50	*5.00*
Kansas mine run	Kansas City	4.00	3.60	3.60	*3.50*
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Latest Pre-Strike Company	Feb. 5, 1923 Independent	Feb. 5, 1923 Company	Feb. 12, 1923† Independent	Feb. 12, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.50	6.15@ 6.20	7.00@ 9.50	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	5.25@ 6.00	4.00@ 4.10	*5.00@ 5.50*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00@ 5.50	4.00	5.00@ 5.50	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 2.75	2.75@ 3.00	2.25@ 2.75	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 296, Week of Feb. 12, 1923. Average spot price for same period, $3.58. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighed in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Louis is getting unsatisfactory again. Congestions are developing.

Kentucky demand during the week was largely for lump coals. All other sizes moved stiffly in the unaccustomed cold that visited Louisville. A slight improvement in car supply and high river stages have combined to aid coal movement just at the right time, for the buyer's benefit, so that some recessions in price were made. East Kentucky block coal got down to $5.50, 2-in. lump to $4 and mine-run to $2.25 in some instances, with screenings at $2.25@$2.50. Best Kentucky lump sold at $3.50@$4; mine-run $2.25@$2.50 and screenings $2@$2.25, spot at the mines, buyers paying brokers' charges.

Of course the only spot coal that sells any Kentucky or Midwestern market is that which is rolling and close to destination. Thus the market all around is tiptoeing along, refusing to take a ton of coal that might have to be carried into the next warm spell, which might arrive at any moment.

Northwest Stirs a Little

Cold weather—bitter cold, ranging down as low as 33 below zero for a day or two at the Head-of-the-Lakes—stirred the retail markets of the Northwest during the week just closed. Most of the trade was in anthracite, Pocahontas, coke and hard-coal substitutes for domestic use. This demand was strong enough to push anthracite hard against the top of the circular, breaking through occasionally at Milwaukee, where anthracite was listed at $15.75 for egg, $16.10 for stove and $16 for nut. Pocahontas screened sizes are moving at $13.75 wholesale and $15.75 retail and mine-run at $11@12.50. On that market Pittsburgh, Hocking Valley and Youghiogheny, pile-run and screenings advanced 25c. largely because car-ferry congestion holds back all Eastern coals. Rail deliveries, however, are so good that Illinois and Indiana pile-run and small screened sizes went off 50c.

At all docks the domestic sizes have been moving off steadily, leaving screenings in surplus. A little railroad buying is still noticeable but most roads appear to be satisfied with what they have under contract. Duluth notes that shipment off the docks there is easing up as compared with last year. The January total was 13,683 cars as compared with 24,521 cars in January of 1922, when the country was getting ready for a strike. Eastern lump is still reasonably strong at $9.50; run of pile, $8.25@$8.50 and screenings are sagging at $6@$6.25.

West Awakens Somewhat

Colorado and Utah during the past week shivered and bought coal. The result of the zero weather and stiff breezes was that retailers whose supplies were low demanded coal at once and steam trade livened up noticeably. For a week mines in almost every district worked every day and railroads did a reasonably good job of moving mine outputs. Raw weather along the Pacific Coast draws more coal in that direction too. Thus, for the time being, the mountain states and Far West are in a brisk condition and prices are not dropping. In Kansas City the weather produced no noticeable effect for the better. The market was as full of holes as a Swiss cheese, but no sudden drop in prices appeared. Kansas lump continues at $5; nut, $4.50; mine-run, $3.50 and screenings, $2.50.

Softness characterizes the Ohio coal trade both as to steam and domestic coals. Buying is reduced to present needs, as few consumers are trying to stock up for the future. In some instances reserve piles are being used. Distress coal in the Columbus market is heavy and as a result some extremely low prices are reported in order to dispose of it. Retail stocks are only fair, dealers buying only for the present, believing that prices will be lower. Michigan points are absorbing a fair tonnage.

In the Cincinnati market similar conditions exist. Rejections are the order of the day. There is little talk of contract making, buyers as in the east, apparently being determined to hold off. Car supply is reported as improving, and three days a week are being reported from some sections.

Mines in the eastern Ohio No. 8 district are working less than 35 per cent of full time. Cumulative production figures from Jan. 1 to Feb. 3 indicate an output of 1,551,000 tons, or about 50 per cent of capacity.

Bituminous-coal receipts at Cleveland for industries and retail yards during the week ended Feb. 3 show a decrease of 51 cars from the preceding week. Total receipts were 2,887 cars, divided 2,117 cars for industries and 770 for retail yards. Receipts for industries decreased 103 cars as compared with the preceding week, while arrivals for retail yards show an increase of 52 cars over the preceding week. Cleveland receipts have averaged 2,930 cars per week since Jan. 1, as compared with 2,345 cars per week during the last quarter of 1922.

In West Virginia low-volatile as well as high-volatile coals felt the effect of a falling. Lump was the least affected. High-volatile mine-run did not average more than $2.50 a ton throughout the week, the range extending to $3. Nut and slack ranged $2.50@$2.65 and egg and lump $3.50@$4.50.

Car supply in West Virginia, Virginia and northeastern Kentucky was not as conducive to large movement of coal as during the preceding week.

The first and most prolonged touch of real winter weather of the season at Birmingham Ala., was experienced last week. It was ushered in by cold rains followed by sleet and a light snow, which played havoc with power transmission lines and caused a heavy loss in coal production during the first two or three days of the week. Weather conditions also affected labor.

Seaboard Market Dull

Light shipments of steam coals all-rail are about the only indication of firmness in the present market in New England. Several large consumers who were planning to make purchases at this time have concluded now to wait until the market settles. Among these are textile manufacturers and certain power companies who are banking on liberal water power within a month's time. Congestion at the rehandling wharves is clearing up and there is much less pressure generally to get forward supply.

At Hampton Roads certain of the agencies have made strenuous efforts to place accumulations while the market was at all favorable. Spot prices have been scaled down to $6.90 per gross ton f.o.b. vessel, and 15@25c. less has been rumored. There are ample tonnages on hand at the Virginia terminals, and the trade expects to see quotations gradually slump to $6.50, or around $3.50 per net ton f.o.b. mines. A few shippers, however, are inclined to think that $3.50 per gross ton will be nearer a going price, especially on contract.

The Pennsylvaia grades also are gradually sagging off in price, although a pronounced slump has been arrested by continuing difficulties in transportation. A larger volume is moving from central Pennsylvania to piers at Philadelphia and New York, but much of this is contract coal diverted to tidewater to facilitate delivery. Prices average around $4 per net ton at the mines for medium grades, with the more favorably known coals selling still at $4.50@$4.75.

Operating interests are busy canvassing for contracts throughout this territory. The Hampton Roads shippers are expected to retain much of the tonnage obtained last year, but aside from a few special cases the Pennsylvania producers are not likely to close much business of a comprehensive nature, at least not on the present cost basis. The differential is much too great as compared with the smokeless West Virginia coals to admit of much large tonnage except within the nearer strip which is now reserved to all-rail shipment without competition from tidewater.

Conditions are quiet along the seaboard. More than 70,000 tons of British coal arrived in New York harbor during last week, not including a cargo of British furnace coke consigned to a large retail coal firm and which will be offered for sale through the regular channels.

There is still much interest in the contract situation but buyers are not inclined to enter into agreements.

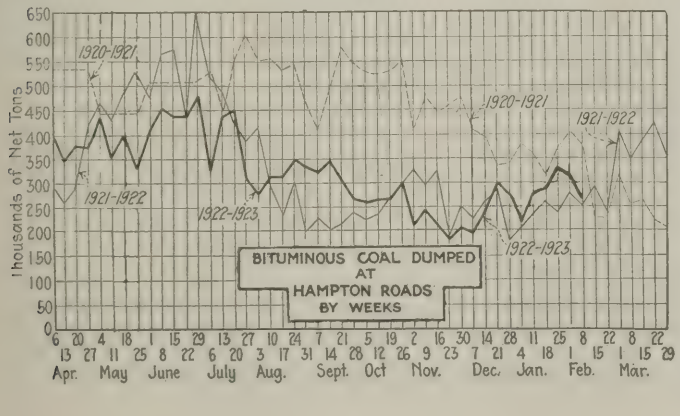
The outstanding feature of the Baltimore market are the prospects for a more active bunker business. This trade is encouraged by the belief that a number of ships, including American shipping board vessels, seem likely to be in the market shortly for considerable quantities offered.

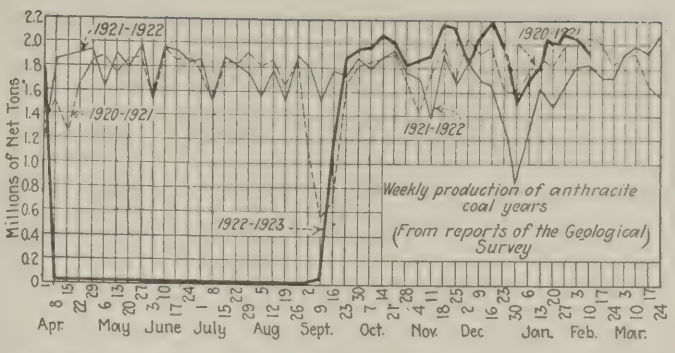
Anthracite

Demand for the domestic sizes of anthracite continues strong. The larger companies and independent producers are having no difficulty in disposing of their output but the smaller operators have found it necessary to shade their quotations slightly. Retail dealers in the outlying district who are located at points where it takes from three to four weeks for shipments to reach them continue to cancel orders.

"The production of anthracite declined slightly in the week ended Feb. 3," says the Geological Survey. "The total output, including mine fuel, local sales and dredge and washery output, is estimated at 2,056,000 net tons on the basis of 39,321 cars loaded as reported by the principal anthracite carriers.

"Early returns from the railroads on loadings this week (Feb. 5-10) indicate a somewhat smaller output, probably a little less than 2,000,000 tons."





Coke Market Weaker

The coke market has weakened in price rather sharply the past week or ten days, chiefly on account of decreased buying for heating purposes. Some steel companies are rumored to have entered the market for spot or prompt coke.

Utilities Continue to Consume More Coal

Electric public-utility plants consumed 3,586,346 net tons of coal during December, according to a recent report of the Geological Survey. This compares with 3,350,761 tons consumed during November, according to corrected returns.

The average daily production of electricity by public-utility power plants in December, again broke all records of output, making the sixth time that a record has been established since May. The daily production of electricity in December was 146,700,000 kw.-hr. The total output for the period January to December, inclusive, was 47,676fi049,000 kw.-hr., an increase of more than 16 per cent over that for 1921.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Jan. 27, 1923 Inclusive	Week Ended Jan. 27, 1923
U. S. Total	55.7	...	...	
Alabama	64.6	84.7	90.3	(a)
Somerset County	74.9	36.3	31.0	27.8
Panhandle, W. Va.	51.3	57.3	54.2	50.3
Westmoreland	58.8	65.8	58.0	64.9
Virginia	59.9	55.7	54.1	55.0
Harlan	54.8	22.1	21.9	21.5
Hazard	58.4	16.4	19.9	21.8
Pocahontas	60.0	36.6	36.7	38.7
Tug River	63.7	28.8	33.0	29.8
Logan	61.1	26.2	31.0	26.2
Cumberland-Piedmont	50.6	31.7	42.9	43.9
Winding Gulf	64.3	30.4	33.7	30.8
Kenova-Thacker	54.3	42.4	39.2	29.5
N. E. Kentucky	47.7	28.4	28.9	22.1
New River	37.9	31.6	34.9	37.0
Oklahoma	59.6	59.1	42.1	31.6
Iowa	78.4	75.9	80.7	74.0
Ohio, Eastern	46.6	40.8	34.4	34.1
Missouri	66.8	76.3	78.7	68.0
Illinois	54.5	49.9	55.1	49.5
Kansas	54.9	55.9	55.2	44.4
Indiana	53.8	37.7	55.1	55.2
Pittsburgh†	39.8	41.2	35.6	35.9
Central Pennsylvania	50.2	53.4	39.8	26.7
Fairmont	44.0	35.5	40.4	(a)
Western Kentucky	37.7	32.4	34.2	33.9
Pittsburgh*	31.9	56.1	69.6	63.1
Kanawha	13.0	15.6	20.5	22.9
Ohio, Southern	24.3	38.1	41.1	40.4

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded—All Cars	Cars Loaded—Coal Cars
Week ended Jan. 27, 1923	871,164	194,738
Previous week	865,578	192,824
Same date in 1922	740,386	179,816

	Surplus Cars—All Cars	Surplus Cars—Coal Cars	Car Shortage	Car Shortage
Jan. 20, 1923	26,485	6,699	72,754	37,508
Same date in 1922	330,681	104,386	.....	....

Foreign Market And Export News

Welsh Coal Trade Shows Increased Activity; British Production Increases

British mines produced 5,644,000 tons of coal during the week ended Jan. 24, according to a cable received by *Coal Age*. This was the largest tonnage produced during any week of the year. Quotations on some grades are slightly advanced from last week.

The Welsh coal trade is in good condition. Inquiries continue to come for coal for export. So far the Welsh coal trade has not been affected by the German situation. France is buying well, and exports to Germany are sustained, but there is no unusual pressure.

Steam coal is being heavily booked in all regular markets. German business on a heavy scale has not yet arrived, though trading to the extent of 150,000 tons has been done. Collieries are all well sold up and in anticipation that demands will be stimulated are asking higher prices for forward shipment. Demand from South America is active.

Prices throughout north England are rising generally and steadily. Contracts have been placed with Durham mines by gas companies for four lots of second class gas coal, ranging from 50,000 to 60,000 tons each, at prices between 22s. 3d. to 22s. 9d. f.o.b.

Germany has purchased in the Humber market over 250,000 tons of Derbyshire and Nottinghamshire steam coal for shipment during February, March and April.

Hampton Roads Market Dull

Business was dull at Hampton Roads on a falling market due to general oversupply in sections furnished from this point. Coastwise business slowed up, but prices were approaching a point where competition with British coal in the North may be made possible.

Dumpings were slowed up because of the recent storm which froze coal cars at all piers and made several extra operations necessary before they could be dumped. Many vessels were delayed in this manner.

There was a feeling that the bottom of the market is in sight, and that movement will be increased in a short time.

French Tonnage Figures

The following tabulation shows the production, imports and exports of coal, coke and patent fuel during the first eleven months of 1922, the balance being placed at the disposal of consumers or otherwise disposed of:

COAL	Metric Tons
Output	29,094,394
Imports	20,157,381
	49,251,775
Exports	1,847,062
Placed at the disposal of consumers or transformed into coke or patent fuel	47,404,713

COKE	Metric Ton
Production (coke-ovens annexed to collieries)	901,111
Imports	4,599,358
	5,500,469
Exports	430,848
Placed at the disposal of consumers	5,069,621

PATENT FUEL	
Production (patent fuel works annexed to collieries)	2,543,732
Imports	1,305,348
	3,849,080
Exports	96,638
Placed at the disposal of consumers	3,752,442

There were 20,157,381 metric tons of coal imported into France during the first eleven months of 1922 from the following countries:

From	Metric Tons
Saar	3,186,494
Great Britain	10,825,544
Belgium	2,201,833
United States	23,255
Germany	3,363,261
Netherlands	552,757
Other countries	4,237
Total	20,157,381

British Coal Exports Increase

Exports of British coal to European countries in 1922 amounted to 48,291,462 tons, according to figures issued by the Bankers Trust Co., of New York. This was more than 8,000,000 tons less than in 1913. British coal exports to Germany were approximately 8,346,000 tons as compared with about 8,952,000 tons in 1913. The figures for Europe and South America in detail follow, in thousands of tons:

To Europe:	1913	1922
France	12,776	13,579
Italy	9,647	6,342
Germany	8,952	8,346
Russia	5,998	584
Sweden	4,563	2,523
Belgium	2,031	3,480
Netherlands	2,018	6,067
Other European Countries	10,854	7,361
Totals	56,839	48,291
To South America:		
Chile	589	84
Brazil	1,887	1,013
Uruguay	724	503
Argentine	3,692	2,021
Totals	6,892	3,621

A large gain was made in 1922 compared to 1913 in British coal exports under the classification "other countries," which includes the United States, says the statement. The exports for 1913 under the above classification amounted to 1,749,877 tons, while in 1922 they were 6,168,825 tons. That increase was principally due to the demand for British coal in the United States because of the mine dispute.

Hampton Roads Pier Situation

	Feb. 1	Feb. 8
N. & W. piers, Lamberts Pt.		
Cars on hand	1,090	1,027
Tons on hand	77,921	69,314
Tons dumped for week	90,007	112,289
Tonnage waiting	2,200	17,300
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,440	1,815
Tons on hand	83,480	107,750
Tons dumped for week	83,908	60,691
Tonnage waiting	10,000	43,563
C. & O. piers, Newport News		
Cars on hand	1,470	1,489
Tons on hand	80,590	87,285
Tons dumped for week	107,088	60,222
Tonnage waiting	89,015	9,185

Export Clearances, Week Ended Feb. 10, 1923.

FROM HAMPTON ROADS

For Cuba:	Tons
Br. SS. Berwindvale, for Havana	7,686
Br. SS. T. L. Church, for Havana	2,825

Pier and Bunker Prices, Gross Tons

PIERS

	Feb. 3	Feb. 10†
Pool 9, New York	$7.50@$7.75	*$7.25@$7.50*
Pool 10, New York	6.75@ 7.00	*6.75@ 7.00*
Pool 11, New York	6.00@ 6.50	*5.75@ 6.25*
Pool, 9, Philadelphia	7.65@ 8.00	*7.25@ 7.60*
Pool 10, Philadelphia	7.10@ 7.35	*6.70@ 6.90*
Pool 11, Philadelphia	6.60@ 6.75	*6.00@ 6.40*
Pool 1, Hamp. Roads	7.50	*6.85@ 7.15*
Pools 5-6-7 Hamp. Rds.	7.25	*7.00*
Pool 2, Hamp. Rds.	7.50	*6.85@ 7.15*

BUNKERS

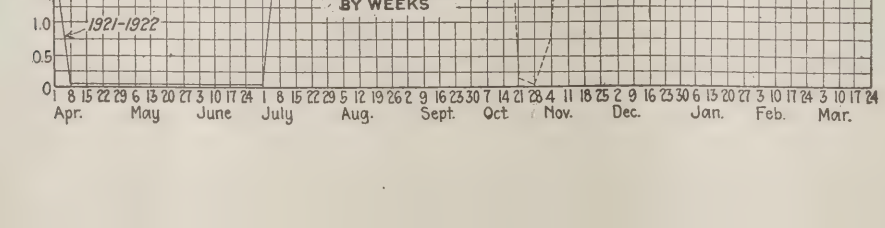
Pool 9, New York	$7.85@$8.10	*$7.60@$7.85*
Pool 10, New York	7.10@ 7.35	*7.10@ 7.35*
Pool 11, New York	6.35@ 6.85	*6.10@ 6.60*
Pool 9, Philadelphia	8.25@ 8.60	*7.35@ 7.75*
Pool 10, Philadelphia	7.40@ 7.60	*7.00@ 7.25*
Pool 11, Philadelphia	6.90 @7.15	*6.25@ 6.55*
Pool 1, Hamp. Rds.	7.50	*7.15*
Pool 2, Hamp. Rds.	7.25	*7.00*

Current Quotations British Coal f.o.b. Port, Gross Tons

Foreign Quotations, by Cable to Coal Age

	Feb. 3	Feb. 10†
Admiralty, large	29s.6d.@30s.	29s.6d.@30s.
Steam, smalls	20s.	**19s.@21s.6d.**
Newcastle:		
Best steams	27s.6d.@35s.	*27s.6d.@28s.*
Best gas	26s.@28s.	**26s.6d.@27s.**
Best bunkers	25s.@27s.6d.	**26s.@27s.6d.**

† Advances over previous week shown in *heavy* type; declines in *italics*.



News Items From Field and Trade

ALABAMA

A. R. Long, who has been vice-president and general manager of the **Brookside-Pratt Coal Co.** for several years, was elected president at a recent meeting of the directors of the company. He succeeds James Bonnyman, who severed his official connection with the company several months ago to go to Cincinnati, headquarters of a new company in which he is interested and which is extensively engaged in coal mining in Tennessee and Kentucky.

The Leeds Coal Co. is sinking a slope mine in the Cahaba Valley, east of Birmingham. The company was recently organized with I. F. Mankin, president; Henry Neny, vice-president and general manager, and W. H. Moore, secretary-treasurer. A spur track will be built to the new operation from the McCoomb's switch of the Central of Georgia Ry. Messrs. Mankin and Moore are residents of Jasper and Mr. Neny makes his headquarters in Birmingham.

At the recent examination held by the state board of examiners headed by C. H. Nesbitt, chief mine inspector and chairman of the board, thirty-three certificates were awarded to applicants who successfully passed the examination as first-class mine foreman, nine second class, and eleven received certificates of competency as fire-bosses.

The Hilliard Coal Co., with an opening at Hilliard, six miles west of Jasper, **is installing electrical machinery** and making other improvements to increase production.

The Monroe-Warrior Coal Co. is reported to be making arrangements to open new mines at Nauvoo, Walker County.

The Sterling Coal Co. has been incorporated at Jasper with a capital stock of $15,000 and the election of the following officers: President, Dr. S. S. Shores; secretary and treasurer, Albert Murray. The company will **develop new mines and lay tracks and tram lines** to the main line of the Frisco R.R.

COLORADO

The Coal Consumption of Denver and Denver's "500,000 by 1930" campaign will both be boosted when the first part of the new Chicago, Burlington & Quincy R.R. shops is put into service in that city. Coal-handling machinery with an hourly capacity of 50 tons is being installed; the employment of over 700 men initially will mean an addition of 3,000 people to Denver's population, and a further increase in coal consumption. The $2,500,000 contract, to be completed by September, 1923, provides a machine and erection shop to care for 175 engines, boiler and blacksmith shops, storehouse, oil house and power plant. The work is under the direction of W. T. Krausch, of Chicago, engineer of buildings for the C., B. & Q.

George P. White has been appointed sales manager of the **Huerfano Coal Co.** He formerly was connected with the Colorado Fuel & Iron Co.'s sales force.

The steel mills are working full time at Pueblo, and the Trinidad and Walsenburg mines are supplying them a total of 5,000 tons of coal per day.

The Leyden Coal Co.'s mine lost five days in January. The Denver City Tramway Co. and the Denver Gas & Electric Light Co. are supplied by this company.

DELAWARE

The du Pont explosive known as **Monobel No. 8 has passed all tests,** including the low freezing test, of the U. S. Bureau of Mines necessary to place it on the list of permissible explosives for use in coal mines. It is now entitled to the official L. F. designation and will hereafter be branded as Monobel No. 8 L. F.

ILLINOIS

Ora D. Dillavou, formerly one of the partners of Boone-Dillavou Coal Company, Champaign, has withdrawn from that firm to assume charge of the sales force of the Harris-Dillavou Co., also of Champaign, handling coal and building material. The business of the Boone-Dillavou Co. will be closed.

Fire recently caused several thousand dollars damage to the top works of the **Ernest Coal Co.** mine near Johnston City. The blacksmith shop, machine shop and several other nearby buildings were totally destroyed by the fire.

The **Pyramid Coal Co.** has been granted articles of incorporation at Springfield with a capitalization of $225,000. The offices of the new organization are at Marion.

The "Heato" mine at Carrier Mills **will resume work soon,** according to announcements given out. The property was recently purchased by the Carterville Fuel Co., of Carterville. It is reported that the company will open a strip pit on the land joining the mine.

Articles of incorporation have been filed for the **Southern Illinois & Kentucky Railroad Co.** at Mt. Vernon, Jefferson County. This paves the way for construction of the **new Illinois Central cut-off** to be built from Edgewood to Metropolis through the center of the vast **Franklin and Williamson County coal fields.** The new route will make the haul much shorter than the main line of the road via Carbondale and Duquoin, and will be used for freight and coal hauling almost exclusively, running only accommodation passenger trains. The incorporation papers were dated Jan. 11, 1923, and the capital stock is $40,000 divided into 400 shares of $100 each. The incorporators and directors are prominent Illinois Central officers: C. H. Markham, president of the Illinois Central R.R.; C. M. Kittle, M. P. Bleuvelt, W. S. Horton and Bert A. Beck.

The United Mine Workers have just opened the **American Hospital** in Johnston City. The institution is neat, clean and attractive. Dr. Fred Greenbaum, of West Frankfort, is in charge of the new hospital.

Mine No. 18 of the Chicago, Wilmington & Franklin Coal Co. at Herrin recently **broke its hoisting record** by bringing to the surface a total of 4,357 tons of coal in eight hours. The previous record of this mine was 4,175 tons. A total of 1,381 dumps were made on the day of this last record. The company's Orient No. 1 mine holds the world's record for a single day's hoist of 8,218 tons, and is located only a few mines from No. 18 mine.

Several of the mines located near Springfield have **reduced the price of coal for local delivery** 50c. per ton. A mild winter, with the consequent lessening of demand for coal over normal times, is given as the reason for the reduction.

J. W. Colliver, sales manager for Old Ben Coal Corp. of Chicago, is spending a month at Palm Beach, Fla.

The Standard Conveyor Co. has acquired by purchase all the rights, titles and patents pertaining to the "Brown Portable" line of portable and sectional piling, elevating, conveying, loading and unloading machinery for the handling of packed and loose materials. This line of machinery has been manufactured by the Brown Portable Conveying Machinery Co. at North Chicago for ten years. Until further notice the plant will be continued in operation by the Standard Conveyor Co.

An explosion in Mine No. 1 of the **Superior Coal Co. near Gillespie** caused injury to eleven men who were entering the mine one morning recently, their lamps setting fire to a pocket of gas which had accumulated during the night. All the men were burned. John Keeves was the most severely injured.

The **state mine rescue headquarters has been moved** from Harrisburg to Eldorado by recommendation from the State Department of Mines and Minerals. The station will be located on the top floor of the First State Bank of Eldorado Building and will be in charge of Frank Patterson, manager.

The Zeigler Coal & Coke Co. has been granted incorporation papers at Springfield and will mine and sell coal. The company will have headquarters in Zeigler and is capitalized at $18,000. The incorporators of the new concern are E. A. Bronson, Wm. J. Warr and Frank M. Wakefield.

The Chicago & Eastern Illinois R.R. announces that **a $500,000 extension** will be made in the shops of that company in Salem. The road handles much of the Franklin and Williamson County coal mine output through Salem and has found the present facilities inadequate.

The St. Louis Coke & Chemical Co., with large plants at Granite City, and main offices in St. Louis, announces that it will start construction soon on a **new blast furnace** which together with other improvements will cost approximately $1,500,000. The plant consumes large tonnages of southern Illinois coal daily and is at present turning out large amounts of benzol, which constitutes the basis of the motor fuel sold under the name of benzol gas. According to announcements given out by C. R. Holzworth, superintendent of the plant, the new equipment to be installed will practically double the company's present output of coke and byproducts.

The St. Louis Coal & Iron Co. will open a new mine in Johnston City about March 1, according to reports. The mine will be equipped with electrical mining and haulage machinery and will be modern in every respect.

The **Cloverleaf Coal Co.,** of Marion, has been incorporated and capitalized at Springfield at $150,000. The company will mine and sell coal and is expected to open a new mine at Marion in the near future.

A part of the surface plant at **Franco Mine No. 1,** at Johnson City, belonging to Cosgrove & Co., was recently **destroyed by fire.** This is not expected to interfere seriously with operation, and the owners say they will be able to replace the buildings in a month.

INDIANA

Fire of undetermined origin recently caused a $20,000 loss to the old Freeman mine, now known as the **Howe-Coulter mine No. 2,** located at the edge of Bicknell. Firemen were able to save the engine house and its equipment, but virtually all the other superstructure burned. Thirteen men at the bottom of the shaft when the fire was discovered escaped without injury. The mine was idle the day of the fire. William Howe, John Coulter and Robert McCleavy, all of Chicago, are the principal stockholders in the company. The mine formerly was operated by the Tecumseh Coal Co. and has been producing Fifth vein coal for more than twenty years.

Unscrupulous coal dealers will have a difficult time misrepresenting the kinds and grades of coal they sell to consumers if a bill introduced in the Senate of the General Assembly of Indiana by Senator Rowland H. Hill, of Carthage, goes through. Senator Hill is a retail coal dealer. The bill would require every wagon load of coal to be accompanied by a delivery ticket showing in pounds the gross weight of the load and the tare weight of the delivery vehicle. One of the tickets would be given to the purchaser and the other retained by the deliveree. The ticket would also show the state in which the coal was mined, the name and number of the vein or seam from which the coal was taken and the size and grade of the coal.

Creation of a state department of mines and mining to consist of two operators, two miners and the state mine inspector is asked in a bill introduced in the Indiana General Assembly by Clem J. Richards, of Terre Haute, a mine operator. The bill is the direct result of the findings of the commission created by the 1921 Legislature to codify all mining laws and make recommendations for the betterment of the industry.

Only three new provisions are contained in the **codification of the mining laws of Indiana** prepared by a state codification commission and introduced as a bill in the General Assembly by Senator Clem J. Richards, a coal operator. One provision seeks to protect miners from the danger of oil and gas wells that are drilled through coal seams, by providing that the well owner must incase his drilling in concrete or piping. Another provision governs the placing and use of electrical appliances in mines and the third deals with the manner in which worked-out parts of mines shall be sealed off from other parts. The bill introduced previously by Mr. Richards providing for a state mining department, separating the present state mining inspection work from the state industrial board, is not a part of the codification bill. The proposal, however, has the unanimous approval of the codification commission, Governor McCray, the industrial board and operators and miners in the state, according to Cairy Littlejohn, state mine inspector. **It has passed the Senate** 40 to 3 and has gone to the House.

The Sterling Collieries has been organized in Indianapolis for the purpose of doing a general coal mining business. The company has a capital stock of $100,000 and the organizers are William Schrolucke, John A. Templeton and Clarence W. Means.

The mines of the **Archbold Coal Co.** at Newburg, after being shut down for three weeks, reopened recently, when about 100 miners returned to work, following a strike which was caused by the miners walking out when the company changed brands of powder without first consulting the workers.

KENTUCKY

The F. T. Slider Co., Louisville, Jeffersonville and New Albany, handlers of sand, gravel and coal, operating its own river equipment, has recently placed orders for **six all-steel barges** with the Howard Shipyard Co., at Jeffersonville. This is one of the first companies in that district to build all steel barges for towing coal, sand, etc.

Willard R. Jillson, state geologist, in a recent talk in Louisville, said that during the first six months of 1922 Kentucky produced 17,267,132 tons of coal and during the first eleven months, on incomplete records, 36,361,000 tons were produced.

The two mines of the Coil Coal Co. have been sold by the Coil interests to the West Kentucky Coal Co., of Paducah and Sturgis. The report of the sale stated that the properties were purchased by W. F. Bradshaw, tobacco and insurance man; C. F. and H. L. Richardson, Paducah and Sturgis respectively, and T. E. Jenkins, Sturgis. Other than Bradshaw the purchasers are all connected with the West Kentucky Coal Co. The mines have a capacity of 1,250 tons daily, some reports stating 2,000 tons.

K. U. Meguire, of the Harlan Coal Co. interests, Louisville, reports that the **Letcher Coal Mining Co. has succeeded the Amburgy Coal Co.**, operating in Letcher County, and the capital has been increased from $185,000 to $225,000. Mr. Meguire continues as president. The Meguire interests recently took over the Perciful-Gorman coal mine interests, in the Hazard field of Perry County, known as the Perry County Coal Corp., on Carrs Fork. That concern has become the Black Hawk Coal Co.

A report from Smithland, in a district from which very little coal has been reported, is to the effect that a 5-ft. vein of good coal has been struck on the farm of H. F. Moore, near Carrsville, at a depth of 107 ft. At 12 ft. a 12-in. vein was found and a 20-in. vein at 60 ft. It is reported that a stock company is being formed to promote the mine and that a shaft will be sunk next spring or summer.

Notice has been filed with the County Clerk at Louisville affirming ownership of the **Kentucky Block Coal Mining Co.**, of Blue Diamond, by Harry F. Buloock and V. B. Renaker, Lexington; and C. S. Foyle and John Hayslett. The company operates in Perry County. Buloock and T. E. McConne also affirmed ownership of the **Kentucky Jewel Coal Co.**, of Lexington.

Charles Buddeke, of the Charles Buddeke Coal Co., Louisville, and his partner, Denver P. Cornett, who also is connected with the Cornett Lewis Coal Co., Harlan County, are **planning to install automatic unloading equipment at the Louisville retail yard**, but have not been able to decide on the best equipment as yet. Plans have been considered for an elevated trestle for unloading cars to hoppers, and also for a dumping pit, using electric conveyors to hoppers, or locomotive crane to hoppers and trucks. The city has a yard next door, which has a low elevated track, which could be carried over to the Buddeke yard at a higher elevation, but Buddeke is opposed to unloading from track, contending that there is too much breakage in soft coal.

As a result of heavy rains throughout the Ohio Valley, **the Ohio and tributary streams are rising rapidly**, the river being close to flood stage at Evansville, Ind., and some points, but affording a fine boating stage for movement of coal tows in the Kentucky and upper Ohio, and from Western Kentucky south to points in Louisiana and Arkansas. The present high stage is very welcome to river coal men following the long summer months in which the river was a dried up stream.

MARYLAND

The tipple of the Sullivan Bros. Coal Co. at Carlos, near Frostburg, was **destroyed by fire** on Feb. 1. Nearly 100 men were thrown out of work.

MINNESOTA

There seems to be **no end to the activities of the Ford interests.** With the announcement of the establishment of a large manufacturing plant on the west edge of St. Paul, adjacent to the Minneapolis labor market, came the report that coal was to be brought up from the Illinois mines on barges on the river and unloaded at the plant. But it is also given out on what seems to be good authority, that the Ford interests are also about to buy a coal dock at the Head-of-the-Lakes.

The Minneapolis & St. Louis R.R. Co., J. D. McCarthy, general purchasing agent, Minneapolis, **is taking bids** until Feb. 14 for furnishing coal from March 1 to Dec. 31, 1923, for various sizes (mine-run, lump, egg and screenings) the quantity to be 300 tons to 1,000 tons per day daily except Sundays.

The report of Ivan Bowen, as State Fuel Administrator of Minnesota, recommending state control of fuel selling, has thoroughly aroused Twin Cities coal men. They declare that neither the state nor the nation has as yet demonstrated any ability to administer business any better for either the public or the industry than private owners do. They see in the report merely a bid for votes—a regular political movement.

The Republic Coal Co., of Minneapolis, and affiliated concerns, Pratt Bros., the Midway Coal Co. and others, has moved from the Franklin Building to 629-635 Palace Building, where larger quarters are available.

A bill has been introduced in the Legislature which would make it **unlawful for mining and fireboss certificates to be granted aliens.** It has been reported on favorably in committee. Another bill would abolish the Public Utilities Commission. Former Chief Justice Corfman has been made a member of this body in place of Judge Heywood, deceased.

The trial of the coal and lumbermen charged with price-fixing following a grand jury investigation last fall, will not come up till April or May, it having been again postponed.

MISSOURI

The Mulberry Hill Coal Co. is a new concern just incorporated for $200,000 and will maintain offices in St. Louis. The company will mine and sell coal. The incorporators are W. F. Zerban, E. E. Carter and F. Nold.

NEW YORK

The Morrison & Risman Co., manufacturers and jobbers in railway track equipment, handling new and relaying rails, frogs and switches, spikes, bolts, nuts, tie plates, etc., has been incorporated with a capital of $500,000, fully paid in. The officers of the company are S. Morrison, president; S. Risman, vice-president; R. L. Morrison, treasurer, and S. H. Risman, secretary. The company maintains general offices in Buffalo, N. Y.; a district sales office in Philadelphia, Pa., and has works and warehouses in East Buffalo, N. Y., and Lebanon, Pa.

NORTH CAROLINA

The Carolina Coal Co. of Sanford is reported to have let contracts for the construction of three miles of railway to connect the mines at Coal Glen with the Norfolk Southern R.R. and the Southern Ry. between Cumnock and Gulf.

OHIO

A strike of 400 miners in the employ of of the Rail & River Coal Co.'s mine at Bellaire early in February in the face of an order from President Ledvinka of Ohio Subdistrict 5 directing them to remain at work was denounced by Ledvinka, who said: "These men have no grievance and I am ashamed to confess that men in my district would be guilty of such a flagrant violation of the contract between the operators and the United Mine Workers." The strike appears to have grown out of several minor complaints as to working conditions, but notwithstanding the adjustment of such differences the miners walked out. Commenting further on the action of the miners in striking Ledvinka said he had ordered the men to return to work forthwith.

A. Y. Miller, foreman of the U. S. Bureau of Mines Car No. 7, recently spent a week in Kirksville, where he gave free instructions in first-aid work to all miners of Adair and adjoining counties, who availed themselves of the opportunity. There is a strong possibility of the next state-wide meeting in first-aid and rescue work being held in Kirksville, in which first-aid teams from all parts of Missouri will participate.

Mrs. W. K. McKiernan, widow of William H. McKiernan, a miner of Moberly, who gave his life July 18, 1919, in saving Bob Anderson, a carpenter, from suffocating in the Kimberly mine near this city, **has been awarded abronze medal and $70 a month from the Carnegie Hero Fund Commission**, with an additional $5 a month for each of two children. McKiernan's heroism followed an accident at the mine when black damp got into the compartment in which Anderson was working.

PENNSYLVANIA

An Eastern syndicate has acquired 2,000 acres of coal land in northern Cambria County. This land was the property of the Central Cambria Coal Co. The price paid was $325,000. T. Stanton Davis, of Ebensburg, one of the principal owners, conducted the negotiations. The land contains Miller seam coal of the Wilmore basin.

A state charter was recently issued to the **Pittston Fuel Co.**, Scranton. It will mine and prepare coal for the market. Its capital is $25,000, and Richard R. Walsh, Scranton, is treasurer and one of the incorporators, the others being Patrick R. Jordon and John J. McGuire, Scranton.

The Old Buffalo Coal Co., Philadelphia, has notified the State Department at Harrisburg that it has changed its corporate title to the **Pennsylvania Coal & Mining Co.**

Five Johnstown mines of the Cambria Steel Co. broke all output records in January by producing 187,804 tons of coal. The previous high mark for these mines was made in November, 1922. The Slickville mines, in Westmoreland County, which are a part of the Cambria mining department, produced 66,700 tons in January, and the mines of the Union Coal & Coke Co., a subsidiary of the Midvale Steel & Ordnance Co., located in Washington County, produced 150,658 tons, bringing the total production for the entire department to 405,162 tons for the month.

A new coal-mining company has been organized at Curwensville, Clearfield County, to be known as the **M. & N. Coal Co.** At the organization J. Howard Thompson was elected president; L. C. Norris, secretary-treasurer; C. O. Norris, A. Z. Wolf and John W. Norris, of Curwensville, and Don Mahaffey and F. C. Mahaffey are the other members of the firm. They will operate on the Robert Mahaffey tract, consisting of some 2,000 acres, underlaid with Moshannon vein, and near the New York Central R.R. at Mahaffey.

An appeal has been taken against increases in coal valuations in Greene County. The valuations have been advanced from 20 to 75 per cent and have increased the taxable coal values in the county by $6,000,000. In all 502 appeals have been taken.

George R. Marietta has been elected president of the Connellsville Coke & Fuel Co. to succeed his father, the late Rockwell Marietta. W. F. Soisson was re-elected vice-president and W. H. Soisson, secretary and treasurer. The following board of directors was elected: V. H. Soisson, W. F. Soisson, W. H. Soisson, William H. Marietta, J. G Percy, George R. Marietta, and Clarence B. Marietta, the last-named being a new member of the board.

Engineers from far and wide in northeastern Pennsylvania attended the **annual banquet of the Engineers' Society of Northeastern Pennsylvania**, held at Hotel Casey, Scranton, Feb. 1, which was one of the most successful and enjoyable in the history of the society. Dr. John M. Thomas, president of State College, newly elected president of the society, officiated as toastmaster. Dr. Thomas gave a brief address in which he outlined the history of the work done by engineers in bringing the world to its present state of prosperity and predicted that engineering work will have an important bearing on the industrial future of the world. George E. Stevenson, retiring president of the society, introduced Dr. Thomas in an impressive talk. The speaker of the evening was Dexter S. Kimball, dean of the school of engineering at Cornell University and past president of the American Society of Mechanical Engineers. Mr. Kimball's address was interesting and instructive. Peter G. Rimmer, of Wilkes-Barre, was chairman of the banquet committee.

Somerset County coal output is to be increased by extensive improvements in the Garrett section. The Tri-State Colliers Coal Mining Co. producing 1,000 tons daily, has equipped the mine with electricity. The operation in Moshannon vein owned by Charles Merrill as well as that of the Moore, Courtney & Furtney Co. has also been electrified. A new development in the Moshannon vein is being opened by the George Stein Coal Co.

A. J. Musser, general manager of the Clearfield Bituminous Coal Corporation, has by action of the board of directors been appointed vice-president and general manager in charge of the property and operations of the corporation with headquarters at Indiana.

General Manager J. B. Warriner, of the **Lehigh Coal & Navigation Co.**, in an open letter to taxpayers and others in the Panther Creek region, calls attention to the fact that local taxation—that is school, borough and county taxes—has increased 383 per cent since 1913, as far as this company is concerned. In 1913 the total was $191,000. In 1922 it will be approximately $923,000. These figures do not include the anthracite tonnage tax, which will amount to about $500,000 a year on navigation output, nor do they include any other state or federal tax. In a general way, it might be said, purely local taxation is costing about 25c a ton on the total navigation production. In 1921 the local taxes mounted to $473,000. "The big jump in 1922," says the letter "is due to the action of the Schuylkill County Commissioners, who have assessed coal lands at from five to ten times their actual value, or at the rate of 500 to 1,000 per cent, while private property has been assessed at from 8 to 50 per cent of its actual value. During the period 1913-1922 wages have increased approximately 137 per cent; the cost of living, according to the government index, has risen 55.6 per cent; while taxes have increased 383 per cent. Every cent for taxes unjustly or unnecessarily levied is a blow at the anthracite industry. The results inevitably will be low wages or curtailed working time, which is the same thing. When this time comes it will be too late to remedy the situation—the mine worker will suffer, not the politician."

Robert Holiday, superintendent of the Crucible mine of the Crucible Fuel Co., at Crucible, has resigned his position.

Charles Enzian, consulting electrical engineer, of Philadelphia, has accepted a position as chief engineer of the Berwind-White Coal Mining Co., at Windber, succeeding **James Browning**, who has been appointed as general superintendent.

The Triple Vein Coal Co., owned by Charles F. Roy, and Robert Roy, both of Somerset, and H. P. Wood, engineer, of New York, is equipping the Southside mine, on the Casselman River at Garrett, with a **belt conveyor and picking table combined**, the work being under supervision of Engineer H. P. Wood. A double crossing also is being placed at the pit mouths. The improvements will enable the company to load coal at both the Baltimore & Ohio and the Maryland R.R. sidings. The improvement will increase the daily tonnage to 1,000 tons.

UTAH

The I. C. C. has given the Carbon County Railroad Co. permission **to build 4.79 miles of railroad** from a junction on the Sunnyside branch of the D. & R. G. Ry. to the coal deposits of the Utah Coal & Coke Co., which are to be developed by the Columbia Steel Co. The cost of construction, without equipment, is estimated at $293,902. This includes $56,459 for tipple yards. The equipment is expected to cost $50,000. Construction is expected to be completed by May 1, 1923.

According to the U. S. Bureau of Mines, **more coal is being mined under government leases in Utah than in any other state** in the Union. Out of the forty-four coal leases thus far made by the government, fifteen are in Utah

At this writing **the fate of the Utah Public Utilities Commission seems to be in the balance.** Two or three lively hearings have been held by the legislative committee in charge of the bill to repeal the law, establishing the commission. One witness stated that since the commission was created in 1917 it has saved the people of Utah $3,000,000 in refusing carriers' advances in freight rates.

VIRGINIA

The Fall Branch Coal Corporation, of Johnson City, Tenn., which was lately incorporated for $20,000, has 300 acres of coal land under development at Splashdam, with a daily capacity of 200 tons.

The Fairfield Coal Corporation, of Wise, has been incorporated with a capital of $10,000. S. U. Hyman, of Keystone, W. Va., is president of the corporation and Max Kaplan, of Wise, Va., is secretary.

The Old Dominion Coal, Iron & Coke Co., of Roanoke, has increased its capital to $200,000. J. N. Newton, Jr., is president of the concern.

WEST VIRGINIA

The Ideal Coal Co., of Charleston, has been incorporated with a capital of $150,000. The incorporators are S. L. Walker, G. L. Guthrie and A. S. Jenkins.

The Independent Coal Co., of Huntington, has increased its capital stock to $100,000.

The capital stock of the **National Coal Mining Co.**, of Charleston, has been increased from $50,000 to $150,000.

The Jack Run Coal Co., of Clarksburg, has been incorporated with a capital of $60,000 and with Lugi Ridolfi, of Barracksville, and William D. Aurorea and Z. Ridolfi, of Clarksburg, as the incorporators.

The Mountain State Coal & Gas Syndicate has been formed at Huntington, to take over the Williams Sanatarium at Kenova, the Gracum Coal Co. and the Cabell Oil & Gas Co., of West Virginia, and the Mud River Co. and the Stevenson Coal Co. of Kentucky. The company is capitalized at $2,000,000 and has elected the following officers: President, **Thomas W. Jones**, of Middleport, Ohio; secretary, E. W. Bush, of Huntington, W. Va.; treasurer, T. J. Kennedy, of Huntington, W. Va.

The Monongah Fuel Co., of Monongah, of which David Victor is president and general manager, has awarded the contract for the installation of electrical equipment to the Fairmont Electric Service Co., at Fairmont. The improvements will consist of three transformers, motor generator set, a switch, lightning arrester,, steel substation tower and miscellaneous switchboard and protective apparatus.

An announcement just given out at the headquarters in Indianapolis, Ind., of the United Mine Workers of America that **a compromise** has been reached in the damage suit of the **Willis Branch Coal Co.** of West Virginia against the Mine Workers, was **"unfounded and unauthorized,"** according to John L. Lewis, international president. Mr. Lewis said that the extensive nature of this litigation has required numerous conferences between counsel for both sides and that "the entire subject matter is still in the hands of the attorneys."

Negotiations are reported to be in progress by Henry Ford for the **purchase of the coal interests of T. E. Houston** in Mingo and McDowell Counties, according to reports here, which local operators assert are reliable. The main offices of the Houston interests are in Cincinnati. The properties constitute the second largest coal operations in southern West Virginia. Those involved in the reported negotiations are: Houston Coal Co., Maitland mine, Maitland; King Coal Co., King Mine, Kimball; Tidewater Coal & Coke Co., Tidewater No. 1 and No. 2 mine, at Vivian; Houston Collieries Co., Carswell No. 1 and No. 2 mines at Kimball; Keystone Coal & Coke Co., Keystone Mine, Keystone; Houston Coal & Coke Co., Houston mines Nos. 1, 2 and 9, at Elkhorn; Thacker Coal & Coke Co., Thacker mines Nos. 3, 9, 11, 12, 15 and 18, at Thacker.

Probable purchase of the Virginia Ry. by Henry Ford continues to be a topic of absorbing interest in coal circles. The understanding is that Mr. Ford would like to obtain possession of this road in order to make Norfolk a terminal for all shipments to Europe and South America.

To the 103 mines now operating on the Virginian Ry. is soon to be added that of the **Morrison Coal Co., which will ship about 50,000 tons a month.** The company has under lease a total of about 4,600 acres on Laurel Fork of the Guyan River in the Wyoming County field. The Morrison Coal Company is one of the group in which the Laings are interested. Some coal is already being mined and stored at the source of production pending completion of a spur of five miles from the main line of the Virginian, which is to be ready about May 1. In the meantime work is boing forward on the tipples and within the next six weeks work will be begun on the construction of houses. The plants of the new company will be of the most modern type and every convenience and comfort will be provided for the workmen.

The Virginian Ry. enjoys the distinction of having the largest wreck-train crane in use on any railroad in the world. It is a 200-ton crane and was built especially to handle the big moguls operated by that railroad.

The Bell Creek By-Product Coal Co. has been incorporated, the capital stock of the company being fixed at $50,000. Montgomery is given as the general headquarters of the company. Incorporators of the new concern are J. E. Wilkinson, F. E. Smart, W. H. Koester, G. C. Humphreys, C. N. Smithson and W. H. Thomas, all of Montgomery.

The Logan County Coal Corporation, just organized, represents a consolidation of several companies in the Logan field in which the same people were interested, the effect of the merger being to combine all the companies under one management. The concerns consolidated were the **Lundale Coal Co., the Three Forks Coal Co., the Amherst Fuel Co.** and several subsidiaries. The combined capitalization of all the companies is in the neighborhood of $1,000,000. With all the companies under one management it is estimated that it will be possible to reach a production of 2,000,000 tons a year. Officers of the Logan County Coal Corporation are: George M. Jones, president; J. N. Schweitzer, vice president; Angus MacDonald, of Charleston, secretary; W. R. Foglesong, Jr., assistant secretary; F. P. Chambers, treasurer; W. W. Beddow, general superintendent; J. B. Kirkpatrick, purchasing agent; R. C. Newman, auditor. The company will have its general office at Lundale.

Receipt of a check for taxes of the **Consolidation Coal Co.** in Marion County, discloses that that company is the largest taxpayer in the county. In Marion County alone the Consolidation company paid a total of $114,000 in taxes.

The Kuhn Coal & Mining Co. has executed a lease to A. M. Sigmon, F. W. Kuhn and D. C. Breedlove covering a seam of coal known as the Peerless Gas on Witchers Creek for a period of five years. The lessees will be required to pay a royalty of 50c. a ton on all coal mined. Failure to operate the mine for a period of 80 days will serve to invalidate the lease.

WISCONSIN

H. H. Morris has been appointed district manager of the Cincinnati office of **the Valley Coal Co.**, Milwaukee, Wis., and also will handle the purchase of coal from mines in the States of West Virginia and Kentucky. **R. E. Olmstead** has been appointed field agent of the company, with headquarters in Huntington, W. Va.

The Chippewa Lumber & Coal Co. has been incorporated at Chippewa Falls with a capital of $70,000; incorporators: W. A. King, H. T. King and T. A. Willenbockel.

Alex B. Uhrig was elected to the presidency of the **Milwaukee-Western Fuel Co.**, made vacant by the death of his father, Edward A. Uhrig, in December.

CANADA

The Spokane & Alberta Coal & Coke Co., of which L. K. Armstrong, of Spokane, Wash., is general manager, **is opening up coal lands in the Crow's Nest Pass district.** A considerable expenditure already has been made on development and it is planned to begin shipping coal some time this winter. The Canadian Pacific Ry. has given permission for the linking of the company's three-mile spur with the main line of the Crow's Nest Pass Ry., and the work is in progress.

In an address given at a luncheon held at Drumheller, Alta., in honor of Sir Henry Thornton, president of the Canadian National Railways, Ltd., J. Gouge, vice-president of the Western Canadian Coal Operators' Association, advocated the **elimination of the Canadian import duty of 53c. a ton on lignite**. This duty, he said, afforded no protection to the Canadian lignite industry, but on the contrary adversely affected it in its efforts to become established in the Western States. The United States, it was pointed out, exacts a duty on coal only from countries imposing an import duty on that commodity. To Sir Henry Thornton, it was suggested, that Alberta coal might be established in the Ontario market if through coal trains were provided at much reduced rates.

The executive committee of the United Mine Workers, District No. 26, Glace Bay, N. S., has decided **to abide by the ruling of the International Executive Board** that the application of the district for permission to affiliate with the Red International of Moscow be withdrawn. It was decided to appeal to the next International convention of the United Mine Workers.

The property of the old Diamond Coal Co. near Lethbridge, Alta., is getting a new lease on life under the management of the **Consolidated Diamond Collieries**, which is now operating three slopes in the 5,000-acre tract controlled by the new company, and **will soon sink a shaft and begin a development of the property to raise its output from about 800 tons a day to 2,000 tons.** J. L. Parker, of Burmis, who formerly was with the Diamond Coal Co., becomes general superintendent of the Consolidated company's operations in February. Melvin Jackson, managing director, has been on a trip through the mining regions of the East and Middle West in the United States buying machinery and equipment.

Association Activities

Logan Operators' Association

Charles W. Jones, president of the Merrill Coal Co., was elected president of the Logan Operators' Association at its annual meeting held in Huntington on Feb. 3. Other officers chosen were: Frank Enslow, Huntington, first vice-president; A. J. King, Huntington, second vice-president, and H. A. McAllister, treasurer. The executive committee consists of President Jones, A. R. Beisel, H. E. Jones, G. M. Jones, R. R. Smith, W. R. Thurmond, C. H. Jenkins and M. E. Kent.

Following a discussion it was decided to ask the Chesapeake & Ohio Railroad Co. officials to improve the transportation facilities from the Logan field. The association was asked to extend its aid to the establishment of a hospital for crippled children which it is proposed to erect at Huntington. A banquet followed the meeting.

Winding Gulf Operators' Association

The Winding Gulf Operators' Association held a meeting at White Sulphur Springs on Feb. 3, when transportation facilities on the Virginian Ry. were discussed, shippers at the meeting seeking to ascertain just what they might expect from the Virginian in the future. There were representatives of 103 mines present at the meeting. S. M. Adsit, traffic manager of the road, declared that although the Virginian was handicapped by a lack of adequate motive power the road had succeeded in handling 1,000 more cars of coal during January than during any corresponding month in its history. The management of the road has ordered fifteen new locomotives of the large type, some of which will be available by May and all of them by July 1. The road will soon receive bids from two of the larger electrical manufacturing companies for the electrification of the road from Elmore, W. Va., to Roanoke, Va.

As a result of a discussion of mine rating and distribution, a committee of two was named to meet with like committees from each coal district on the line of the Chesapeake & Ohio for the consideration of new rules affecting the allotment of coal mines. The association also went on record in favor of the construction of a hard surface road from Beckley to Mullens.

Morgantown Wholesale Coal Association

The Morgantown Wholesale Coal Association at a recent meeting held in Morgantown named the following officers for this year: R. R. McFall, of the Southern Fuel Co., president; F. M. Lucas, of the Stentz-Lucas Coal Co., vice-president; W. M. Powell, of the Southern Fuel Co., treasurer; Paul H. Keener, of the Metro Coal Co., secretary; C. E. Watson, of the C. E. Watson Coal Co., secretary of the board of directors. It was decided by the association to hold a meeting every Tuesday and that at every meeting a program of interest to the coal industry should be arranged for. The speaker at the first meeting held in accordance with such a plan was C. M. Lyons, of the Equitable Coal Co., whose subject was business ethics as applied to the coal industry.

Traffic News

In taking exception to the tentative opinion in the Western coal rate case, the Sheridan-Wyoming Coal Co., the Big Horn Collieries Co. and the Owl Creek Coal Mining Co. declare that "in order to give all Western coal an opportunity to compete, **differentials, in cases where they are necessary, should be made as small as possible.**" They make a plea for definiteness in these differentials so that there will be no uncertainty in the future and that they have the right to demand rates on fine coal to any destination to which the carriers carry fine coal rates from competing points of origin.

The Kemmerer-Rock Springs operators urge the Commission to prescribe **a differential of 85c. for southern Wyoming** under Castle Gate to the Northwest and permit the Union Pacific to establish the Castle Gate basis of rates from southern Wyoming to Salt Lake City or, as the irreducible minimum, to prescribe a differential of 75c. to the Northwest and permit the Union Pacific to establish the Castle Gate basis of rates from southern Wyoming to Salt Lake City.

Extension of the Tennessee, Alabama & Georgia Ry. Co.'s tracks from Gadsden to Odenville, Ala., has been approved by the Interstate Commerce Commission. This extension will afford transportation to a coal and iron region.

In an effort to meet the shortage of domestic fuel in the South, the Interstate Commerce Commission on Feb. 9 issued Service Order 38, which probably will be followed by similar orders, instructing the Southern Railway Co. **to assign fifteen cars per working day** to the mine of the Montevallo company at Aldrich, Ala. The order is to be in effect until March 5. It provides, however, that not more than 20 per cent of the amount shipped on any day is to be sold for use for other than domestic purposes. The cars assigned under this order are not to be counted against the distributive share of the mine.

After an extended study of the coal rates involved in the case of **Dewey Brothers Co. vs. the Norfolk & Western Ry.**, A. S. Worthington, an Interstate Commerce Commission examiner, has submitted a tentative opinion stating that the commission should find that **rates on coal** in carloads from inner crescent mines served by the Chesapeake & Ohio, Louisville & Nashville, and Norfolk & Western to Blanchester, Leesburg, and Lynchburg, Ohio, **were unreasonable** to the extent that they exceed $1.70 per ton prior to Aug. 26, 1920, and $2.38 thereafter, and that like rates from inner crescent mines on the C. & O. and L. & O. to Lynchburg are unreasonable to the extent that they exceed $2.38 per ton.

He also states that the commission should find that the **rates on coal from outer crescent mines on the N. & W.** to Blanchester, Leesburg and Lynchburg **were unreasonable** to the extent that they exceeded $1.80 per ton prior to Aug. 26, 1920, and $2.48 thereafter. As the present rates, with the exception of the rate to Lynchburg, from points on the C. & O. and L. & N. are in conformity with the proposed conclusion no order with respect thereto is necessary.

Rates on coal from mines on the Norfolk & Western in the Pocahontas, Kenova, Thacker and Clinch Valley districts to stations on the Norfolk & Western and connecting branches between Roanoke and Bristol are found to be **not unreasonable.** In its opinion to that effect the Interstate Commerce Commission dismisses the complaint brought by the Mathieson Alkali Works at Saltville, Va.

An unreasonable rate was charged the Hoosier Lime Co. for the transportation of 55 cars of coal from Victoria and Midland, Ind., to Salem, Ind., in the opinion of the Interstate Commerce Commission's examiner who handled the case. In his tentative report he recommends the payment of reparation.

Charges collected on coal from the Globe Iron Co.'s mine to its furnace at Jackson, Ohio, were not unreasonable, in the opinion of the Interstate Commerce Commission's examiner who handled the case. He recommends that the complaint be dismissed.

Obituary

The death, on Jan. 24, of **David Cochrane,** the inventor, designer and first builder of the open feed water heater which bears his name, closes the career of a man whose ideas have resulted in the conservation of millions of tons of coal per annum in the United States and elsewhere. Mr. Cochrane was born in Sawkey, Clackmanmonshire, Scotland, in 1850, and in his early years worked as a patternmaker on the Clyde. In 1879 he came to the United States. His open heater, brought out in 1883, was specifically designed to protect boilers from the effects of cold, unpurified feed water and was itself the first to be built of cast iron plates, to avoid corrosion. Mr. Cochrane also was the first to design a successful oil separator, a heater and receiver, and other appliances which have since become standard practice.

Abraham Carpenter Overholt, aged 65 years, died at his home in Scottdale, Pa., on Jan. 31, after several weeks' illness. He was vice-president of the Lincoln Coal & Coke Co., director of the East Fayette Coal Co. and the Woodland Coal Co., all with offices in Scottdale. Mr. Overholt also was vice-president and a director of the First National Bank and a director of the Scottdale Savings & Trust Co. He was the founder of the United States Cast Iron Pipe & Foundry Co. at Scottdale and at one time was its president.

William C. Goodnow, 57, for many years connected with the coal trade in Minneapolis, died Jan. 28, following an operation. With his brother, the late John Goodnow, (afterwards consul-general to Shanghai, China) he engaged in the retail business in 1893. In 1909 he formed the W. C. Goodnow Coal Co., wholesale, with offices in the Lumber Exchange, which he continued until his death. He was a 33d degree Mason, and was active in club life. Interment was at Hannibal, Mo.

Recent Patents

Stopping for Mine-Ventilating Crosscuts. Joseph F. Joy, Pittsburgh, Pa., assignor to Joy Machine Co., Pittsburgh, Pa.; 1,435,008. Nov. 7, 1922. Original application filed Feb. 15, 1919; serial No. 277,177. Divided and this application filed March 24, 1920; serial No. 368,454.

Spirit Level and Plumb. H. C. Drummond, Davenport, Iowa; 1,435,054. Nov. 7, 1922. Filed Jan. 3, 1921; serial No. 434,742.

Mining-Machine Chain. Clyde L. Kenton, Columbus, Ohio, assignor to the Jeffrey Mfg. Co., Columbus, Ohio; 1,435,309. Nov. 14, 1922. Filed May 3, 1920; serial No. 378,518.

Coal Breaker. Frank Pardee, Hazleton, Pa.; 1,435,330. Nov. 14, 1922. Filed Dec. 30, 1921; serial No. 525,863.

Safety Arrangement for Charging Devices of Hoist Cages. Ludwig Thallmayer, Berlin-Charlottenburg, Germany; 1,435,564. Nov. 14, 1922. Filed May 17, 1921; serial No. 470,460.

Coming Meetings

The Rocky Mountain Coal Mining Institute will hold its winter meeting Feb. 24-26 in Denver, Colo. Secretary, Benedict Shubart, Boston Building, Denver, Colo.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

National Foreign Trade Council will hold its annual conference April 25-27 at New Orleans, La.

Northwestern Pennsylvania Coal Operators' Association will hold its annual meeting March 6 at the William Penn Hotel, Pittsburgh, Pa. Secretary, T. F. Diefenderfer, Butler, Pa.

Canadian Institute of Mining and Metallurgy's annual meeting will be held March 7, 8 and 9 at the Mount Royal Hotel, Montreal, Quebec, Canada. Secretary, George C. Mackenzie, Montreal, Quebec, Canada.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

Indiana Bituminous Coal Operators' Association will hold its annual meeting March 14 at Terre Haute, Ind. Secretary, P. H. Penna, Terre Haute, Ind.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Southern Appalachian Coal Operators' Association will hold its annual meeting Feb. 23 at Knoxville, Tenn. Secretary, R. E. Howe, Knoxville, Tenn.

The executive board of the **Coal Mining Institute of America** will meet in Pittsburgh, Pa., Saturday, March 3.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 23 NEW YORK, THURSDAY, FEBRUARY 22, 1923 Number 8

Shades of George Baer!

IT IS a commonplace to designate certain among the labor side as radicals and thus to indicate they are disposed to turn things upside down, to destroy the present order of things and make the world over. The complacent majority always is more or less tolerant of the antics of the "reds" providing they are not too militant, the more philosophical probably conceding that it is healthful to be stirred to thought at times.

The ultra conservative and the radical are so far apart that they come together, as when East meets West. The ultra conservative lives in the past and has learned nothing of the present. It is but a step from his way of doing things to the way the radical would have them done. If we decry the radical, we must deplore the ultra conservative. If we would take issue with the element—it happens to be in labor—that would abolish capital and despoil the public for its own selfish ends, we also must take issue with the element—it happens to be in capital—that would override the rights of all others.

We are as disposed to dub the coal operator a radical who has no respect for the public or the rights of his fellow operators as we are the labor unionist who wants to take over the coal mines. The coal operator who is so steeped in his own ego that he consistently refuses such a measure of co-operation in an emergency as has been deemed reasonable by his fellow operators is as dangerous to the public welfare and the peace and good repute of the coal industry as any who wave the red flag. On his head rests more responsibility for unrest, suspicion and public condemnation than upon all the acts of all others combined. A policy of the "public be damned" no longer sets will in this country.

It is an unfortunate weakness in the present order of things that a whole group must appear to condone, if indeed it is not held equally at fault, for the policy of wilful obstinacy of one of its number. There is no means of discipline. There is but disappointment and chagrin that an otherwise good record of responsible coal operators for sensible, reasonable co-operation with the government should be marred by one of their number.

Canada's Share of Available Anthracite

MATTERS of fact and matters of policy are involved in the present controversy over the anthracite shortage in New York and New England and the embargo on shipments to Canada demanded by certain spokesmen from that territory. The matter of policy is easily and quickly disposed of. To all intents and purposes Canada is a part of the United States so far as coal is concerned. This question was threshed out during the war as well as in the 1919 strike, and Canada was treated as one of the states of our Union. Canada is entitled to her pro-rata share of our coal conditioned upon her following the same sort and degree of restrictions over its use and distribution as are imposed on this side. Happily it appears that this is the last word of the administration at Washington, for we are informed that no embargo will be imposed.

As regards the facts there remain some doubt, for we have not the complete story of anthracite distribution this year, the Hudson Coal Co., reputed to be a large shipper to Canada, having refused, according to the Federal Fuel Distributor, to divulge any data with respect to what it has done with its coal. But aside from the fact of whether that company shipped all its coal to Canada or none, there remains the fact that the communities in trouble are not asking for coal but are demanding anthracite.

The short supply of hard coal for householders has been pieced out this winter by millions of tons of substitutes, mainly soft coal. Those who accepted the situation and are using a reasonable share of other fuel are not making complaints to Congress. New England is sore over the coal situation. The Pennsylvania state tax, the strike, and now high prices at the curb and dirty coal, and not enough of it, have riled a people beset by an unusually hard winter. This has given opportunity for political play, and it also has given opportunity for spreading some sound truths about coal and the use thereof.

Kicking against the hard fact that a 60-per cent supply will not fill a 100-per cent requirement takes many angles.

Modern Silesian Mining Methods

SO MUCH has been said about German flushing methods that our readers will be much interested to find from the article by A. Gerke in this issue that the Silesian mine owners are not maintaining those methods but are tending toward systems such as we are following, that do not include flushing as part of the process.

The war seems to have changed the attitude of the Silesian coal operators so that they prefer to run the risk of losing a little coal to the unpleasant certainty that large sums of money would have to be spent should they fill their mines with waste rock and washer tailings. Whether we are justified in continuing our methods in the face of our waning anthracite supplies and lack of virgin coal territory is a matter that must, and will be, decided in the end upon other premises than German precedent, but the methods described by Mr. Gerke will be held by many to be a proof that the flushing method is expensive and justifiable only where the conservation of small quantities of coal and the protection of the surface are of more importance than conservation of labor.

The stockwork system described by Mr. Gerke is almost, or entirely, unknown in American coal mines. It is a suggestion nevertheless for those who operate beds on heavy pitches.

Recent Disasters and Their Lessons

REGRETTABLE indeed have been the recent explosions at Spangler, Dolomite, Dawson and Dunsmuir. It is to be hoped that their lessons will not be forgotten and that from them will come improvements in practice that will make explosions far less frequent. Of the Spangler and Dunsmuir explosions nothing will be said here. It is better to discuss only the other two, which were obviously and admittedly accidents resulting from coal dust.

Both occurred in mines which were admirably managed, but it would seem that in both too much confidence was shown in sprinkling, and here it should be conceded that in both mines the word "sprinkling" seems inadequate to express the volume of water actually used. "Dousing" with water would appear more appropriate. J. J. Forbes tells us in this issue that in Dolomite ten men were employed solely in keeping down coal dust. He assures us that the work of these men saved many lives, and we can well believe him.

Nevertheless, the Dolomite disaster was a coal-dust explosion, and it would appear that the sprinkling that was so efficient to the inbye of the main parting could not have been so effectual outbye from that point and possibly in the parting itself. It appears that runaway cars had raised a heavy dust on other occasions, and so it was undoubtedly present at least most of the time. No evil result had followed from this dust, and doubtless none was anticipated. No shot was likely to be placed at this point, consequently none could blow out, and the dust of coal is not readily fired unless the flame is part of the gust by which the dust is raised. If it were not so, probably many a tipple would long ago have been demolished by an explosion, for the air in such places always is charged heavily with dust.

Unfortunately there was always the possibility of a short-circuit either of the trolley wire or of the high-potential feeder. So when the opportunity came the dust was there and the explosion occurred. It is certain that the accident would not have happened had the feeder been trenched and covered by a plank, as are the high-voltage feeders in the Valier mine of Illinois. Furthermore, there were the trolley wires always ready to act in the same rôle as the offending feeder line, should the cars travel so far before piling up.

For this reason it is necessary to call attention to the danger of the mine entrance. It was at this point that the Monongah explosion started, killing 361 men. Here it was the trolley wire that made the short-circuit. Again in the Starkville mine of Colorado it was not far from the mouth of the mine that the explosion started, and it was a wrecked trip of cars that was the initiating cause. The explosion traveled several miles into the interior of the mine, and all the men—there were 56 of them—who were at work were killed.

So much attention has been given to the dangers of the live workings that those of the entrance of the mine have been overlooked. Yet in the mines of northern climes this is the one point which, in many cases, may not be properly safeguarded. If well sprinkled with water it will soon be rendered impassible because of the formation of ice. Here all the air receives its first warming, and here it is most greedy for moisture. Consequently this is the point where rock dust is greatly needed.

We cannot doubt that the European practice of "stone dusting" or rock dusting, as we term it, is the safest method, especially where the cars are not allowed to leak or spill coal. It is said that a company in the Middle West long ago lost faith in sprinkling and is a strong advocate of rock-dust barriers. Undoubtedly traps like these are good, but a general dusting everywhere is even better, and the use of both is better yet.

Obviously neither the Dolomite nor the Dawson workings constitute a safe mine, for contingencies might arise and have arisen in them causing explosions. The large sums expended, the rigorous inspections, the elaborate system of prevention, the intelligence of the management, were alike admirable but ineffectual. Let us hope there is something better. Let us trust that where the company has the personal integrity of the Woodward Iron Co. and the Phelps Dodge Corporation they can make their mines foolproof and rascal-proof. But that can be done only by pursuing some other method than that now adopted.

At the Dawson mine there has been one accident already from a blownout shot, and the recent disaster possibly may prove to have had a similar origin. It is true that when the company's rules have been followed there is no danger that an explosion will result from the firing of shots. It is clear that in such a climate as New Mexico a mine that is free from explosions of any kind for years and never has had them when shooting coal according to rule must have a good schedule of operation and must have a splendid body of shotfirers to carry it out.

Where explosives are allowed to come into a camp, however, they may be stolen. That may occur either before or after their distribution, and if a single man can steal a single cartridge and fire a single unauthorized shot and that shot will explode the mine, the system, though admirably conceived and carefully carried out by all the personnel but that one man, is a failure, and some means should be taken, if possible, to correct it.

It must be remembered that the greater the crime of firing an unauthorized shot the more likely it is to be a menace to everyone in the mine when it does occur. No man violating a law so needful to be enforced, the punishment of which, if detected, is so sure, will take the time and use the patience to make the shot safe. He in all probability will tamp it with coal dust as the material most readily at hand.

It is extremely difficult to wet coal or any other dust through and through. The top may be wet and the bottom still dry. The dust also will float unwetted on the water. Forceful spraying is necessary and not always successful. For this reason the use of rock dust is the safer remedy and should have had greater acceptance long ago.

This country invented the rock-dust spraying machine. Let it not be the last country to put it in continuous operation. Since Great Britain and France have compelled the use of rock dust and required the inspectors to ascertain, by sampling, the dusts on the mine floor, conditions have much improved. If the rule is not everywhere needed, as in the anthracite region, it surely is indicated in sections where the conditions are arid, where the hygrometer shows the percentage of moisture present in the air to be unduly low and where accidents like those at Dawson and Dolomite prove that the danger is unusually imminent.

WHAT THE COUNTRY NEEDS is more railroading and less railriding.—*Norfolk Virginian-Pilot.*

ON THE OTHER HAND, if it is going to be impossible to get coal there is still a lot of discarded political timber available.—*Detroit News.*

How Greater Depth and Reduced Thickness of Coal Have Intensified Lackawanna Mine Problems

Coal Is 71 Per Cent as Thick and 17 Per Cent Deeper Than Fifty Years Ago—Depth and Thickness by Five-Year Periods—Increased Use of Power Raises Output per Mule

By Dever C. Ashmead*
Kingston, Pa.

IN LACKAWANNA COUNTY, Pennsylvania, the average depth at which anthracite is mined increased from 229 ft. in 1872 to 268 ft. in 1922. The average thickness of bed mined, 6.83 ft. in 1872, in 1922 was but 4.88 ft. That hard-coal mining is getting deeper each year and that the thicker beds are being mined out has been a matter of common knowledge for years. This study, it is believed, is the first attempt to set forth these important facts in a quantitative manner. The results of this investigation, representing a year's collection and study of all available data, are not startling to those familiar with the hard-coal regions of Pennsylvania but they are illuminating to those who have wondered why the cost of their household fuel has been mounting year after year.

Prospect of Future Even Less Assuring

That the cream of the anthracite deposits has been removed and that from now on we must depend on an output from deeper and thinner beds, costing each year more and more in man power for its production, means only that the cost will continue to mount and that the total output cannot in any considerable degree pass that of recent years.

Conditions vary from district to district in the anthracite area and the results of this study will be presented in a series, the first covering the Lackawanna district, embracing the mines in Lackawanna County, Susquehanna County and Wayne County. At the conclusion of the articles on the several fields the data will be summarized for the whole region, with a forecast on costs in the immediate future.

The writer desires to express his thanks to R. V. Norris, consulting mining engineer, of Wilkes-Barre, for his advice and assistance in the preparation of this series of articles. To the Department of Mines of the State of Pennsylvania particular credit is due for the collection of data on depth and thickness, obtained by the mine inspectors from the various coal companies at the request of the writer. Thanks also are tendered to the office force of the Department of mines at Harrisburg for their aid in compiling statistics not published in their annual reports.

The representative character of the statistics on which this study is based is indicated by the following table and diagram (Fig. 1) showing against the total operation in the district the number of plants from which figures were obtained. In 1921-22 approximately 96 per cent of the companies reported on the depth and thickness of the beds. In 1902 about 95 per cent reported. In 1887 there were reports from about 61 per cent and 49 per cent reported in 1872. It was possible to use 85 per cent of the production statistics for 1921, 92 per cent for 1902 and 54 per cent for 1877.

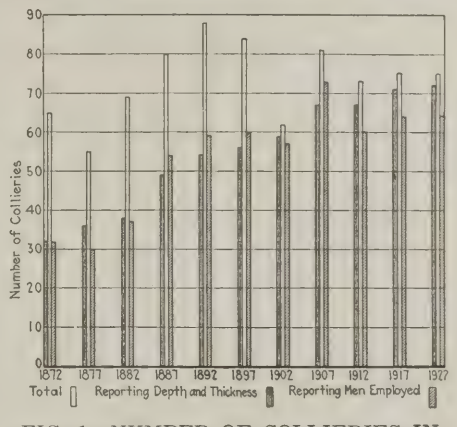


FIG. 1—NUMBER OF COLLIERIES IN LACKAWANNA COUNTY

This diagram shows the number of plants from which statistics on depth and thickness of coal mined were available by year and the number from which data was secured with respect to men employed, as compared with the total.

Washery coal and strippings have been excluded from the calculations wherever possible. Collieries known to sell locally likewise have been omitted. The geologic series in the Lackawanna district, as shown in Fig. 2, lies comparatively flat. The beds of coal are at shallow depths. The principal beds worked in the region are as follows, named from the surface down: Eight Foot, Five Foot, Four Foot, Diamond, Rock, Big Vein, New

*Assistant Editor, *Coal Age*.

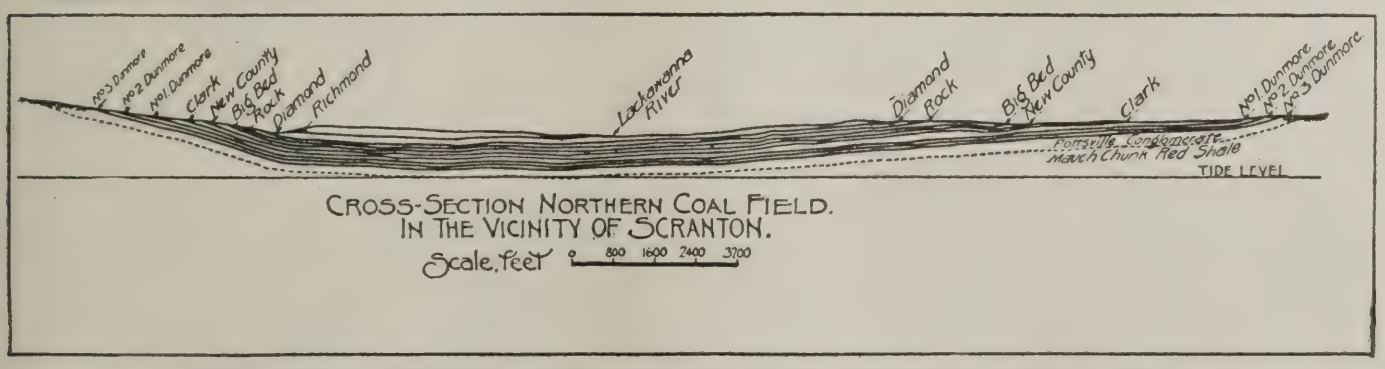


FIG. 2—SECTION OF THE LACKAWANNA DISTRICT IN THE VICINITY OF SCRANTON

This section of the coal measures shows the general flatness of the beds in this vicinity. It will be noted that the beds become slightly pitching as they approach the outcrop. Locally there are heavy rolls or faults. Even in the center of the basin the beds of coal are not flat but pitch heavily in small areas.

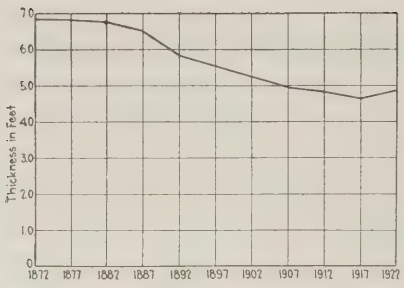


FIG. 3—AVERAGE THICKNESS OF COAL MINED AT FIVE-YEAR INTERVALS IN THE LACKAWANNA DISTRICT

The points on this curve were calculated from data obtained by the Department of Mines of the State of Pennsylvania from the various coal companies. A simple average thickness of coal was determined for each colliery, as there are no records of the output by beds. These simple average thicknesses were then multiplied by the production of the colliery and the results from all of the collieries were totaled. This total was divided by the total production of the collieries considered and the result plotted as weighted average thickness of the beds of coal in the Lackawanna district. This method was followed for each of the years shown.

County, Clarke, First Dunmore, Second Dunmore, Third Dunmore. In the vicinity of Forest City, at the northeastern end of the district, only the four lower beds are worked, but passing to the southwest to the Lackawanna-Luzerne County line the measures become deeper and here the higher beds are mined. From 1872, when the supply of anthracite was considered to be practically inexhaustible, the price was low and only the cream of the deposits were mined, and until 1882 there was no marked change in mining conditions. The average thickness of the beds mined in 1882 was 6.78 ft., compared with 6.83 ft. in 1872. From the early 80's on there was a steady depletion of the thicker beds and by 1917 the average thickness had decreased to 4.65 ft., or a drop of 31.8 per cent. The slight increase in thickness shown for 1922 over 1917 was due primarily to the opening of small outcrop strippings which could not be separated from the rest of the data.

Although the present average thickness is estimated at 4.88 ft., this does not tell the true tale. The coal that is now being obtained from the thicker beds is a continually decreasing percentage of the total output, as the work in these measures is now mainly second mining and in some cases third and fourth mining. In 1872 79.5 per cent of the coal was taken from beds thicker than the average for 1922. In 1872 only 20.5 per cent of the coal came from beds thinner than 5 ft., and of this 20.5 per cent, 14 per cent was from beds between 4 and 5 ft. in thickness and only 6.5 per cent from beds from 3 to 4 ft. thick.

Beds less than 3 ft. thick were first mined in 1887 and then represented only 1 per cent of the total. By 1922 25 per cent of the total was from beds thinner than 3 ft.

Fig. 3 shows that from 1897 to 1917 there were one or two beds being mined whose thickness averaged between 1 and 2 ft., but in 1922 there was no mining in beds of this thickness. These beds probably were found to be unprofitable or else they have been exhausted. However, even now in a few cases mining is being done in beds thinner than 2 ft., but only for very small local areas in

TABLE I—NUMBER OF COLLIERIES IN LACKAWANNA COUNTY

	Total As Reported by the Department of Mines	Having Depth and Thickness, Data	Having Tonnage Data
1872	65	32	32
1877	55	36	30
1882	69	38	37
1887	80	49	54
1892	88	54	59
1897	84	56	60
1902	62	59	57
1907	81	67	73
1912	73	67	60
1917	75	71	64
1921–2	75	72	64

TABLE II—AVERAGE DEPTH AND THICKNESS OF COAL MINED IN THE LACKAWANNA DISTRICT, IN FEET

Years	Average Depth of Workings	Average Thickness Of Beds	Years	Average Depth of Workings	Average Thickness Of Beds
1872	229	6.83	1902	276	5.28
1877	240	6.83	1907	275	4.94
1882	265	6.78	1912	278	4.84
1887	254	6.53	1917	266	4.65
1892	264	5.88	1922	268	4.88
1897	281	5.55			

a bed which averages a greater thickness. Sometimes it is necessary to remove this coal to get at the thicker coal in the same bed. It is clear from this record that the thicker beds are being worked out and that the production of coal in the Lackawanna district may be kept up only by mining more extensively the thinner beds.

Because the beds of coal in the Lackawanna district lie practically flat there are no marked variations in the depths of the workings. In 1872 the average depth of workings was 229 ft. (Fig. 5) and in 1897 this depth reached the maximum of 281 ft. Since then the average depth has not varied more than 15 ft. This may be explained by the fact that the thinner beds of coal which have been opened up in more recent years are scattered through the measures at both shallow and deep levels.

Even though the average depth of workings has remained fairly constant since 1897, the maximum depth of workings has increased. Until 1892 there were no workings reported deeper than 600 ft., but since then the lowest workings have gone deeper and deeper. The maximum depth in 1897 was 800 ft.; in 1902 it was 900 ft. and in 1907, 1,000 ft., the record for the Lackawanna district. In the meantime there has been an increase in the percentage of workings that are less than 100 ft. in depth, for in 1922 about 19 per cent of the workings were within 100 ft. of the surface and this has counterbalanced the greater maximum depth and kept the general average constant. It is interesting to study the change in the thickness of the beds at various depths of workings. This is shown in Fig. 7. Here the average thickness of beds is shown for every 100 ft. change in the depth of the workings. The main feature brought out here is that quite generally throughout this district, irrespective of depth, the thickness of the beds worked has decreased since 1872 and that the average thickness of the beds in the different levels has remained relatively constant.

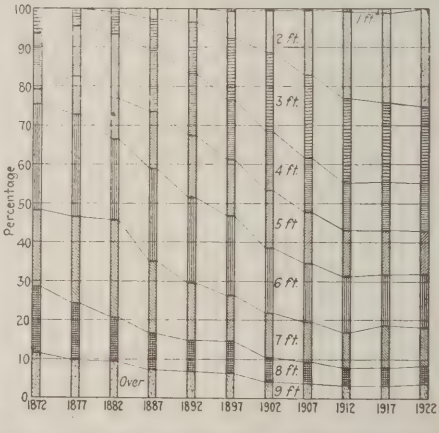


FIG. 4—PERCENTAGE DISTRIBUTION OF NUMBER OF BEDS WORKED BY THICKNESS IN THE LACKAWANNA DISTRICT

This diagram shows the percentage of the total number of beds of each thickness mined in each year. How, as the region has been developed, thinner and thinner coal beds have been opened up is clearly shown in this diagram. The information on which this diagram is based was furnished by the Pennsylvania State Department of Mines from data supplied by the mining companies.

In the early days of anthracite mining mechanical power was not used in the production of coal. It was not until about 1848 that the first steam engine was used, and it was installed in a breaker to drive the rolls

and the revolving screens of that day. There were a few hoisting and Cornish pumping engines used, but most of the mines were opened by tunnels or drifts, so that very little power was required. Even in the fifties comparatively little power was used and it was not until 1860 that steam power was greatly used about the mines. In 1872 although power was being used it had not reached its maximum, for many operations that are now done mechanically were then done by hand.

The increasing consumption of power required in the production of anthracite is shown in Fig. 8. Previous to 1897 there was little or no mechanical underground haulage with the exception of rope haulage. The power necessary to operate the breakers was small, for in 1877 the coal smaller than chestnut was left underground in some mines. The coal coming from the thicker beds was comparatively clean and was given but little preparation other than crushing and screening. The individual plants were small. Less power was required to hoist the coal to the surface from the shallower depths of those early days. There were fewer surface breaks and the surface water did not have access to the mines through the cave holes.

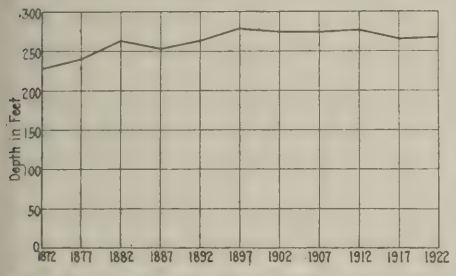


FIG. 5—DIAGRAM SHOWING THE INCREASING DEPTH AT WHICH ANTHRACITE HAS BEEN MINED IN THE LACKAWANNA DISTRICT FROM 1872 TO 1922

The data on which this diagram is based were supplied by the mining companies at the request of the Department of Mines of the State of Pennsylvania. Reports were made showing the maximum depth of workings on each bed in each mine at five-year intervals from 1872 to date. The simple average depth of workings as thus reported was first determined for each colliery. The average of all was determined by weighing each by the production of that colliery as shown by the records of the Pennsylvania State Department of Mines. It was impossible to obtain a true weighted average depth of workings because records of production by beds are not available save for recent years. The Lackawanna district does not show the increase in depth of workings that is found in other regions to the south. From 229 ft. in 1872 to around 270 ft. in the past thirty years is but a small increase.

For the years 1877 to 1897 inclusive it was possible to produce more than 1.5 tons of coal for every boiler horsepower installed, and a trifle under 1.5 tons of coal for each engine horsepower installed. Since then, however, the amount of coal produced per boiler horsepower and engine horsepower installed has uniformly decreased and in 1917 there was produced only 0.82 ton of coal per boiler horsepower and 0.62 ton per engine horsepower.

The increasing use of fuel coal per ton of production follows from a number of factors. It may be expected to increase in the future.

The proportion of total output raised through single shafts is increasing, and therefore larger and quicker operating hoists are required. Mechanical haulage underground is gaining, requiring more power. Greater quantities of water are being raised because the more extensive openings and the surface breakthroughs permit the entrance of the surface water into the mines. At some mines the amount of water that has to be handled is stupendous, reaching at one colliery about 90 tons to each ton of coal shipped.

The mining of thinner beds, many of which are dirty; waste material from shooting down the roof or taking up the bottom to provide sufficient headroom and the working of beds which contain heavy partings formerly considered worthless are all factors requiring more careful preparation of the coal so that it can be marketed. This additional preparation calls for more power. The tendency of all these factors is in the direction of greater and greater power requirements in the mining and preparation of anthracite.

TABLE III—POWER USED IN PRODUCTION OF ANTHRACITE IN THE LACKAWANNA DISTRICT

Years	Boiler Horsepower Installed	Engine Horsepower Installed	Tons of Coal Hauled per Mule	Tons of Coal Produced per Boiler Horsepower	Tons of Coal Produced per Engine Horsepower	Number of Underground Locomotives per 100,000 Tons of Annual Production
1877	13,860	13,931	18.0	1.77	1.76	....
1882	17,610	18,746	12.7	1.51	1.42	....
1887	25,770	27,897	14.9	1.58	1.46	....
1892	33,000	25,443	17.3	1.74	2.10	....
1897	50,000	.....	21.8	1.72	....	....
1902	56,435	68,464	19.6	1.38	1.14	0.19
1907	91,560	98,864	21.8	1.06	0.99	0.74
1912	106,684	112,977	24.4	0.84	0.80	1.37
1917	86,417	114,186	27.6	0.82	0.62	2.18

It is doubted whether the length of underground haul in the anthracite mines has materially increased in the past fifteen years. It is probable that the length of haul increased materially from 1872 to 1882. The length of haul appears to have reached a maximum in 1882, for the tons of coal hauled per mule per day were the least in 1882. From 1882 to 1897 the amount of coal hauled per mule per day increased with shorter haul. From the time (1897) when the underground mine locomotive first began to take on a share of the haulage work, the use of the mule fell off.

The mounting curve of number of underground locomotives considered with the increased tonnage per mule per day brings out the fact that when motors are installed the mule's travels are shortened and more tons are handled each day per animal.

The first serious subsidence of the surface in the anthracite region was reported in 1865 at Stockton, in the Eastern Middle field. A home and a family of five

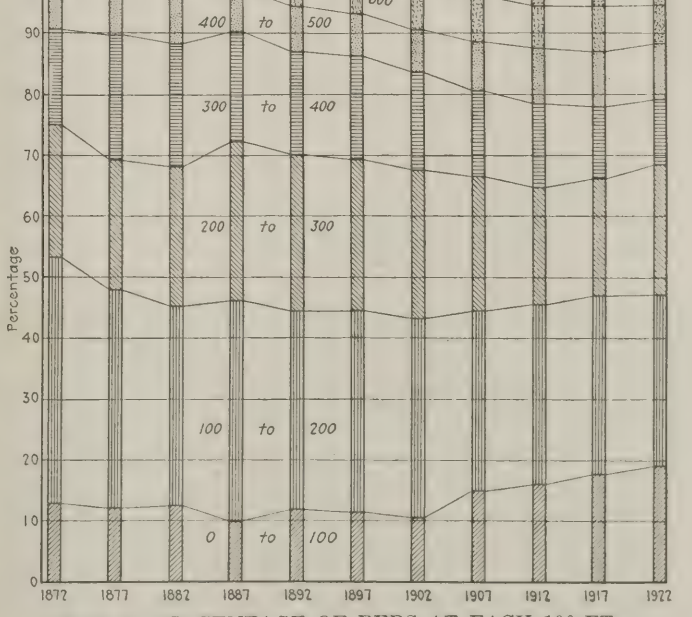


FIG. 6—PERCENTAGE OF BEDS AT EACH 100-FT. INTERVAL OF DEPTH

This curve shows the percentage of beds being worked at each 100-ft. level. The maximum depth only is shown. A bed may be worked at a maximum depth of 500 ft. and be worked at each 100-ft. level upward to the surface, but is here recorded at the maximum depth. The numbers of beds worked each year and at each 100-ft. interval in depth were counted and the percentages to the total plotted on this curve.

were engulfed and their bodies were never recovered. Almost yearly since then more and more support of the surface is removed and there are numerous cases of settlement. This is particularly true of the Lackawanna district, where the beds are closer to the surface than they are elsewhere in the region. The City of Scranton itself has suffered greatly in this respect. Subsidence must be guarded against in built-up areas or if not guarded against then the property so damaged usually is restored. In either case money must be expended and the cost of production increased.

Man power is indispensable in mining coal. Men are required to direct machines and machinery and to do work that can be done only by hand. Many of the labor-saving devices used in other kinds of mining cannot be used in anthracite operations. This is largely because of the character and attitude of the coal beds. The efficiency of the man power determines to a large extent the cost of mining coal. If in the whole region it is found that the efficiency of the men is decreasing it is interesting to seek the explanation.

Production of Coal Per Total Employee

In Fig. 10 three sets of curves are shown. The lower one shows the average output of coal per day for all men employed as calculated from the mine inspectors' reports. A small loss in average daily output, all employees considered, is indicated from 1872 to the later dates. This is in face of the fact that new and improved types of machinery have been developed, reducing the man power required to do the work.

The decrease in output per man employed is greater, however, than is shown by the solid line on Fig. 10. In the earlier years the small sizes of coal were not sold or shipped and were not recorded as production. That is, the divisor in calculating average tons per man was too small. Corrections in the figures that take into account the total output in the earlier years give the dash-line curve in Fig. 10. This indicates a fairly regular decrease in the average output per man, from a maximum of 2.84 tons per day in 1877 to 1.74 tons per day in 1921, a decrease of approximately 39 per cent.

TABLE IV—MULES AND LOCOMOTIVES IN MINES IN THE LACKAWANNA DISTRICT

	Mules In Service	Inside Locomotives		Mules in Service	Inside Locomotives
1877.....	1,361	...	1902.....	3,976	45
1882.....	2,089	...	1907.....	4,472	217
1887.....	2,727	...	1912.....	3,862	369
1892.....	3,321	...	1917.....	2,566	466
1897.....	3,950	...			

FIG. 7—AVERAGE THICKNESS OF BEDS AT EACH 100-FT. INTERVAL IN THE LACKAWANNA DISTRICT, 1872 TO 1922

The points on these curves were calculated from data furnished by the various mining companies to the State Department of Mines. The figures are unweighted averages as there are no records over this period covering the tonnage of coal produced from each bed.

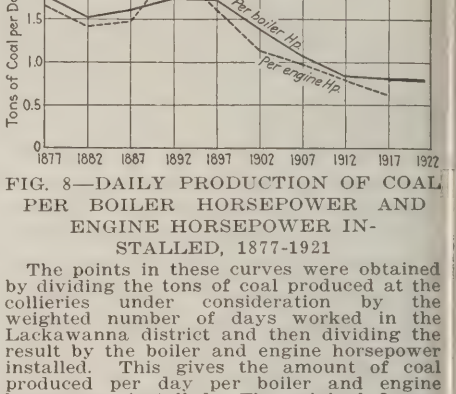


FIG. 8—DAILY PRODUCTION OF COAL PER BOILER HORSEPOWER AND ENGINE HORSEPOWER INSTALLED, 1877-1921

The points in these curves were obtained by dividing the tons of coal produced at the collieries under consideration by the weighted number of days worked in the Lackawanna district and then dividing the result by the boiler and engine horsepower installed. This gives the amount of coal produced per day per boiler and engine horsepower installed. The original figures for these calculations were obtained from the reports of the mine inspectors to the Pennsylvania State Department of Mines. In the earlier years no figures of boiler horsepower were recorded but from the details of the size of the boilers the capacity was calculated.

A further correction is necessary. There have been two changes in the length of the standard day. From 1877 to 1902 the day was 10 hours, and from 1902 to 1916 it was 9 hours. Since 1916 it has been 8 hours. Seemingly, therefore, the dash-line curve should be corrected by reducing the figures by 20 per cent for the years 1877 to 1902, and by 11 per cent from 1902 to 1916 to bring all records to the comparable basis of 8 hours per day. However, from information in old reports and from conversations with superintendents of the earlier years, the writer concludes that the miners never worked longer hours than they do at the present time, particularly the contract miners. These corrections are made, therefore, only with respect to day men. The final corrected figure is 2.55 tons of coal per man per day in 1877 as against 1.74 tons in 1921, a decrease in average daily production of 0.79 ton of coal per man employed, or 31.2 per cent.

The second set of curves in Fig. 10 shows the average daily output per inside employee. The heavy line shows, as calculated from the mine inspectors' reports, an output in 1877 of 2.95 tons compared with 2.32 tons in 1921, a decrease of 0.63 ton per man per day, or 24.8 per cent. Corrected for the smaller sizes not shipped in the earlier years, the figure for 1877 is 4.33 tons per man per day, some two tons, or 46.4 per cent, above 1921.

From 1902 on there is little variation in the average daily outputs for inside employees. There is some evidence that these daily averages went up in 1917 and 1918. Figures from the records of a few companies employing about 4,000 miners show that these men worked on an average of about 0.4 hour more during the war period than they did in 1919. This reported working time for the year 1918 at these few mines was 7.

hours at the face and in 1919, 7.1 hours at the face. Taking this into consideration, the curve, even during the latter period, shows a decided decrease in the tons of coal produced per day per inside employee.

The third and last set of curves in Fig. 10 shows the average daily output of outside employee. The showing here is controlled by the changes in breaker employees. During the early period there was comparatively little machinery used in the breakers, as the coal was clean and required a minimum of preparation other than that given by the breaker boys. There were many men and boys assigned to this hand preparation, which reduced the average daily output of outside employees. From 1872 to 1877 for the first time the average output decreased. During the late seventies jigs were introduced in this region, and gradually the slate pickers decreased and the tonnage per man increased. Gradually the capacity of the breaker machinery was increased and as it increased the output expanded. No more men were required to man the breakers with larger capacities than were required to operate the older and smaller ones. With the introduction of conveyor lines and the more extensive use of steam locomotives and other mechanical devices for moving the coal below and on the surface there has been some decrease in the number of men required. As against this it is probable that a few more surface men are now required to handle and prepare timber to support the continually increasing areas of new mining opened underground.

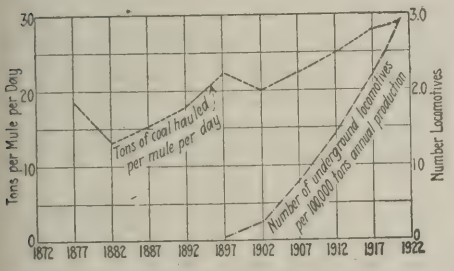


FIG. 9—AVERAGE DAILY TONNAGE HAULED PER MULE AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS OF ANNUAL PRODUCTION, IN THE LACKAWANNA DISTRICT

These figures were calculated from the reports of the district mine inspectors of the Department of Mines of Pennsylvania. In determining the tons of coal hauled per mule per day, the total production was divided by the weighted number of days worked in the Lackawanna district and then by the number of mules at the corresponding collieries. The number of locomotives per 100,000 tons of coal produced was determined by dividing the number of tons of coal produced by the weighted number of days worked for the district, multiplying the result by 300 (as a full working year) to bring the figures to a common base. This result was divided into the number of locomotives used in the district, and by pointing off properly the result is the number of locomotives per 100,000 tons of coal produced. It will be noted that the figure for 1897 of tons of coal per mule per day is extremely high. This is due, it is believed, to errors in the inspectors' reports for that year. This divergence will be noted in many of the curves for the year 1897.

The increase in power required has meant in some cases an increase in the force used in producing power, but as against this the mechanical stokers have cut the force. Then again other companies have ceased producing their own power wholly or in part. The introduction of electric machinery has added electricians to the outside forces.

Again noting the data shown in Fig. 10 it is seen that in 1877 the average daily output per outside employee was 5.73 tons compared with 5.01 tons in 1882 and 8.03 tons in 1921, an increase of 3.02 tons, or about 60 per cent in 44 years. Corrected for the small sizes, the figures become 8.40 tons in 1877, 6.84 tons in 1882, and 8.03 tons in 1921. The correction here is for the full difference in the hours worked, as the men are mostly day men and although there are many monthly men employed there are no contract men. Therefore the cor-

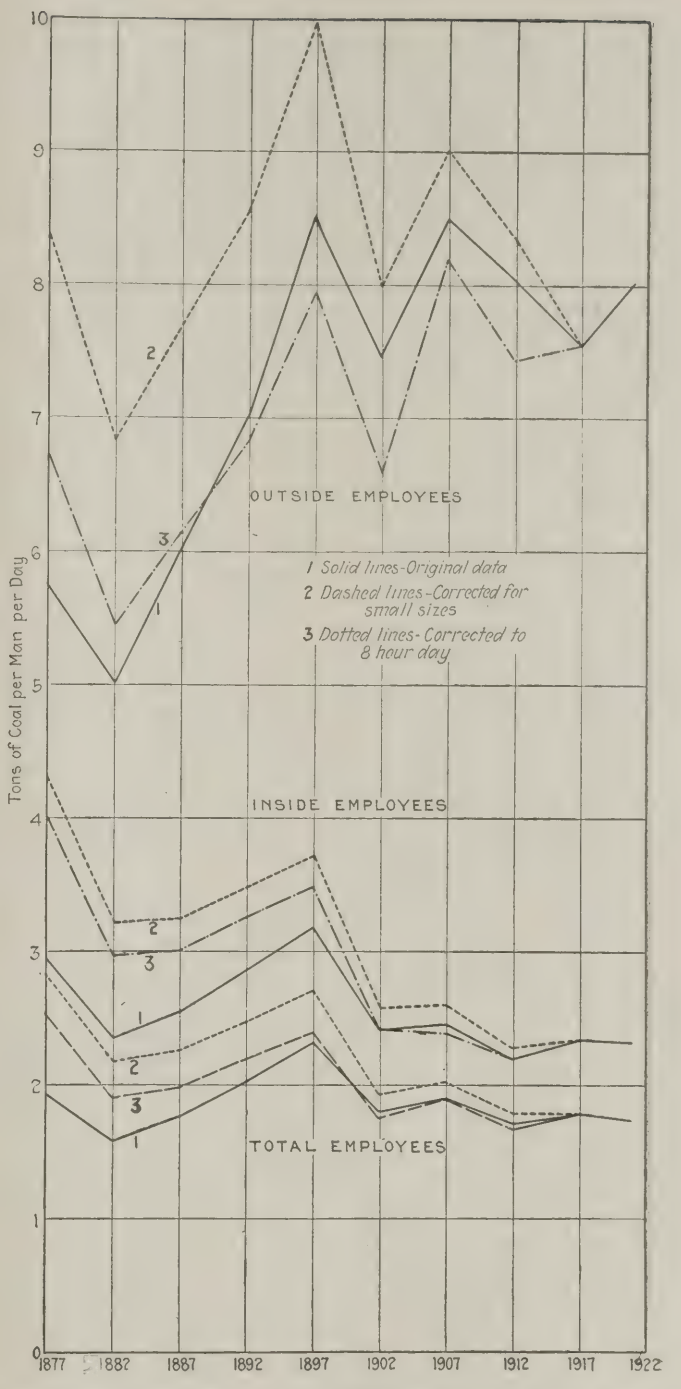


FIG. 10—AVERAGE DAILY PRODUCTION OF COAL PER EMPLOYEE IN THE LACKAWANNA DISTRICT, 1872-1921

The figures are shown as calculated from the reports of the state mine inspectors, also with corrections for small sizes of coal not reported as production in the earlier days, and finally to a uniform 8-hour day. The solid lines represent the figures as calculated from the original data taken from the reports of the mine inspectors in the anthracite region of the Department of Mines of the State of Pennsylvania. The days worked were determined by multiplying the number of employees by the number of breaker days at each colliery. Then the total number of employees in the district was divided into the sum of the men-days at each colliery and the result considered the weighted average number of days worked. The next step was to divide the total number of employees into the total production of the collieries to determine the average annual output per employee. This, divided by the weighted number of days worked, gave the average daily output per employee.

The dash line shows the correction for small sizes. It was impossible to obtain exact tonnages of small sizes of fresh mined coal shipped in these earlier years but from information in the reports of the Girard Estate and in the Coal Trade Annual estimates were made. For later years the actual figures are given by the U. S. Geological Survey. These estimates are: 1872, sizes under chestnut shipped, 8.8 per cent; 1877, 16 per cent; 1882, 26.8 per cent; 1887, 30 per cent; 1892, 42 per cent; 1897, 57 per cent; 1902 82.7 per cent; 1907, 84.6 per cent; 1912, 90.3 per cent. Knowing the true percentages of small sizes produced, the corrections were made by difference from these estimates. As no washery coal is considered in these figures the percentage of small sizes from washeries was not taken into consideration.

rection is heavier than where the inside men are considered. The final corrected curve shows for 1877 an average daily output of 6.72 tons for outside men against 5.47 tons in 1882 and 8.03 tons in 1921.

Thus, although from 1877 to 1921 the average daily output for outside men increased, the increase has not been sufficient to counterbalance the loss in average daily production per inside employee, and the average daily production for all employees shows a decided decrease.

Until 1902 the mines operated ten hours a day, from Oct., 1902, to 1916 they operated nine hours a day and from 1916 to date the standard day has been eight hours. To reduce the figures of average daily output to a comparable basis it was necessary to correct for the differences in the length of day worked. The figures during the 10-hour day period were reduced by 20 per cent; for 1902 they were reduced 17.3 per cent, as the mines worked 10 hours for a few months at the beginning of the year and 9 hours at the end, and during the 9-hour day period the figures were reduced by 11 per cent. To allow for the fact, irrespective of the hours of the day men the time actually worked by the miners has always been about 8 hours, a further correction was necessary. The miners represent about 50 per cent of the total force and correction was made accordingly. It will be noted that the year 1897 is out of line with the others. This is believed to be due to errors in the mine inspectors' reports for that year. The diagram also shows these data, original and with the same corrections for inside employees.

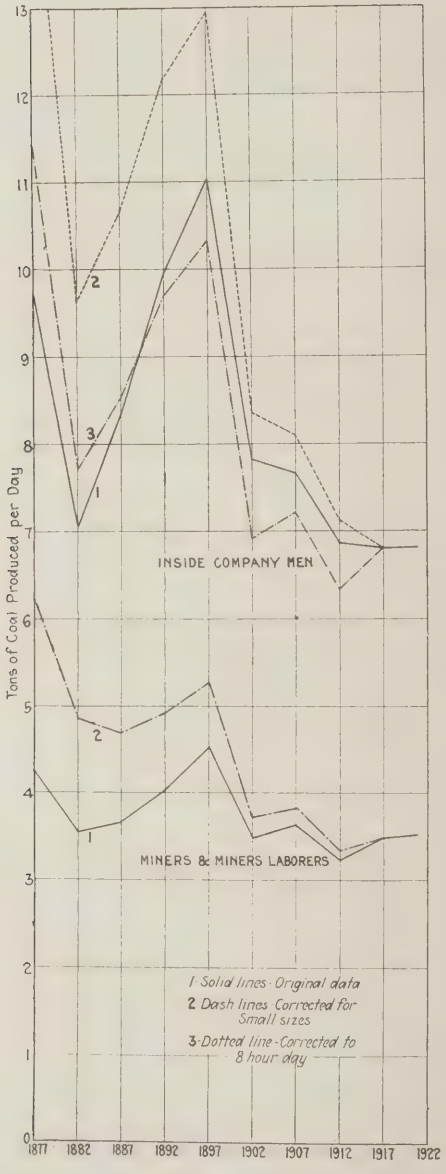


FIG. 11—AVERAGE DAILY PRODUCTION FOR INSIDE EMPLOYEES IN THE LACKAWANNA DISTRICT, 1872-1921

The figures are shown as calculated from the reports of the state mine inspectors, also with corrections for small sizes of coal not reported as production in the earlier days and finally to a uniform 8-hour day. In the calculation of these curves the same method was used as in calculating the curves for the number of tons of coal produced per day per total man employed. No correction was applied for hours worked for the miners, as they worked the same time under all conditions. It is again necessary to call attention to the fact that the points for the year 1897 are too high and should be neglected and that the average for the years 1892 and 1902 is considered to more nearly represent the facts.

TABLE V—MEN EMPLOYED IN PRODUCTION OF ANTHRACITES IN THE LACKAWANNA DISTRICT

	Total Employees	Inside Employees	Outside Employees	Miners and Miners' Laborers	Company Men
1872	9,655	6,744	2,911	4,818	1,926
1877	9,553	6,305	3,248	4,394	1,911
1882	13,084	8,892	4,192	5,910	2,982
1887	22,944	16,122	6,822	11,146	4,976
1892	25,649	18,212	7,437	12,930	3,321
1897	31,661	23,015	8,646	16,332	6,683
1902	30,941	23,379	7,562	16,177	7,202
1907	39,413	30,563	8,850	20,715	9,848
1912	42,859	33,385	9,105	22,705	10,680
1917	37,885	28,895	8,990	18,905	9,990
1921	34,644	26,888	7,756	17,748	9,140

Before considering the curve in Fig. 11, which shows a fairly uniform decrease in the daily output of underground men, let us see what has happened in the Lackawanna district that will throw light on this condition. The average thickness of the beds mined has been decreasing. Working thinner beds means that more cuts must be made across the face of the room or gangway and more holes must be drilled for a given output. The coal must be handled in cramped positions. Each of these conditions tends to reduce the daily output of the miner. In the thinner beds the top rock must be taken down or the bottom lifted to admit the mine cars. This deadwork reduces the productive work time of the miner.

In the mining of dirty beds the miners are required to devote a part of their time to the removal of the refuse underground. During the earlier days of mining the beds were practically clean and the time lost in the removal of refuse was negligible.

Another factor reducing the daily output of miners in some beds is supporting bad roof. Bad roof there always has been, but where the coal was thick in the old days 2 to 4 ft. was left for roof support. Coal is too valuable now to be left for this purpose. Setting timbers takes time and reduces the productive work time of the mine worker.

There are improvements in practice, however, that operate in the other direction. Machinery has been introduced, enabling the miner to get out more coal under the same conditions. In the Lackawanna district the beds of coal are flat and mining machines are extensively used in many of the mines for undercutting the coal. Scraper loaders are used in thin beds at many of the collieries, eliminating the hand loading into mine cars.

In the early period of mining the shotholes were drilled by hand, but now the jackhammer and similar types of drills are becoming common. Power drills reduce the labor of drilling and give the miner more time for loading coal and doing other work. Carbide and portable electric lamps have replaced the oil lamp. The miner has better light in which to work, without the smoke from the open flare. Good lighting is an important help to the underground worker.

Setting the increased difficulties in mining against the improvements in methods and machinery, it is interest-

TABLE VI—PRODUCTION AND DAYS WORKED AT ANTHRACITE MINES IN THE LACKAWANNA DISTRICT

	Production In Gross Tons	Average Days Worked		Production In Gross Tons	Average Days Worked
1872	4,886,618	...	1902	8,215,592	141
1877	2,688,120	145	1907	17,360,165	231
1882	4,728,397	226	1912	16,520,299	224
1887	9,278,548	228	1917	19,251,863	283
1892	10,746,036	206	1922	17,334,459	267
1897	10,887,372	148			

TABLE VII —AVERAGE DAILY PRODUCTION OF ANTHRACITE PER EMPLOYEE, LACKAWANNA DISTRICT IN GROSS TONS

Years	Per Total Employee Reported	Per Total Employee Corrected for Small Sizes	Per Total Employee Corrected to 8-Hr. Day	Per Inside Employee Reported	Per Inside Employee Corrected for Small Sizes	Per Inside Employee Corrected to 8-Hp. Day	Per Outside Employee Reported	Per Outside Employee Corrected for Small Sizes	Per Outside Employee Corrected to 8-Hr. Day
1877	1.94	2.84	2.55	2.95	4.33	4.03	5.73	8.40	6.72
1882	1.60	2.18	1.92	2.36	3.23	2.98	5.06	6.84	5.47
1887	1.77	2.26	1.98	2.55	3.25	3.02	6.06	7.71	6.16
1892	2.03	2.48	2.20	2.87	3.50	3.26	7.03	8.56	6.84
1897	2.32	2.71	2.38	3.20	3.71	3.49	8.52	9.97	7.97
1902	1.81	1.94	1.76	2.41	2.58	2.43	7.45	7.97	6.59
1907	1.91	2.03	1.91	2.46	2.61	2.41	8.49	9.01	8.20
1912	1.71	1.78	1.68	2.20	2.29	2.20	8.05	8.36	7.45
1917	1.79	1.79	1.79	2.35	2.35	2.35	7.55	7.55	7.55
1921	1.74	1.74	1.74	2.32	2.32	2.32	8.03	8.03	8.03

ing to see what has actually resulted. In Fig. 11 the lower set of curves shows the production per miner and miner's laborer per day. The solid line shows the figures calculated from the mine inspectors' reports. In 1877 the output per miner and miner's laborer was 6.21 tons per day while in 1921 it was 3,51, a decrease of 2.71 tons, or 43.7 per cent. If the 1897 result is considered valueless, as is explained in the footnote to Fig. 10, and the average of 1892 and 1902 is considered

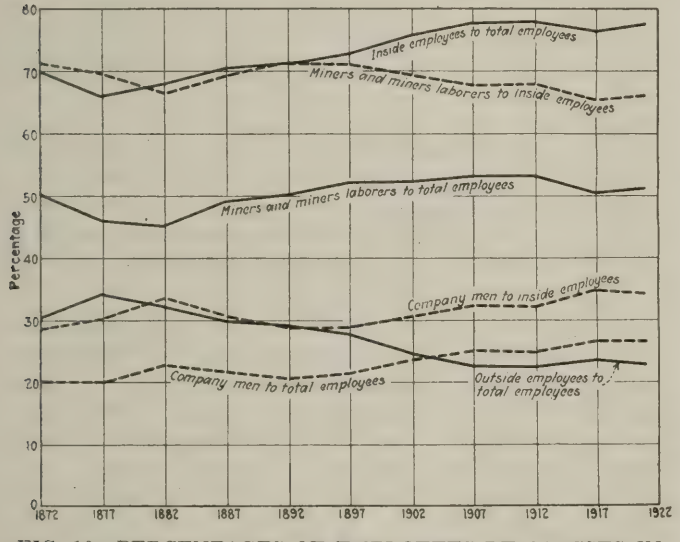


FIG. 12—PERCENTAGES OF EMPLOYEES BY CLASSES IN THE LACKAWANNA DISTRICT

From the annual reports of the mine inspectors of the Department of Mines of Pennsylvania.

TABLE VIII—PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

Years	Inside Employees	Outside Employees	Miners and Miners' Laborers	Miners and Miners' Laborers (a)	Company Men	Company Men (a)
1872	69.9	30.1	50.0	71.2	20.0	28.6
1877	66.0	34.0	46.0	69.8	20.0	30.2
1882	68.0	32.0	45.0	66.5	22.8	33.5
1887	70.3	29.7	49.0	69.1	21.7	30.9
1892	71.0	29.0	50.0	71.2	20.4	28.8
1897	72.6	27.4	52.0	71.0	21.1	29.0
1902	75.6	24.5	52.0	69.3	23.3	30.7
1907	77.6	22.4	53.0	67.8	25.0	32.2
1912	77.9	22.1	53.0	68.0	24.9	32.0
1917	76.4	23.2	50.0	65.4	26.4	34.6
1921	77.6	22.4	51.0	66.0	26.4	34.0

(a) Percentage to inside employees

TABLE IX—AVERAGE DAILY PRODUCTION OF INSIDE MEN

Years	Miners and Miners' Laborers Reported	Miners and Miners' Laborers Corrected for Small Sizes	Inside Company Men Reported	Inside Company Men Corrected for Small Sizes	Inside Company Men Corrected to 8-Hour Day
1877	4.23	6.21	9.73	14.26	11.40
1882	3.55	4.85	7.04	9.62	7.70
1887	3.67	4.69	8.32	10.64	8.50
1892	4.03	4.91	9.97	12.16	9.72
1897	4.51	5.27	11.02	12.90	10.31
1902	3.48	3.74	7.82	8.36	6.91
1907	3.63	3.84	7.63	8.10	7.21
1912	3.73	3.35	6.86	7.13	6.35
1917	3.59	3.59	6.80	6.80	6.80
1921	3.51	3.51	6.81	6.81	6.81

the proper figure, then the dash curve shows a fairly uniform decrease in the amount of coal produced per miner and miner's laborer per day.

As has been previously explained, the figure for the miner's daily output should not be corrected for hours worked. However, in the earlier years the miner's laborer did not quit work with the miner and it may be possible that some correction should be made for this condition. It is not believed that such correction would affect the final result for in those days the number of miners' laborers was proportionately less than today. Furthermore, since the miners never did average 8 hours work per day, this would doubtless counterbalance the longer hours of their laborers.

The data for the earlier years on company employees probably is not as complete as it might be, but from 1882 on the figures are considered fairly good. The corrected figures for company employees (Fig. 11) from 1882 to 1892 show a gain in average daily output and from 1892 to 1921 they record a continuous decrease.

Why the greater output per man in the earlier period? During the earlier period the price of coal was extremely low and it is surmised that the companies forced to economize in some manner kept the number of company men at the lowest possible level. This increased the average daily output per man.

Motor haulage in this district began in 1895 and has continually increased, but there is shown no corresponding decrease in the number of men employed.

Electric Furnace for Determination of Coal-Ash Fusion Temperatures

By Osborn Monnett* and Jerome F. Kohout*

EXPERIENCE has proved the value of the electric furnace illustrated herewith for determining the temperature at which coal ash will fuse. It is of simple construction and economical in operation, and the fusing temperature of coal ash can be more quickly and easily found than in a gas furnace, which we regarded as undesirable because it was noisy in operation and too hot for the convenience of the operator and, furthermore, because temperatures approaching 3,000 deg. F. could not be attained without the introduction to the burners of auxiliary oxygen and because the atmosphere in the heated zone could not be regulated simply and positively.

Of prime importance is the character of the atmosphere in which the fusing takes place. The consensus of opinion at the present time is that the atmosphere should be such as will favor a minimum fusing temperature of the ash cone. With this form of electric furnace the proper atmosphere to ascertain that temperature can be introduced and kept under control.

The furnace we required was one in which the fusing would be done in a tube of about 1-in. bore. With the exception of the Hoskins tube furnace practically all the gas and electric furnaces on the market were of the crucible or vertical type or modifications of that construction. The Hoskins furnace, however, requires for its operation an alternating current of low voltage and high amperage. In consequence a transformer has to be used to provide current of the correct potential. We were limited to direct current of 110 or 220 volts and could not use over 35 amperes, owing to the restrictions imposed on those using the lighting circuit in the "Loop district" of Chicago.

The furnace as finally built consists of two refractory

*Commercial Testing & Engineering Co., Chicago, Ill.

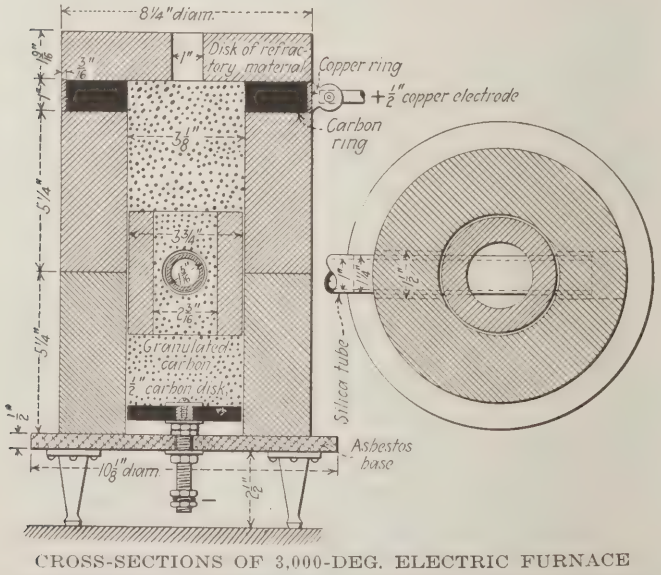
cylinders, each 6 in. high, 8¼-in. outside and 3⅞-in. inside diameter, set on end, and one on the other. These form the outside of the jacket. The cylinders each have 1½-in. semicircular grooves made radially on one of their ends, on the bottom of the one and on the top of the other, so that when they are set up on each other with the grooves adjacent the jacket will have through it a hole 1¼ in. in diameter. Within these outer cylinders is another hollow cylinder also about 6 in. high, of 3¾-in. outside and 2 1/16-in. inside diameter, placed so that it is 3 in. below the upper edge of the upper cylinder and an equal distance above the lower edge of the lower cylinder. This inner lining is pierced at its mid length with a hole 1¼ in. in diameter which is placed so as to line up with the hole in the outer jacket.

A fused silica tube 8 in. long, of 1-in. bore and ⅛-in. wall is placed in this opening and forms the muffle. The heat is generated around the silica tube and within the inner refractory cylinder.

The electrode at the bottom of the furnace consists of a graphite disk 3¾ in. in diameter and ½ in. thick, through the center of which passes a ½-in. copper rod. The electrode at the top is a graphite ring of 3⅞-in. inside and 7-in. outside diameter and 1 in. thick. Around it is placed a copper band fastened to a ½-in. copper rod. Coarse granular resistor material is placed on the lower electrode in the lower cylinder.

The inner cylinder, carrying the silica tube, is placed in position, and the space around the tube filled with resistor material which has been ground so that all of it passes a 20-mesh and 60 per cent passes a 40-mesh sieve. The upper cylinder and upper electrode are placed in position and the rest of the furnace filled with the coarse granular carbon. The electrodes are connected to the line, and some sort of outside resistance is employed to control the current input and hence the temperature. A switchboard is used carrying resistance coils suitably connected to single-pole double-throw switches, so that any part or all the resistance may be cut out or put into series with the furnace.

The atmosphere is introduced through a small-bore silica tube placed in line with the muffle tube, so that the inner end of the small tube is within the inner end



CROSS-SECTIONS OF 3,000-DEG. ELECTRIC FURNACE

Substantially it consists of a two-piece vertical refractory cylinder made of Corundite, with an inner cylinder of the same character. Through these cylinders at right angle to them passes a silica tube which serves as the muffle. The furnace is mounted on a Transite asbestos base. Granulated carbon carries the current from the upper to the lower terminal, heating the silica tube in its passage.



ELECTRIC FURNACE AND ITS ELECTRIC CONTROLS

On the left may be seen the pyrometer for gaging the temperature. The control box above the desk is opened to show the switches, resistances and meters. This furnace is being operated by direct current.

of the larger. Illuminating gas in a slow stream is passed through absorption oil to remove whatever light oil or other hydrocarbons are soluble in it. It is then passed through water to saturate it with water vapor and then through a silica tube filled with pieces of coke and heated red hot.

The purpose of this hot tube is to break down the remaining hydrocarbons so that the gases leaving the tube are principally carbon monoxide, hydrogen, water vapor and nitrogen with a little methane. The gases next pass through a bunsen burner to mix in a little air, the upper end of the chimney of the burner being connected to the silica tube.

An analysis of the atmosphere within the silica tube drawn from the hot zone with the furnace at about 2,500 deg F. is as follows:

Gas	Percentage	Gas	Percentage
Carbon dioxide	9.5	Carbon monoxide	11.4
Unsaturated hydrocarbon	0.0	Methane	0.0
Oxygen	0.4	Nitrogen	71.5
Hydrogen	7.2	Total	100.0

A series of ash-fusion determinations was made on four samples of coal ash in this furnace, and the same ashes were fused in the gas furnace of the U. S. Bureau of Mines in its laboratory at Pittsburgh, Pa. One sample was fused in the Chicago Laboratory at 2,215 deg. F. and in the Pittsburgh Laboratory at 2,060 deg. A second sample fused at 2,361 deg. and 2,320 deg. respectively. A third sample fused at 2,555 and 2,500 deg. and a fourth at 2,892 deg. and 2,900 deg.

It will be noticed that the agreement is close, particularly in view of the fact that an operator making two determinations of the same ash in the same furnace is regarded as having checked his first figure if he comes within 90 deg. of that figure in making the second determination. In this case two different operators determined the fusing temperature with two totally different types of furnace, and yet the greatest difference between their results was 155 deg. F. For making temperature measurements a Leeds & Northrup optical pyrometer is used.

High-Power Cable Cut by Cars That Were Uncoupled In a Rotary Dump Explodes Coal Dust at Dolomite

Review of Accident Based on Intimate and Painstaking Inquiry—Injured Cable and Broken Car Wheel Found Suggestively Near One Another—Sprinkling, or Rather Dousing, of Workings and Spare Fan Saved Many Lives

By J. J. Forbes*

THE explosion which occurred about 2:40 p.m. Nov. 22, 1922, in the Dolomite No. 3 mine of the Woodward Iron Co., resulting in the death of ninety men and in slight or severe injuries to seventy or more others, was altogether unusual. Rarely do so many conditions combine to cause an explosion. It is believed that much greater loss of life would almost certainly have resulted if the Woodward Iron Co. had not employed means calculated to localize the effect of any explosion that might happen.

To enable the reader to understand the conditions under which the explosion occurred and was propagated a short description will be given of the mine layout. Dolomite Mines Nos. 1, 2, and 3 are all connected, but the ventilation of No. 1 mine is entirely separate from that of mines Nos. 2 and 3; in fact the last two mines are really one. No. 3 mine is opened by a slope driven on a pitch of 30 deg. through rock which at a distance of 850 ft. intersects the coal bed.

The slope, which is laid with two tracks, is about 6 ft. high and has an average width of about 20 ft. In line with the slope is the "yard," or parting, which has four tracks—two empty and two loaded. Its length is 500 ft. The "yard" is provided with a weighhouse, a motor pit, an office for officials, and other suitable conveniences. In the ordinary operation of the yard 12 to 20 employees, including couplers, spraggers, weighman, sandmen and sprinklers were employed. On the morning of the explosion 475 men were checked into No. 2 and No. 3 mines through No. 3 slope, and in addition to this 397 were checked into No. 1 mine, making a total of 872.

Spare Fan Ready for Just Such an Accident

The operation known as mines Nos. 2 and 3 is equipped with two separate and distinct fans, housed in fireproof buildings, one of which is provided for use in case of an emergency. At the time of the explosion the Capell fan, electrically driven, was in full operation. About 75 to 100 ft. therefrom is a Sirocco fan which by simply throwing in "jaw clutches" can be driven either by a gasoline motor or electricity. No. 2 fan pulled about 130,000 cu.ft. of air per minute, 70,000 to 75,000 cu.ft. of which entered through No. 3 slope, the rest intaking through slope No. 2.

All coal is loaded into wooden cars which are provided with tight gates and is transported from the live workings to the yard by ten electric locomotives. It is hoisted to the tipple by means of an electric hoist and is discharged into storage bins at that point by means of one of two 5-car rotary dumps. For the haulage of the coal ten electric locomotives are provided. Running along the right rib of the slope was a 3,300-volt armored protected cable. This feeder consisted of three conductors of No. 4 copper wire stranded, each covered with varnished cambric and separated by jute. Around the cable was about $\frac{1}{8}$-in. lead insulation and over the lead were two flat steel spirals $\frac{3}{4}$ in. wide wrapped so that one covered the spaces left by the other. The cable was guaranteed for 5,000 volts working pressure, according to a statement made at the coroner's inquest by W. M. Johnson, electrical superintendent for the company.

F. E. Dean, tipple foreman, testified at the inquest that the tail car in a trip of three empties jammed in the guides of the west rotary dump on the tipple. Chain blocks which were badly worn were first used by the tipple crew for pulling the trip, but without success. In an effort to release the car that was jammed the two front cars were disconnected and pulled forward for a short distance.

Broke a 60-Lb. Rail in Hurrying from Dump

The hoisting cable being disconnected, the cars ran backward with considerable momentum and dislodged the jammed car, breaking a 60-lb. rail that, to keep the cars from running away, had been placed across the riding ring of the dump about 2 ft. above the tipple rail and about 10 to 15 ft. below the jammed car. The cars started back into the slope running on the west track and as they neared the bottom they crossed over to the east side and were wrecked against some loaded cars that were standing in the yard.

W. M. Johnson testified at the coroner's inquest that after the explosion, but on the day on which it occurred, he had found a flattened place in the cable about 100 ft. from the foot of the slope and that this flattened place caused two of the three strands of wire to cross, forming a short-circuit. Johnson also stated that he found a broken car wheel about 15 ft. below the flattened place in the cable.

The Bureau of Mines' investigators had an opportunity to examine this cable during the coroner's inquest and afterward, and they observed the flattened place in the cable and the place at which the cable "blew" or arcked. It is believed that the cable was ruptured by a flying piece of steel, probably a car wheel from the wrecked trip, as there was no evidence that would indicate that the cable was ruptured by a car or cars running over it. It is said that whenever a trip broke loose from the tipple and wrecked in the yard it almost invariably threw clouds of coal dust into the air so dense that for some minutes it was difficult to see any considerable distance in the yard. Undoubtedly this wreck brought about the usual dense cloud of dust, and the short-circuiting of the cable with the arc thus resulting ignited the coal dust which was thrown into suspension when the cars piled up. F. E. Dean, tipple foreman, testified before the coroner's inquest that almost imme-

*U. S. Bureau of Mines.

diately after the trip was wrecked in the slope, particles of coal started to fly out of the mouth of the slope followed by flame.

On the afternoon of the explosion, as a result of the cessation of dumping in the tipple, about thirty employees had gathered on the yard, in addition to those regularly employed at that point. Among these were seven locomotive crews (three per crew), the foreman, the master mechanic, the machinist, the electrical workers, the transportation foreman, the sprinkler, and the assistant mine foreman.

The explosion wave worked inby, filling the yard with flame and killing practically everyone in the yard either by burns or gas, and also sent flame with considerable force out of the mouth of the slope, igniting such parts of the tipple superstructure as were of wood and this despite the fact that the building was located about 200 ft. from the portal of the slope.

It is reported by survivors who were on the tipple at the time of the explosion that there was much flame and that the smoke was so dense on the tipple that for some time no one could see what was transpiring. After leaving the yard the flame started into the haulage entries through openings which radiated therefrom. In the most of these haulageways the trolley lines were still found in place after the explosion and although few doors were blown out and brattices forced, the violence was not great, except possibly in the motor-generator room or substation where the flame found an abandoned drift in which the dust could gather.

Rescuers Without Apparatus Enter Mine

In a number of instances men rushed out of their working places upon hearing the blast and feeling the concussion and upon reaching the main aircourse, some met the gas which was being borne by the ventilating current toward the fan. Most of the miners who encountered the afterdamp retreated, and later on came out safely in fresh air after the currents had cleared the entries of afterdamp. Some of the men inhaled the poisonous gases that immediately followed the explosion and were rendered unconscious; especially was this true on the west side of the mine.

The fresh air quickly replaced the poisonous gases, however, and allowed rescuers without apparatus to pull unconscious men out of the gas pockets and to place them in fresh air where they might recuperate. Unfortunately a number of miners who were overcome by the first flow of poisonous gases did not recover and were found dead. In all, fifty-seven bodies were found in the yard, and twenty-nine bodies within several hundred feet of it, mostly along entries. Four died in the hospital, making a total of ninety dead.

The explosion was stopped within a few hundred feet of the yard owing to the efficient manner in which the mine workings had been sprinkled. In other words, due to the lack of dust for propagation, the explosion was localized and confined principally to the main entries and passageways leading from the yard of No. 3 slope. According to the statement of C. E. Nesbitt, chief state mine inspector, at the coroner's inquest, the mine was moist before the explosion, otherwise it would have extended throughout the mine workings.

The verdict of J. D. Russum, coroner of Jefferson County, Alabama, as to the cause of the Dolomite No. 3 mine explosion is as follows:

"After making a thorough investigation in reference to the 89 men* who lost their lives in the explosion of Dolomite No. 3 mine on Nov. 22, 1922, about 2:40 p.m. and after carefully studying the testimonies of all the witnesses which were practically in agreement, I find that the explosion was caused by the rupturing of a high-powered cable. After making a thorough investigation of said cable I find that the rupture was caused by a heavy blow from a flying piece of steel, possibly a broken car wheel, from a runaway trip of cars. I am unable to place the responsibility on any one individual, as the disaster was merely an accident."

Sprinkling lines traverse main and side entries, 4-in. and 2-in. pipe lines being employed for this purpose with taps usually placed at 100-ft. intervals. Common garden hose in 50-ft. sections is used for sprinkling both rooms and entries. A corps of ten sprinklers were continuously employed by the company to sprinkle the mine and they performed that task not only in the entries but in the rooms also. The rooms and entries are washed clean of dust, the work of thus sprinkling the entire mine taking approximately three days.

It is felt that a large number of lives were saved by the efficient method of sprinkling employed and a very disastrous explosion prevented which undoubtedly would have propagated into the workings of No. 2 and No. 3 mines and possibly into No. 1 mine. Again, it is believed that a large number of lives were saved by the commendable way in which the ventilation fans were arranged, for within 15 minutes after the explosion caused by the short-circuiting of the cable in No. 3 slope, the Sirocco fan, driven by a gasoline motor was in full operation, pulling full currents of fresh air through Nos. 2 and 3 slopes, thereby clearing the affected and unaffected parts of mines Nos. 2 and 3 of poisonous gases. The prompt starting of the gasoline fan after failure of that driven by electricity, whereby air currents were kept going at almost normal velocity, permitted the rescuers as well as the workers to travel in fresh air within a comparatively short time after the explosion.

*This verdict was given Dec. 15, 1922. Since that date one more man died in the hospital, making a total of 90 dead.

A Spanish Coal Field; the Wonder Is That It Was Not Worked Long Ago

DESCRIBING the Villablino coal field of Spain, H. M. Morgans, speaking before the South Staffordshire and Warwickshire Institute of Mining Engineers, said it measured $3\frac{3}{4}$x$17\frac{1}{2}$ miles. The coal beds are tilted steeply, mostly between 50 and 90 deg. parallel with the axis of a range of hills. Owing to the great pressure and movement the coal is tender. The range has been cut by half a dozen valleys running north and south at right angles to its axis. For this reason the coal seams can be worked by level driven on the strike from the sides of the valley or by cross-measure roads from the main east-and-west valley south of the range. There are nine to twelve seams, all over 20 in. thick. The total thickness is 36 ft. The interval between seams varies from 66 to 164 ft., and the character of the coal ranges from semi-bituminous to anthracite, with 20 per cent of volatile matter as a maximum. The ash content runs from 8 to 16 per cent, and heat values exceeding 14,000 B.t.u. have been obtained. The coal is mined by overhead stoping, working in steps and packing with dirt on which boards are placed to keep the coal clean. This packing partly comes from the mine but when needed is brought from outside.

Dispatching of Mine Cars at the Rolling Mill Mine

One Man Regulates from Telephone Center Entire Distribution of Cars Except in Night Shift and "Frogs" Sections Thus Providing Car Supply in Exact Proportion to Needs — Heading Trackage Covers 55 Miles

By George Atwell Richardson*

THE Rolling Mill Mine of the Cambria Steel Co., at Johnstown, Pa., which was opened more than sixty-seven years ago, has extended over a larger area than probably any other one mine in the United States. Its operations have covered approximately ten square miles. The distance to the farthest working face is five miles, and the total heading trackage actually in use aggregates about fifty-five miles. The record daily production of coal, made as recently as May 31, 1921, is 3,872 net tons.

At first glance figures such as these would suggest that the dispatching problems at this mine are of considerable magnitude and that the method of handling coal would be of a more or less complicated nature, involving much work and planning. As a matter of fact, however, the dispatching of trips is handled in a surprisingly simple manner with great efficiency, the details of which follow:

At the present time six sections of the mine are being worked. The sixth, or last, which is known as the "Mill Creek" area, is operated only on the night shift. Coal is hauled during the day from the other five sections, which are known as "Frogs," "Klondike," "4 Left," "6 Left" and "33 Level."

Dispatcher Allots Cars Among Motormen

The trips are controlled by one man who is known as the dispatcher. He has full control of the allotment of cars, running of trips, etc. He is located in a brick office (see Fig. 1) about one mile to the east of the main, or No. 26, sidetracks where the trips are made up. Close by the dispatcher's office is the head of an old three-track siding marking the end of the rope-haulage system which was abandoned only a comparatively short time ago. All gathering was done to this point. It is interesting to note that despite the age of the heading and its width, but little timber has had to be used for its support.

Coal is gathered by mules and storage-battery and electric locomotives. Mules are used where the gradient is so steep that the miners cannot push their cars from the working faces to the room necks. There are three mules in "6 Left" section and two in the Klondike. All the coal in the "Frogs" section is gathered by mules.

Storage-battery locomotives are used in certain locations owing to the presence of gas. Two are used on "33 Level," one on "4 Left," one on "6 Left" and one on "Klondike." All of these locomotives are rated as 7-ton machines. Cars are gathered in the Mill Creek section with trolley locomotives, for gas has never been found in that area. In fact for all purposes it is a separate mine.

For main haulage and for special purposes five 15-ton and three 10-ton trolley locomotives are provided. As a rule the hauling is done with one 15-ton and one 10-ton locomotive working in tandem. The normal trip averages about 80 cars, each holding about 1 ton 1,400 lb., but it is of record that one 15-ton locomotive hauled 103 cars over this grade.

The cars in use at the present time number about 1,000, of which 200 are allotted to the "Frogs" section. These latter are older cars, which can be used to advantage at this place because the haul is short.

The dispatcher's office is, of course, the nerve center of the mine and all mine telephones connect through it, and messages to the outside must be so routed during the daytime. At night a direct connection with the outside is maintained.

The present telephone system has three circuits and the three switches and the dispatcher's telephone can be clearly seen in Fig. 2. In all, connections are made to sixteen telephones. What these are is shown in the following table:

Switch No. 1 (Left in Fig. 2)	Switch No. 2 (Center in Fig. 2)
Outside Connections	
Supply Office	
Machine Shop	Frogs
Power house	Elk Run shaft
Foreman's office	Upper end, Elk Run siding
Switch No. 3 (Right in Fig. 2)	
No. 4 Left section	Bottom Mill Creek shaft (coal taken up here for boilers)
No. 33 level	No. 4 left side track (used mostly in bringing men out)
No. 6 left	Klondike
Mill Creek	No. 26 Siding
Pumproom	

The actual details of the dispatching are as follows: First in order comes the question of the proper distribution of cars. At "Frogs" that matter does not have to be considered, as the supply of cars will always take ample care of all the requirements of this section.



FIG. 1—EXTERIOR OF DISPATCHER'S OFFICE

The work of dispatching is based on a continuous record. The dispatcher knows just how many cars each section has received and can compare it with the number to which its capacity entitles it. In mines where dispatching is not checked by such a record injustices are likely to occur. Note the care with which the trolley wires are guarded.

*Midvale Steel & Ordnance Co., Cambria Steel Co.

NOTE—With the growth in size of modern coal-mining operations the problem of dispatching is rapidly becoming one of great importance to mine-operating officials. This is an account of the methods used in an operation which has been described in other articles in *Coal Age* by the same author.

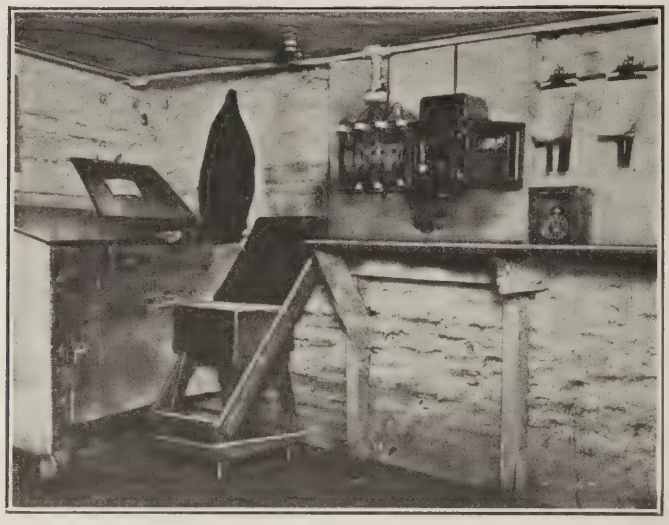


FIG. 2—INTERIOR OF DISPATCHER'S OFFICE
Here is the central station for sixteen telephones in various parts of the mine. The dispatcher arranges from this office for an even distribution of the cars at all points.

As a result the dispatcher pays no attention to it other than to get a record at the end of the day of the total number of cars loaded and hauled from these workings to the Elk Run shaft.

In the other sections a shortage of cars might often occur. The manner in which they are distributed to the different working faces depends entirely on the dispatcher's judgment based on his knowledge of the track system, the coal supply and other conditions.

All cars are distributed to these sections by gathering locomotives working to and from No. 26 sidetrack. The switch boy at this point attends to the telephone, the dispatcher giving him orders as to the number of cars to be allotted to each locomotive.

Outgoing trips operate on approximately 45-minute schedules, subject to the dispatcher's orders. A simple record is kept of these, which, however, meets all the present requirements. It consists of nothing more than a form ruled in pencil and filled out each day as shown, the record for Dec. 15, 1922, being taken as a typical example:

RECORD OF CAR APPORTIONMENT, DEC. 15, 1922

Trip No.	Frogs	Klondike No. Cars	4-Left Cars	6-Left Cars	33-Level Cars	Cars Per Trip from 26 Sidetrack	Time Net	Output Tons
1	..	24	30	..	15	69	8	194
2	..	22	27	23	31	103	9	336
3	..	26	32	23	22	103	10	512
4	..	26	33	25	33	117	11	763
5	..	20	32	28	33	113	12	1,070
6	..	23	32	27	..	82	1	1,300
7	..	30	32	24	33	119	2	1,441
8	..	23	29	31	33	116	3	1,680
9	..	22	32	32	33	119	4	1,925
10	..	21	..	24	31	76	5	2,347
Totals		237	279	237	264	1,017		

As is evident, the totals shown in the last column are cumulative. The final total and also that for total cars shipped includes cars from the "Frogs" section.

The night shift works only in the Mill Creek section and when it is through in the morning a pencil memorandum showing trips handled, cars loaded and hauled, and cars left for day hauling, is available for the dispatcher's use in planning his work.

Coal from the Rolling Mill mine is hauled to a rotary dump at Elk Run shaft, dumped down a well and loaded again on the lower level for direct haulage to the coke ovens. This lower level is a part of the Rosedale Mines and dispatching is handled independently from the Rosedale end.

From this short article it will be seen that despite the size of the mine in question, the problem of dispatching is an easy one to handle, given a capable dispatcher who knows his mine and is on the job.

Should Starting of Electrical Machinery Be Regulated by Automatic Devices?

By H. H. Johnston*
East Pittsburgh, Pa.

IN THE article entitled "Year 1922 Tackles Hopefully Many of the Big Problems of Coal Production and Preparation" that appeared in *Coal Age* Jan. 18, pp. 89-91, the author says:

> One wonders whether the time will not come when the man who runs a locomotive or even a medium-sized hoist will be afforded opportunity merely to start the sequence of actions by which full power is developed or shut off, instead of being able to throw the controller handle with utter disregard of all the rules of proper operation. This provision is already embodied in electric railroad work. Why should the motorman have it in his power to "goose" a motor? If we had electricians to handle electric machinery the present equipment might be properly used, but with machines started by motormen, machine men, ditch diggers, pumpers and hoistmen little latitude of choice should be allowed. It is to be hoped that within the space available on the locomotive, mining machine and loader some means will ultimately be found to put devices which will prevent the motorman, cutter and loader, respectively, from abusing their motors.

These remarks were forwarded me by the author in a letter under date of Jan. 6, asking for my opinion relative to their practicability. They express without a doubt a thought to which operators, manufacturers and engineers have given much consideration. The conditions under which mines are operated vary so much, particularly in main and gathering haulage, that automatic control of the character in use on railroads is, I believe, entirely out of the question.

The locomotive of the mine is called upon to operate under conditions which vary widely with different kinds of operatives, trip lengths, track conditions, grades, etc. On the other hand it must always be remembered that in street-car service, owing to a fear that too great an acceleration of the car would cause discomfort to passengers, the maximum speed of acceleration usually is limited. Furthermore, the cars in street, elevated or subway railway service which use automatic control actually carry the burdens which they transport instead of trailing those burdens behind them in a trip of cars. This weight bears down heavily on the wheels so that the acceleration sought rarely is enough to cause the wheels to slip on the rail. On the other hand, the mine locomotive in the course of every run may be required to start at the slipping point of the wheels, as, for instance, when starting the train on an upgrade. It also may be called upon to start with an inordinately light load, where the tractive effort would be much below normal.

In railway equipments the usual practice is to use a current limit relay which during the acceleration periods automatically controls the various switches or contactors. This relay lifts when the accelerating current has reached a predetermined value. Under these conditions, should the motorman attempt to notch the controller quickly to the last step, the limit relay will lift as he passes a certain point and the accelerating switches will not be brought into action till the limit relay will drop, and this will be when the accelerating current decreases as the result of increased car speed.

Where remote-control devices are used—that is, where a master controller is operated by the motorman and

*General engineering department, Westinghouse Electric & Manufacturing Co.

contactors are controlled from the master controller—it is comparatively easy to provide for the automatic control of the motor and to do it without additional equipment. But when we come to the mine locomotive, it is, I believe, necessary to remember that we must have notch-by-notch control even if we do have the automatic feature. There are many times when mine locomotives must be operated for a long time on the resistor points. Any automatic features used to take care of the needs outlined in the article quoted, therefore, must be used in conjunction with the ordinary step-by-step control.

If automatic acceleration were provided in the same manner as on street railway cars either the current limit relay should be changed in every case so that it would be adapted for the acceleration of the locomotive and its trip under the particular load condition encountered or the automatic devices for the control of acceleration should be more adequate than could be provided by the use merely of a current limit relay. In conjunction with that device should be one dependent on the time element so that under all conditions provision would be made for bringing in the accelerating switches, one after another, with a definite time interval between them. Automatic acceleration by the current relay is not used in main-line electric, freight, passenger or switching locomotives for precisely the same reasons that operate against its use in mine-locomotive service.

Where Regulation Has Been Made Automatic

Perhaps the only instance around coal works where locomotives have been controlled by automatic devices has been on some of the more recent quencher locomotives used at byproduct coke plants. But these are operated under a loading and grade condition that is always practically the same, day in and day out and trip after trip. In these installations a master controller is used, having the usual notch-by-notch scheme of control, but having in conjunction with this a provision for automatic acceleration in case the man who handles the locomotive wilfully or otherwise turns the handle of the controller too fast to the last or intermediate running points. On these locomotives electro-pneumatic unit switch control is used. With it is embodied a current limit relay and, as stated, manual control.

Various mechanical devices have been designed for use with mine-locomotive controllers. Drum controllers also have been put into street-car service. These make it necessary for the motorman to consume time in operating his control handle from notch to notch. Motormen become expert in handling most of the devices of this kind which have been put on the market, and even though they are supposed to delay the motorman materially in passing from notch to notch they do not always prevent him from abusing the equipment entrusted to his care.

Undoubtedly the question the writer has in mind is: Will the control operation become eventually so simplified that the sequence of actions will be started by the pressing of a push button. It is difficult to see how this will come about, especially in mine-locomotive service, but it is not at all impossible to foresee that we may yet use a master controller, a set of contactors, and a reverser in conjunction possibly with a current limit relay so as to provide sequence of the control circuits, provision being made on the master controller and between the various contactors for the operative to obtain notch-by-notch acceleration either to resistor or running points.

Under existing conditions at many mines the motormen and operators of other electrical equipment cannot be penalized sufficiently for the damage they do when they operate their controllers in the manner described in the article. For reasons not electrical, such actions under certain conditions could not be penalized, but perhaps there are other ways of preventing the abuse of equipment.

I have in mind a sort of recording device that might be planned and applied to the various mine equipments which would tell the operative or would record for the mine superintendent or other official, either directly or indirectly, what savings the motormen and other operatives in the mine have made possible by more careful and capable operation of their controllers.

No doubt if such a device were installed, even though it would show nothing more than the saving in power, a considerable reduction would be made in operating expenses. This would reveal, however, only a part of the saving that would arise from the careful operation of the controller which such a record would cause. There would be a further saving not noted on the record, for the installation of the device would greatly reduce the number of equipments that fail today by reason of power being too rapidly applied to the motors.

British Columbia Seeking Uses for Fossil Resins of Coalmont Mines

IN AN article read before the Canadian Institute of Mining and Metallurgy, R. T. Elworthy and R. K. Carnochan discussed the possibilities of using a fossil resin found in the coal on the waste dumps of the Coalmont Collieries, Coalmont, B. C. This material aroused much interest, especially as it is reported to be identical with Prussian amber. Of 400 lb. of the coal sent to the Mines Branch of the Department of Mines of Canada, resin formed about 8 lb. The pieces were about the size of a pea, were irregular in shape, without marked cleavage lines and fairly brittle. Their color varied from opalescent lemon yellow through all stages from brown to black, some showing a green fluorescence. It readily can be separated from the coal by flotation in solutions of sodium or calcium chlorides of specific gravity 1.10 and graded by using solutions of specific gravity 1.03, 1.05 and 1.09. Ultimate analyses gave a composition of about 80 per cent carbon, 10 per cent hydrogen, 9 per cent oxygen, 0.3 per cent sulphur and 0.7 per cent ash.

The amber made an excellent varnish that did not crack but was of rather a dark color. The manufacturers of varnish feared that it would not compete with copals such as the Zanzibar, Kauro, Manila and Congo gums.

Large-sized blocks of amber are formed from clippings and waste by the action of heat and pressure. According to one process the material is heated to 200-250 deg. C. and a pressure of 400 atmospheres applied. Experiments made in the compression of Coalmont resin have not yet been successful, though it is hoped that better results will be obtained with a new mold now being made in the work shops.

But the synthetic resins such as Bakelite, Redmanol and Condensite are rapidly supplanting compressed amber and it is improbable that there is any use for the Coalmont resin in this direction. It therefore seems difficult to find satisfactory uses for the resin unless it can be obtained in large quantity and sold cheaply enough to compete with the darker varnish stains.

Extracting Thick and Steeply Pitching Coal Seams

Galleries Are Extended Either from Shaft or Chuteway, the Coal Thus Entered Being Extracted by Shots in Sides and Roof of Roadway—In Other Sections Diagonal or Vertical Breasts Are Driven and Drawn Without Stowing

By A. Gerke
Waldenburg, Silesia, Germany

NO UNUSUAL difficulties are experienced in the working of thin seams, even when they pitch heavily, but the mining engineer often must face difficult problems if the pitching seam is from 20 to 25 ft. thick, for in such cases methods that are quite efficient with thin seams cannot even be considered. In most instances, where the beds are thick, either cross working or stoping methods have been adopted. Even until recent years one German coal mine has been operating on this latter principle, the excavation being stowed. The seam is from 20 to 25 ft. thick and pitches at an angle of 70 to 90 deg.

Expensive Stowing Methods Abandoned

The results obtained by this method were not at all satisfactory. Though the work was done with the greatest possible care the face of the coal frequently broke down owing to the friability of the coal and the thickness of the coal bed. In consequence the workings had to be substantially timbered. In some places the coal fell for a height of from 60 to 100 ft., and the stopes had to be abandoned and the roadways and airways had to be sealed. This had to be done with exemplary care, for if it were not so done or if when thus performed the seals became leaky, mine fires soon broke out, and hence it happened that in many cases, owing to the danger that the fire would spread, even unmined parts of the seams had to be abandoned.

Furthermore, the cost was too high and the returns were too small, and that was true even when no such accidents occurred. Consequently other methods had to be devised. On account of the unfavorable nature of the seam it could not be mined by working from footwall to hanging wall, stowing refuse in place of the extracted coal. This method, therefore, gave way to the stoping method just mentioned, and that in turn was abandoned for the method described in this article. The two systems used are termed "stockwork" (*etagenbruckbau*) and "working by diagonal stopes" (*diagonalbruckbau*).

The stockworks themselves are of two kinds, according to the character of the rock bed overlying the coal.

The coal area to be mined by stockwork is divided by hoisting shafts spaced at 350-ft. intervals. The small areas thus served are divided again into smaller areas by driving galleries 6 or 7 ft. wide in the middle of the coal bed—that is, at equal distances from the footwall and hanging wall. When these are driven to the full distance of 350 ft. the coal is extracted on the retreat on both sides of the gallery and up to the roadway above. (See Fig. 1.) First of all a raise is made to the gallery above. Then the roadway is widened to the full width of the seam for a length measured along the gallery of 14 to 18 ft. and the coal in the roof is shot down till the upper gallery is reached. Coal pillars are left about 10 ft. wide to separate the broken coal from the "old man," or fallen roof of the excavated area. By leaving pillars of this kind the coal is supported so as to form an arch which can be broken down only by well-located shots in the sides or the roof of the raise.

Arrange to Make Coal Pile Act as Chute

The cars are brought to the edge of the raise, for the coal comes down in such a large quantity that the loaders can work under the protection of the well-timbered roadway. In case sufficient coal does not fall

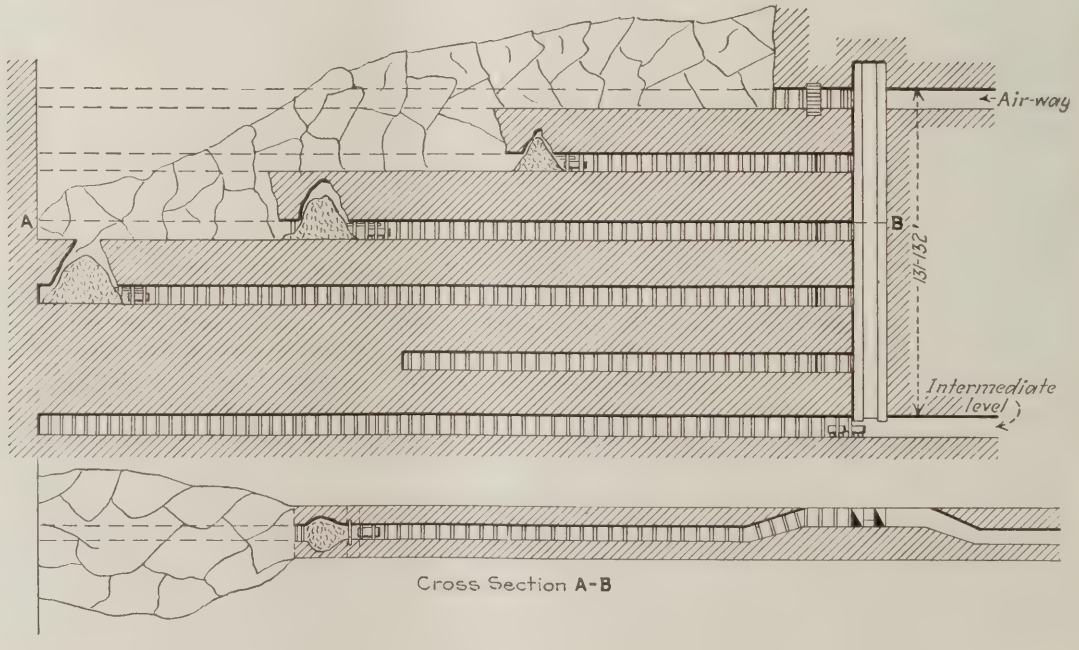


FIG. 1

Stockwork

In steep pitches over 50 to 70 deg. an inclined shaft is constructed directly on the pitch and galleries are driven along the middle of the seam for 350 ft. The coal above and beside the gallery is drawn out by cutting a raise in the roof, by widening the gallery and then shooting down the sides of the raise, the men working in the third operation on the top and sides of the coal pile.

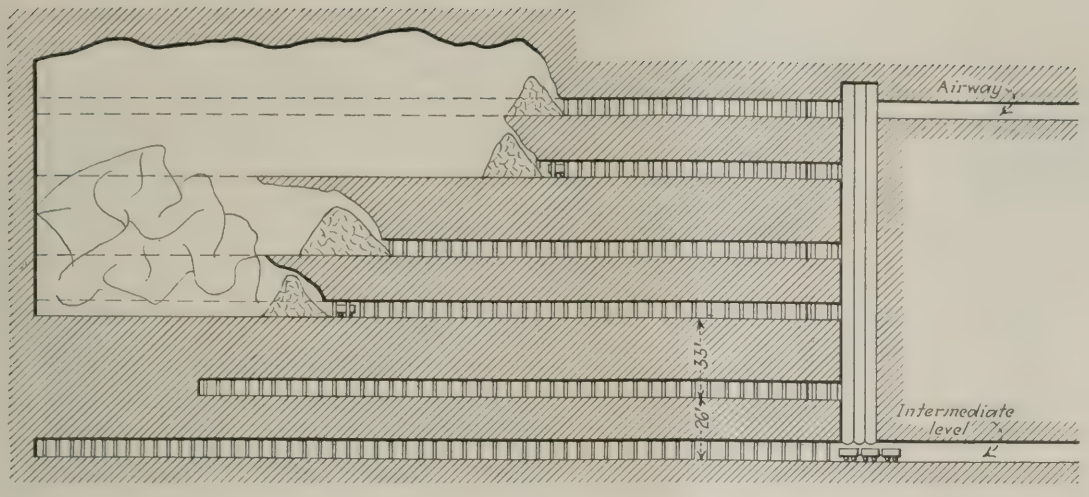


FIG. 2

Another Form of Stockwork

Here the roof is firmer and the seam thinner, 12 to 14 ft. thick. Two adjacent galleries in the retreat are brought back almost abreast and no vertical pillars are left against the goaf.

into the roadway the miners blast the next holes so as to bring down the quantity of coal required. For their own advantage they will not allow all the coal to be removed, for by means of the pile of coal they are able to drill other blast holes more easily. The coal thus piled on the roadway can be removed when the lower roadway has retreated an equal distance.

The cavity created by the extraction of the coal is filled with rock which falls from the hanging wall and the coal which has been left to protect the raise. The roof does not fall in large quantities but gradually.

If the hanging wall is solid and the seam runs only from 10 to 14 ft. in thickness the type of working illustrated by Fig. 2 is preferred. Here two galleries are worked at the same time and by one crew of men. No pillars are left to protect the raise except as a roof to every second roadway.

As the driving of shafts delays operations, and is expensive, entailing much deadwork, diagonal passageways rising at 45 deg. are now used in their place. These are driven as a rule without timber, and in them is placed an open wood trough. (See Fig. 3.) These chuteways are driven and maintained at less cost than inclined shafts, and the coal thus lowered to the roadway is broken less than if dropped down the full pitch of the seam.

Unless the inclination of the bed exceeds 50 to 70 deg. the stockwork method cannot be used to advantage, for the coal will not slide down to the point in the roadway where the cars are to be loaded. For this reason where the coal is of that lesser inclination the operation is by diagonal breasts, as shown in Fig. 4. This method has advantages over stockwork, for less development is needed, no coal is lost, the miners can produce more coal and less timber is used. Furthermore, a large percentage of the coal produced by this method is in large lumps.

The area to be mined is opened up by breasts inclined at 45 deg., the coal being withdrawn from the lower level. After the second mining is completed no pillars are left. The miners drill their blast holes standing on the coal already blown down. It was found that when working by stockwork or by diagonal stopes the miners produced 13 tons, where before, working in the stowed stopes, they mined only 4 tons. The costs of timbering were reduced one-eleventh and the wage cost of haulage one-third.

A modification of stoping in which the area is first divided into longitudinal pillars has recently been used in a seam dipping at 30 to 50 deg. (Fig. 5.) The area to be extracted is divided into sections by subordinate passageways from 90 to 145 ft. apart driven up the pitch. Passageways or galleries are driven on the line of strike at right angles to these and at intervals of 33 ft. Mining may be started at the top gallery or at the lowest one.

The longitudinal pillars are split by a narrow breast up to the gallery above. Then concurrently the pillar toward the goaf is drawn and a slice is taken off the pillar on the other side so that in all the seam is removed for a width of about 20 ft. This may be taken working upward or downward. In either case a 10-ft. pillar of coal is left at the top of the gallery to protect the work in the section below. Eventually this coal will

FIG. 3

Stockwork with Diagonal Chuteway

Here the grade is almost vertical and the coal accordingly is run down a wood trough through a chuteway driven at an angle to the full pitch—in this case of 45 deg. — thus reducing breakage. This method is known as *"etagenbruckbau mit diagonalen rolloechern."*

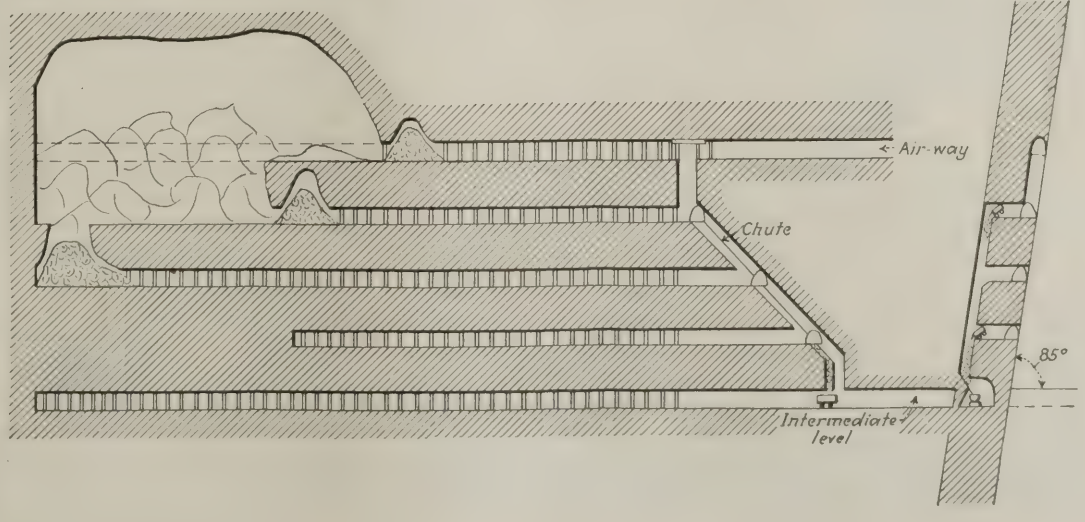
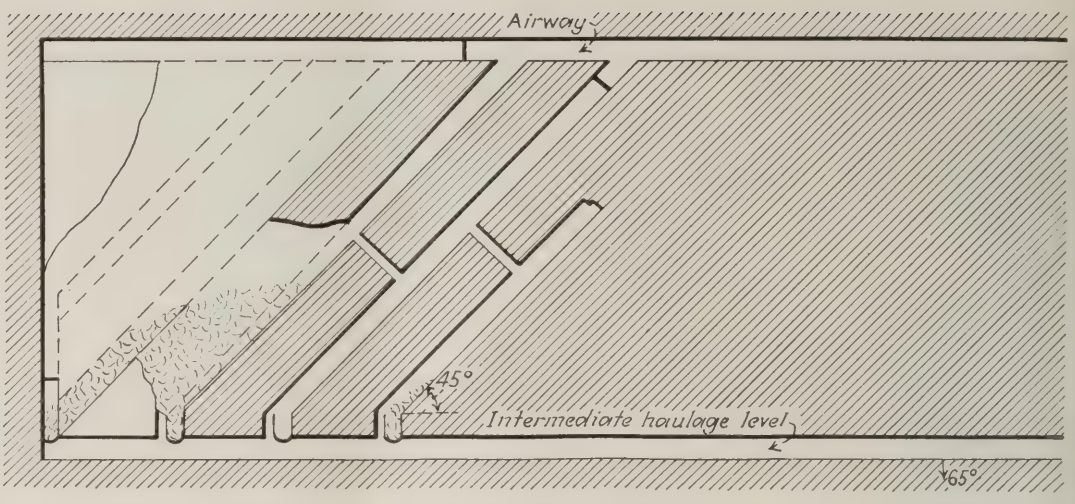


FIG. 4

Diagonal Breasts

Where the pitch does not exceed 50 to 70 deg. stockwork cannot be used. Here diagonal breasts are introduced, which have the advantage of saving in development cost, larger tonnage per man, less coal lost, less timbering required and lumpier coal. The method is termed *diagonalbruckbau*. The rooms are drawn starting from the lower gallery.



be broken down and loaded, as also any coal left between the breast and the goaf. This is worked downward.

The coal excavated in any such breast is dropped down to the gallery below and loaded into mine cars. A line of props is set along the coal pillar at the top to prevent it from breaking down. While working the miners stand on solid coal and they can put their ladders on it in a right angle to the inclination of the coal bed. They are well protected, for the coal they are cutting cannot touch the ladders.

After blasting the men can get back to the working face from the upper gallery, which with proper care can be protected from the falling of coal. As for the trammers, they are well protected, being in the lower gallery. The advantage of this method is that it reduces the waste of coal and affords greater protection to the men.

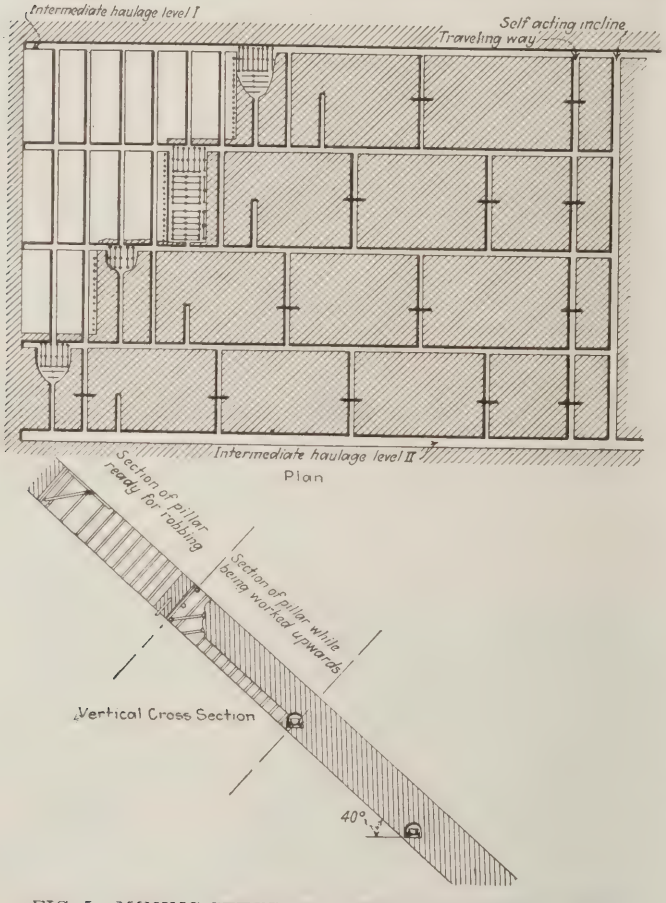


FIG. 5—MINING STEEPLY PITCHING BEDS IN PANELS

Working by longitudinal pillars with inclining sections (*streichender pfeilerbau mit ein fallenden abschnitten*). The work is divided into large panels which are split by small narrow breasts, most or all of the coal being taken out on a retreat, upward or downward. Pillars are left at the top of the galleries to prevent broken roof rock from falling into the breast.

The methods of working just described have proved their value by long use. Of course, they can be employed only if the surface does not need to be supported and when the dip as well as the width of the seam accords with the conditions outlined. These requirements being complied with, the methods can be recommended.

Code for Trade Associations Laid Down

IN place of criminal or even civil proceedings under the anti-trust laws against the Gypsum Industries Association, a decree by consent has been entered in the New York Federal District Court dissolving the association and stating what its members may and may not do in concert in the future. This action followed a widespread investigation by the government and the presentation of evidence to the federal grand jury, which according to report was reluctant to indict but indicated a desire that the government should secure the cessation of alleged abuses growing out of the association's activities. This course of action, far more just and practical than inconclusive prosecution such as has been brought in other industries, was adopted.

The decree agreed to by the United States Attorney and the representatives of the gypsum manufacturers prohibits the weekly or monthly meetings which the government contended afforded opportunities for price fixing, dissolves the association and in its place substitutes a non-profit making corporation. The acts of this corporation which are held to be lawful and to which the corporation is limited by its charter, include advancing or promoting the use of gypsum products by all legitimate means, including research, publicity and advertisement, dealing with engineering and trade problems pertinent to the industry, carrying on educational work, maintaining a bureau to furnish information, dealing with improved methods of plant and mine operation and maintaining a credit bureau.

The injunction provisions of the decree prohibit agreements to

Fix or establish prices for gypsum products.

Establish or maintain uniform prices.

Advance or decrease prices.

Limit, curtail or otherwise control the production of gypsum products.

Fix boundaries of sales territories open only to certain members.

Effect any discrimination in prices.—***The Index.***



Problems of Operating Men

Edited by James T. Beard



Work for Fact-Finding Commission Appointed by President

Cost of Production and Distribution of Coal—Law of Supply and Demand Automatic—Little Need for Intermediaries

ONE of the important duties devolving on the Fact-Finding Commission to which reference has been made in *Coal Age*, Dec. 14, p. 959, will be the determination of the cost of production and distribution of the coal, from its mining till it has reached the final consumer. The work of the commission is to collect data to show the sources responsible for the high prices now being paid for fuel.

In various ways, attempts have been made to explain the present excessive price of coal to the ultimate consumer. Most pronounced of the reasons given has been the high rate of wages paid to miners and mine laborers. This theory, however, would place the responsibility where a more thorough investigation may show that it least belongs

Miners' High Wages Not Alone Responsible for Excessive Cost of Production

The high wages paid to miners and mine workers form a comparatively small item in the actual cost of production and distribution of coal to the consumer. From the time the coal leaves the mine, until it reaches its final resting place in the bins of the consumers, there is every evidence of excessive charges for transportation, handling and distribution by trucks and drays.

For a number of years, there has been a too pronounced differential between the cost of mining the coal and the price paid by the consumer. This differential is too great to be explained by the operation of the natural law of supply and demand. It is well known that this law acts naturally and automatically only when it is unrestricted.

Interference with this natural law has been emphasized by the government as criminal, in the pronouncing as a crime any manipulation in restraint of trade. With equal fairness and justice, our laws might also define as crimes, transactions that divert or obstruct the flow of commodities from the producer to the consumer by the simplest and most direct route possible.

Two Classes of Consumers

In general, there are two classes of consumers: 1. The manufacturer and others who purchase coal in carload lots. 2. The individual or small consumer whose requirements demand less than carload shipments. It is evident that the differential in the former instance is much less than that in the latter, which must involve the service of a retail intermediary as a distributor of coal in retail lots.

The consumer who buys in carload lots must pay a price that includes the cost, f.o.b. at the mine, together with freight charges and expense of handling at destination. On the other hand, the small consumer pays in addition, the cost of handling the coal twice and the profits of the retail dealer.

Handling of Shipments of Coal Through Brokers Harmful to the Industry

There is a class of operators that should be styled "industrial parasites," whose operations are as much against the interests of the producer as against those of the consumer. There is no legitimate excuse or logical reason for the existence of these parasites, in any capacity, in the coal industry. Their operations are confined solely to brokerage in the handling of the product.

There are brokerage firms that do an annual business amounting to millions, on a comparatively small invested capital. Their purchases are sold in the open market or to their clients, at the prevailing market prices, but that is no argument in their favor.

In the handling of large volumes of commodities, such as fuel, it is of the utmost importance that the transportation of the product should be by the most direct route and in a manner to avoid unnecessary transfer charges and demurrage for delay in unloading. All such unnecessary charges increase the cost to the consumer.

In closing, I will mention briefly the opening of small mining operations at the time of the war when the great demand for coal sent the price skyward. These small mines were known as "Snowbirds." They helped in the emergency, although practically their entire output was handled by brokers.

In closing, let me express the hope that the Coal Commission will be able, through its statistical data, to establish the existence of many of the evils that now prey on the coal industry.

Washington, D. C. I. C. Parfitt.

Economy and Supervision Needful

Economy in the use of rails, ties, brattice cloth, etc., important in the operation of a mine—Custom in England—Practice in Rock Springs—Careful supervision needful.

IN HIS interesting letter entitled "Economy in Use of Mine Timber," *Coal Age*, Nov. 16, p. 800, Richard Bowen expresses surprise that, in suggesting ways of improving mining, I failed to mention the practice of economy in the use of mine timber.

Permit me to say, here, that this was not an oversight on my part, as I am a great believer in mine economy, as viewed from many angles. My previous letter did not include economizing in timber, because of lack of sufficient space. However, timber is not the only item requiring the practice of economy. There are rails, ties, brattice cloth and boards, pipes and fittings, together with numerous other supplies.

Just here, I am reminded of a custom in England that might well be followed in American mines. There, when the coal pillar is being drawn back to the entry stump, the deputy, or fireboss, and the miners working the place remain after quitting time and pull out the track and such timber as can be drawn with safety. Nothing is left to be covered up and lost.

If my information is correct, practice in the Rock Springs district, here, allows every miner who has finished his place a bonus of 10c. for each prop he can take out. To my mind, this is a bad arrangement, as only the most experienced men should be permitted to draw timbers from a place about to be abandoned. The work is a dangerous undertaking.

Ascertaining Conditions Underground

A short time ago my attention was arrested by a statement, in *Coal Age*, that some large coal companies were employing private detectives to go through their mines and observe and report on the manner in which they were being operated. This struck me as a good stunt, which might well be adopted in many other mines, where the entire supervision of the underground work is left to one busy foreman, who can hardly keep pace with all that is going on in the mine.

As has been stated by other writers, in *Coal Age*, there is hardly a question but that many wasteful means and methods are being employed in the extraction of coal. I have asked myself the question, Why should not our government take steps to correct this evil? In the conservation of national resources, why permit the operation of mines on a poor basis?

One example showing the need of some more effective supervision of coal operations is the recent explosion at Whitehaven, England, by which, I believe, fourteen miners lost their lives. The explosion occurred half an hour after the men had entered the mine for work, which might suggest that the fireboss had not been able to make a thorough inspection of the workings as required by law.

According to my information the fireboss who examined the mine was compelled to work twelve-hour shifts, which was contrary to the Mine Regulations Act, and his report stated that the district was "clear of gas."

About two years ago I visited in the Whitehaven district going into the Lowca mine where all the miners were using flame safety lamps. Glancing over the deputy's reports for three months back, I was surprised not to find a single gas report; but according to the talk of the miners there was plenty of gas in their places. The fact seemed to indicate that the deputy never made a true report of the mine.

Frontier, Wyo. William Allan.

Developing Ability in Men

Getting things done a peculiar quality of bosses—As the average man sees himself—The man in a rut—Mistakes of companies in training their men.

A SHORT time ago an article appeared in *Coal Age* (Jan. 4, p. 17) bearing on the relative effects of diplomacy and merit in the training of men to be capable workers. In line with what was said by that writer, I am constrained to suggest another viewpoint in the training of men.

Getting things done is a peculiar quality that very few bosses possess. The big problem for the man who employs men is to impress on the fellow who is not hitting on all six cylinders that there is room for improvement. To bring him to understand that fact and accept, in his own mind, the possibility that he can do better is often a difficult matter.

As a general proposition, a man wants to be the judge of the quality of his own efforts. The average man, as he sees himself, thinks and feels that he is doing well. In the majority of cases, he solaces himself with the thought that he is accomplishing more than for what he is paid.

Often have I noticed that when a boss was doing badly, in comparison with other employees of the company, the matter of any improvement in his methods has to be approached with tact. In nine cases out of ten, the man will be possessed with the notion that he is doing well.

At times, it has happened the man would realize that the results he had accomplished were far from satisfactory. But, in such cases, he would claim that the proposition was a hard one, and give it as his honest opinion that he should be paid more money for sticking to the job.

Unwise Handling of the Man in a Rut

We are all familiar with the man who is in a rut. It is hard to convince him that another method than the one he employs would bring better results. If such a one can be brought to open his heart, however, it will often reveal the secret that, had he the opportunity, he could show the boss a few things that would open his eyes.

Some companies handle a situation such as this by dismissing a foreman who has failed by reason of his overestimating his own qualities. This is a great mistake and the concern that assumes such an attitude will never develop capable officials. Instead, they will find themselves continually going outside of their organizations in search of good men. Such a course is too much of a gambler's chance to be recommended.

In closing, let me say that every large coal company should seek to train its men to a more correct estimation of their own qualities. It may take time but in the end will prove worth while. George Edwards.

Pikeville, Ky.

Teach the Rudiments of Mining in Our Public Schools

Coal mining an honorable occupation—Its importance enhanced when taught in schools.

WITH some little surprise, I read the letter of John Rose, *Coal Age*, Dec. 14, p. 961, commenting on my previous suggestion regarding the teaching of the rudiments of mining in our public schools. Mr. Rose says that this "would be difficult, expensive and in a large measure unprofitable." It would seem that our friend's chief objection comes from the fear that the teachers in our public schools have not sufficient knowledge of mining and the attempt would only prove a failure. It may be true that many of the teachers' knowledge of practical mining is quite limited. At the same time, are they not equally ignorant of the rudiments of agriculture, which is being urged and is now taught in many of the schools?

In making this suggestion, my idea was that the teaching of the rudiments of coal mining would impress the child that it is an equally honorable occupation as

that of farming. Moreover, it would give to the children of coal miners an equal start in the work that falls to their lot, as enjoyed by the children of farmers who will be employed in tilling the ground or in other pursuits.

Unfortunately, the work of mining coal has come to be regarded, in the opinion of many, as a degraded occupation. If this idea is to be eliminated from the minds of our younger generation, it will be necessary to adopt some method that will impress them differently, by showing that the work requires both skill and intelligence, to an equal extent with the occupation of a carpenter, machinist or store clerk.

As far as the cost is concerned, the publications on elementary mining, issued by the various vocational boards, are available as textbooks, and arrangements could be made with most coal companies by which their engineers could assist in giving the needed instructions, say once or twice a week.

Advanced Course to Be Taught in High Schools

In the high schools, a more advanced course of study could be offered by the employment of a competent instructor, similar to those now employed to teach manual training, agriculture, etc. In this district, there is employed, in the high school, an instructor to teach agriculture, at a salary of $2,200. Although essentially a coal mining district, there is no similar provision made to teach coal mining.

That the coal industry is one of the most vital of occupations, no one will deny. In fairness and justice to those who follow this pursuit, the same advantages should be open to this as to other classes of workers. Money spent for that purpose would be a profitable investment, if it resulted in bringing a higher proportion of English speaking employees into the mines. The natural results would be that the average father, himself a coal miner, would have no hesitancy in encouraging his children to follow the occupation that has been his life work.

Thomas Allen.

Mount Harris, Colo.

Inquiries Of General Interest

Position of Mine Regulator and Effect of Air Leaks

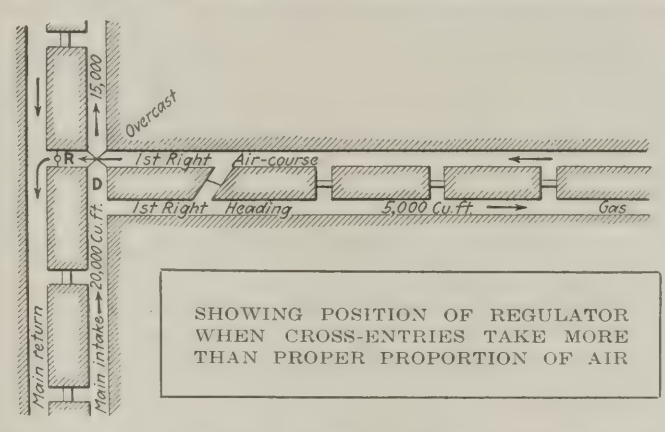
Regulator Required When Door Is Taken Out and Overcast Built—Where Should Regulator Be Placed—Effect of Leaky Door or Stopping

KINDLY permit me to present the accompanying sketch, showing the first-right pair of entries turned off the main heading in our mine, and to explain the following condition that has given rise to much discussion here, in reference to some points.

As shown in my sketch, there is 20,000 cu.ft. of air passing on the main heading. Until a short time previous, there had been a door at the point marked *D*, at the mouth of this pair of cross-entries. The door has now been taken out and an overcast built for the purpose of furnishing a separate split of air to ventilate these entries, which require about 5,000 cu.ft. per min.

We discovered right away, however, that it was necessary to use a regulator, in order to obtain the desired division of the air. Without the regulator, it was not possible to control the air in the proportions desired. The question arose at once as to where this regulator should be placed and this is the first question I want to ask.

Again, it is claimed by some that if the door on the crosscut near the mouth of the cross-entries should leak air, or if any of the stoppings on this pair of entries did



SHOWING POSITION OF REGULATOR WHEN CROSS-ENTRIES TAKE MORE THAN PROPER PROPORTION OF AIR

the same, it is possible for some of the return air to be drawn through this leak back into the intake, or fresh-air current. If that is possible, please explain under what conditions it might take place.

Again, I wish to ask, How would this leak affect the remainder of the current passing through the regulator?

These questions have been under discussion, without reaching any definite conclusion, among a number of mining students attending the State College Extension Course, in Barnesboro. I believe the question first came up at the mining course of the State College some time last summer, and we are all anxious to reach a satisfactory conclusion.

James Bacon.

Barnesboro, Pa.

In answer to the first question regarding the proper place to put the regulator, there is not sufficient data given to answer this question directly. The correspondent should have stated how much the mine is developed beyond this first pair of cross-entries on the right, as compared with the development of the entries themselves.

For example, after building the overcast and taking down the door on the main heading, the location of the regulator will depend on whether the cross-entries take more or less than the desired amount of air. This, of course, is determined by the relative resistances of these entries and the balance of the mine. If the cross-entries are taking more than the desired 5,000 cu.ft. per min., the regulator must be placed on that split.

On the other hand, if the cross-entries are receiving less than the desired proportion of air, owing to their resistance being greater than the remainder of the mine, the regulator must be placed at some point on the main current, so as to force more air into the cross-entries.

In placing a regulator of the box type, consisting of a brattice having an opening provided with a sliding shutter, such a regulator must be placed on the back entry where it will not interfere with the hauling of coal. If the regulator is placed on the air split traveling the cross-entries, it can be located at the point marked *R*, in the accompanying figure, or similarly on either side of the overcast where it will be out of the way.

Referring to the second question, the pressure on the intake of a pair of entries is always greater than that on the return and air can never be drawn from the latter into the former, under any normal working conditions.

The reply to the third question is that a leaky door or stopping on the air split, by short-circuiting some of the air, will cause a surplus of air to pass through the regulator and require a larger opening therein, if the desired 5,000 cu.ft. per minute is to be maintained at the face of the entries. This condition, however, will require increasing the power on the air.

Examination Questions Answered

Mine Formen's Examination Lexington, Ky., 1922

(Selected Questions)

QUESTION—*(a) In your opinion, is black powder dangerous in solid shooting? (b) Is permissible powder safer than black powder in solid shooting? (c) Under what condition should solid shooting be allowed?*

ANSWER—(a) Black powder is particularly dangerous in shooting coal off the solid, because of the liability of the occurrence of a blownout or windy shot, by reason of the coal not having been properly mined or sidecut. The large volume of flame produced by the explosion of black powder affords every opportunity for the production of a dust explosion.

(b) Permissible powder is always safer than black powder, because it is practically flameless when the shot is fired, and there is not the same liability for the production of a dust explosion.

(c) Solid shooting cannot be said to be safe in the mining of bituminous coal, although if the shot is well laid by an experienced miner, no bad results may follow the firing of the shot. The practice of solid shooting prevails largely in the mining of anthracite and the harder varieties of bituminous coal.

QUESTION—*What precautions would you take in entering old workings that have been sealed off?*

ANSWER—Ample time should be given, after breaking down the seals and allowing fresh air to enter the place, for the current to dilute and sweep away the dangerous gases that have accumulated. The place should be entered at the intake end. No open light should be used, but only an electric cap lamp or an approved form of safety lamp should be carried. The advance must be slow and frequent tests made to determine the condition of the air by observing its effect on caged mice or birds taken along for that purpose, or the Burrell gas detector must be employed. No one should attempt to enter such a place alone.

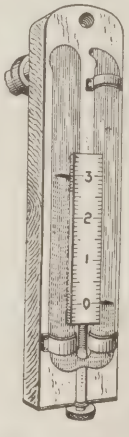
QUESTION—*In case a workman is in contact with a live electric wire, how would you release him? If the man is rendered unconscious, how would you proceed to revive him?*

ANSWER—No time must be lost. Shut off the current if a switch is at hand. Otherwise, throw an iron bar or drill across the wire, on the side of the victim toward the powerhouse, for the purpose of short circuiting a portion of the current and lessening the amount passing through the body. A better plan, however, is to cut the wire on the power side, by a single blow of a sharp ax, when that can be quickly done. Care must be taken to stand on dry ground. It may be possible to quickly drag or push the victim from the wire, using a dry pole for the purpose; or by catching a hold of the man's dry garments and standing on dry ground while so doing.

If the victim is unconscious, he should be moved quickly to where he can have better air and artificial respiration applied in the usual manner. Laying the man prone on the ground with his face turned to one side to admit of free breathing, and the tongue moved forward in the mouth, the operator kneeling astraddle of the man's sides, spreads his two hands over his loins or small of his back and alternately brings a strong pressure on the body to expel the air from the lungs and again releases the pressure to permit air to enter This alternate compression and release must be repeated at the rate of about sixteen times a minute, corresponding to the rate of breathing. The operation must be continued until the patient is revived or life is pronounced extinct by a physician.

QUESTION—*What is a water gage and how is it read when applied to the action of the air current in mine airways?*

ANSWER—As shown in the accompanying figure, the water gage consists of a glass tube bent in the shape of the letter U, and mounted on a wooden base, one branch of the tube being extended at a right angle so as to pass through an opening in the partition dividing the intake and return airways. Both ends of the tube are open to the pressure of the air.



In use, when the water gage has been placed in position on a partition separating the intake from the return airway, the water in the bend of the tube is depressed by the greater intake pressure of the air and rises an equal amount in the other branch of the tube. The difference in the water levels in the two branches of the tube is measured by the scale, the zero of which is adjusted to the lower level and the reading of the upper level is then the inches of water column, or the water gage measuring the difference of pressure between the two airways.

Each inch of water gage corresponds to a pressure of 5.2 lb. per sq.ft. circulating the air from this point on the intake to the same point on the return. In the figure, the water-gage reading is 3 in., indicating a ventilating pressure of $3 \times 5.2 = 15.6$ lb. per square foot.

QUESTION—*What are timbers used for in mines?*

ANSWER—Timbering of roof, in mines, serves two purposes. First, standing a timber under a loose piece of rock may prevent its fall, until such time as the timber is withdrawn. Again, the condition of the timber serves to indicate the action of the roof and gives warning of any increase in roof pressure that may be dangerous. This is made known by the crushing of the timber or of the cap-piece between the roof and the top of the post. In a few words, timbers are used, in mines, for the purpose of giving the miner warning of any unsafe condition of the roof above him. Mine timbers are not used with the idea of supporting the entire overburden.

Coal Situation Discussed from All Angles By New York Section of A. I. M. E.

Stating that coal in the Government Fuel Yard at Washington cost 16c. less in January, 1923, than in the corresponding month of the year previous, H. Foster Bain, director of the U. S. Bureau of Mines, at the meeting of the American Institute of Mining and Metallurgical Engineers at the Chemists' Club, New York, Feb. 14, explained that this was due to the fact that the coal was purchased only from the large companies that had only slightly adjusted their prices. The freight had been reduced 36c. per ton and the price of coal at the mine had been raised 20c., thus accounting for the reduction in the cost of the government.

He stated that the government handled the coal for $1 per ton but he did not desire it to be thought that the average retailer under the conditions he must face could attempt to handle coal for less than $1.88 per ton. Later in the evening Roderick Stephens, vice-president of the Stephens Coal Co., of New York City, took issue with Dr. Bain, saying that from inquiries he had made in Washington, acting for the retailers, he had been brought to the conclusion that the real cost of handling coal at the Government Fuel Yard was about $1.76 per ton. Dr. Bain admitted that the government business was of an exceptional character and the figures it obtained in conducting its business could not be generally applied. Dr. Bain was not prepared to offer any proposals for the correcting of the alleged evils in the coal situation but he listed those which were being presented: Nationalization, unlimited railroad-car supply, unrestricted competition, larger corporations, general unionization, deprival of the right to open mines except under proof of public convenience and necessity and a grant to the Secretary of the Interior of the right to refuse to lease public coal lands where the output from such lands was not needed to meet public needs.

Dr. Bain in his comments said that to demand that the railroads furnish cars and locomotives sufficient to match the present ability of the mines to produce coal would put an unreasonable burden on the railroads. He declared that he never had been able to understand why coal companies had not more generally combined and why the coal industry was wholly conducted by small companies. He believed that it might be possible to compel anyone who wanted to open a mine to show "public convenience and necessity" before allowing him to construct a railroad switch or before permitting the railroad to do it for him. When a new road is to be built the railroad is obliged to show proof that it will be advantageous to the public. He could not see why the arm of the government could not control the constructional activities of the mines as it has done those of the railroads.

Shows Inconsistency of Government Policy

Referring to our public land policy in the West, Dr. Bain said that the U. S. Government was preaching one doctrine and following an entirely different one. It was generally conceded by everyone in the government and without it that there were too many mines and too many miners. Yet the Department of the Interior was compelled to lease to anyone any coal land comprised in the public domain. Worse yet, it was obliged to require of any lesser that he mine a certain quantity of coal each year on pain of forfeiture. That was done because the government did not want to see public lands gobbled up by those who sought them solely that they might hold them for speculation. To avoid that it was necessary to require that the coal be mined. In view of the fact that the Western mines were already working short time for lack of market, to require the opening of mines seemed a suicidal policy. But what could be done under the law? A man recently approached the department to obtain a lease for 1,000 acres. That acreage contained at the least estimate 45,000,000 tons. It might contain 180,000,000 tons. The department was obliged to demand that the lessee mine 100,000 tons per year. At that rate the land would not be exhausted for 450 to 1,800 years. When asked why he wanted so much, the lessee replied that any less acreage would not impress Eastern bankers and would find them unwilling to advance the money needed. So a nation deploring the fact that capital and labor were being wasted by the excessive development of coal lands was itself demanding that more mines be opened and more men be employed. Could a greater contradiction between principles and practice be conceived?

Dr. Bain added that according to Hugh Archbald the miners when employed spent 3½ hr. working and 2½ hr. waiting for cars out of the 6 hr. that the men spent in their working places.

E. W. Parker, director of distribution of the Pennsylvania Fuel Commission, was the next speaker and the principal features of his address are summarized on page 348. Dr. Parker said that the companies in the anthracite region had expended $30,000,000 in pumping, ventilation and other expenses incurred during the strike. For this they did not have a single ton of coal production to show. They are not trying to get this money back and have not raised their prices except to balance increased taxation. Local taxes had increased inordinately and a state tax had recently been imposed. The anthracite companies realized that owing to the strike they would have only 60 per cent of the coal needed by the consumers during the present coal year. Accordingly the quantity provided to each section was 60 per cent of that accorded under the former U. S. Fuel Administration. Every effort had been made to keep quotas up to, and down to, that figure.

Samuel A. Taylor, consulting engineer and operator, of Pittsburgh, Pa., advocated a freight rate strictly based on mileage plus gathering and terminal charges and said that in the older mining sections the coal land in which small mines could be opened already was almost exhausted. He did not believe that it was just, advisable or constitutional to regulate the opening of new mines on the plea that such mines were neither a public convenience nor a necessity. Mines do not necessarily enter into interstate commerce and therefore are not, at least when opening, matters for federal control.

Roderick Stephens spoke briefly and was followed by R. C. Morse, Jr., superintendent of freight transportation of the Pennsylvania R.R. Mr. Morse declared that the shipment of coal to New England had been hampered by lack of facilities for water transport, and this had made difficulties for the railroads. Where the use of a car for twelve days was needed to transport a carload of coal to Tidewater, that use was extended to sixty or more days when the coal was transported to New England by railroad. The railroads, however, had not fallen down, but had done a larger business than ever. The Northwest demanded a return of its box cars during this period of stress but it had been unwilling to return the open-top equipment which it had borrowed from the East.

George Otis Smith, of the U. S. Coal Commission, spoke in the absence of John Hays Hammond, chairman of the commission. He said that undoubtedly the commission would endeavor to introduce remedies for the coal situation, but, relating the story of the horse down the throat of which the farmer tried to blow some physic and found that the horse blew first, he said that he feared that those who were unfavorably affected by the reforms would blow back so hard that the physic could not be administered.

New England Mineral Crude Oil Receipts

(Gallons)

	1918	1919	1920	1921	1922*
Maine and New Hampshire	24,529,000	23,499,000	40,866,000	27,636,000	30,240,000
Massachusetts	35,616,000	48,552,000	235,703,000	499,441,000	556,430,000
Rhode Island	52,634,000	82,320,000	171,648,000	203,665,000	180,653,000
Connecticut	0	0	0	0	0
Totals	112,779,000	154,371,000	448,217,000	730,742,000	767,323,000

* Importations for October, November and December, 1922, estimated.
Approximately 165 gallons of crude oil is equivalent to one ton of bituminous coa

Prelimnary Statistics of Production of Coke And Byproducts in 1922

Statistics of production of coke and byproducts in the United States in the calendar year 1922, as far as available are summarized in the following tables. The figures are subject to revision of final reports from the producers.

ESTIMATED MONTHLY PRODUCTION OF BEEHIVE AND BYPRODUCT COKE AND OF PIG IRON IN 1922

Month	Beehive Coke (Net Tons)	Byproduct Coke (Net Tons)	Pig Iron (Gross Tons)*a*
Monthly average, 1920	1,708,000	2,569,000	3,077,000
Monthly average, 1921	462,000	1,646,000	1,379,000
January, 1922	496,000	1,882,000	1,645,000
February	549,000	1,796,000	1,630,000
March	732,000	2,133,000	2,036,000
April	528,000	2,202,000	2,072,000
May	436,000	2,539,000	2,306,000
June	460,000	2,589,000	2,361,000
July	446,000	2,496,000	2,405,000
August	531,000	1,818,000	1,816,000
September	608,000	2,244,000	2,034,000
October	876,000	2,806,000	2,638,000
November	1,138,000	2,925,000	2,850,000
December	1,233,000	3,063,000	3,087,000
Total, 1922	8,033,000	28,493,000	26,880,000

(*a*) Figures from the *Iron Age*.

PRODUCTION OF BEEHIVE COKE BY GROUPS OF STATES, IN 1921 AND 1922
(In Net Tons)

States	1921*a*	1922*b*	Increase, 1922— Tons	Per Cent
Pennsylvania and Ohio	4,528,000	6,139,000	1,611,000	36
West Virginia	210,000	549,000	339,000	161
Alabama, Tennessee and Georgia	168,000	468,000	300,000	179
Virginia and Kentucky	380,000	445,000	65,000	17
Colorado and New Mexico	99,000	229,000	130,000	131
Washington and Utah	153,000	203,000	50,000	33
Total	5,538,000	8,033,000	2,495,000	45

(*a*) Final figures. (*b*) Estimated from railroad shipments.

BYPRODUCT COKE PRODUCED IN 1921 AND 1922, BY STATES
(In Net Tons)

State	1921*a*	1922*b*	Increase (+) or Decrease (—) 1922 Tons	Per Cent
Alabama	2,401,000	3,496,000	+1,095,000	+ 46
Colorado	287,000	365,000	+ 78,000	+ 27
Illinois	1,322,000	1,985,000	+ 663,000	+ 50
Indiana	3,091,000	3,922,000	+ 831,000	+ 27
Kentucky	185,000	459,000	+ 274,000	+ 148
Maryland	293,000	583,000	+ 290,000	+ 99
Massachusetts	294,000	446,000	+ 152,000	+ 52
Michigan	777,000	1,141,000	+ 364,000	+ 47
Minnesota	436,000	455,000	+ 19,000	+ 4
New Jersey	740,000	787,000	+ 47,000	+ 6
New York	747,000	1,520,000	+ 773,000	+ 103
Ohio	2,966,000	4,877,000	+1,911,000	+ 64
Pennsylvania	5,304,000	7,181,000	+1,877,000	+ 35
Tennessee	58,000	28,000	— 30,000	— 52
Washington	24,000	3,000	— 21,000	— 88
West Virginia	188,000	483,000	+ 295,000	+ 157
Missouri, Rhode Island and Wisconsin	637,000	762,000	+ 125,000	+ 20
Total	19,750,000	28,493,000	+8,743,000	+ 44

(*a*) Final figures. (*b*) From monthly reports furnished by operators.

Available estimat s on byproducts from coke-oven operations in 1922 are based on the assumption that the quantity of byproducts recovered bore the same relation to the known production of coke in 1922 as in 1921, indicating that the recoveries were approximately: tar, 365,000,000 gallons; ammonia (sulphate equivalent of all forms), 946,000,000 lb.; gas, 447,000,000 M. cu.ft.; and crude light oil, 111,000,000 gallons.—*U. S. Geological Survey.*

Class 1 Railroads Consume 9,736,000 Tons Of Coal in November, at $3.88 per Ton

Class 1 railroads consumed 9,736,000 net tons of coal during November, 1922, as charged to account 394, compared with 8,115,000 tons in November, 1921, according to a report of the Bureau of Statistics of the Interstate Commerce Commission covering 177 steam roads. During the first eleven months of 1922 these roads consumed 85,775,000 tons as compared with 83,994,000 tons during the corresponding period of 1921. The delivered cost per ton in November was $3.88 or 24c. above that for November, 1921. The per-ton cost for the year to Nov. 30 was $3.97 as compared with $4.14 during the corresponding period of 1921.

Fuel-oil consumption continues to gain. During November 155,364,000 gallons were used, as compared with 123,513,000 gallons in November, 1921. The figures for the first eleven months of 1922 and of 1921 were 1,408,291,000 and 1,300,307,000 gallons respectively.

I. C. C. Ignores Wadleigh's Suggestions

The Interstate Commerce Commission has declined in two important instances to follow the suggestions of Federal Fuel Distributor Wadleigh. To meet the anthracite situation in the Northeast, Mr. Wadleigh recommended the issuance of priority orders, which the Interstate Commerce Commission declined to do. This resulted in a flare-up in the House of Representatives, where Representative Treadway, of Massachusetts, cricicised the commission for neither issuing the order nor notifying Congress, if it should have had any doubt as to its authority to take that action. Mr. Wadleigh issued a statement declaring that the priority orders are necessary, in his opinion, but that the commission does not agree and instead has urged the railroad to speed up the movement.

A veritable storm of protest has followed the issuance by the Interstate Commerce Commission of Service Order No. 38. This order instructed the Southern Ry. to assign fifteen cars daily to the mine of the Montevallo Mining Co., at Aldrich, Ala., which were not to be charged against the mine's share of equipment. This action was taken over the protest of Mr. Wadleigh. Mr. Wadleigh contends that the action is not justified by the fuel situation in the South and that it is inequitable to other mines. The National Coal Association, the Southern Ry. and various mine operators have protested against the order.

Ohio River Shippers May Get Long-Desired Nine-Foot Stage in 1924

Completion of three river dams in the Ohio between Louisville and Maysville, Ohio, between now and December, 1924, will make possible a 9-ft. stationary river stage between those two points, according to Major W. W. Parker of the U. S. Engineer's office at Cincinnati, Ohio.

The complete construction of dam No. 40 near Chilo during December, 1924, will furnish the missing link to the 9-ft. stationary river stage, for which river men have agitated since time immemorial. Preliminary operations have already been started, and with best working conditions it is thought work on the dam may be completed before the time expected. The other two dams, Nos. 36 and 38, will be completed this season, according to Major Parker. No. 36 dam is located just above Coney Island, about eighteen miles above Cincinnati, while dam No. 38 is near Rising Sun, Ind.

Finds Coal Moving Faster Than Usual

Despite handicaps of some bad-order equipment as a heritage from the shopmen's strike and of periods of winter weather, the railroads of the United States have been handling coal traffic at a rate in excess of the normal annual movement, according to calculations made by the Traffic Bureau of the National Coal Association. Broadly, west of the Mississippi River coal is seeking a market. Transportation conditions in the South are improving, notably in the Alabama field, the association reports. There continues an acute car shortage in the Appalachian fields, attributed largely to the continued demand for coal. No transportation trouble is reported from the North, excepting that due to weather conditions. No real emergency exists in the bituminous-coal situation from the transportation standpoint, the association reports.

Domestic Exports of Coal and Coke

	Month of December— 1921	1922	Twelve Months Ended December— 1921	1922
Anthracite, tons	306,277	381,758	4,176,221	2,365,187
Anthracite, value	$3,439,541	$4,220,591	$45,624,555	$25,350,677
Bituminous coal, tons	770,092	1,468,917	20,652,827	11,083,112
Bituminous coal, value	$3,831,935	$9,437,765	$122,597,038	$65,891,740
Coke, tons	23,034	123,442	273,888	456,733
Coke, value	$197,700	$849,979	$2,760,939	$4,319,538

Washington Opposes Embargo on Anthracite to Canada As Solution of Northeastern Coal Shortage

Washington, D. C., Feb. 19.—With resumption in Washington of the hearing before the Interstate Commerce Commission in response to a Senate resolution to report on the practicability and possibility of an embargo on anthracite coal to foreign countries, which was begun last week in New York, figures were introduced by the Hudson Coal Co. today showing geographical distribution of its deliveries.

This statement showed that from April 1, 1922, to Feb. 15, 1923, the Hudson Coal Co. delivered 990,620 tons of anthracite consigned to the six New England states; 1,122,526 tons consigned to New York State and 442,876 tons consigned to Canada, besides 460,969 tons for other destinations in the United States. Deliveries to New England from Oct. 1, 1922, to Feb. 15, 1923, aggregated 706,001 tons, being 166,087 in October, 168,179 in November, 175,140 in December, 134,-021 in January and 62,574 in February to and including the 15th. Deliveries to New York State in the same period aggregated 833,482 tons, being 177,665 in October, 205,047 in November, 201,916 in December, 159,348 in January and 89,506 in February to the 15th. Deliveries for Canada in the same four and half months totaled 359,587 tons, being 76,892 in October, 85,019 in November, 92,483 in December, 75,820 in January and 29,373 in February to the 15th.

J. K. McNeilly, assistant to the general manager of the Delaware & Hudson R.R., testified Monday that that railroad has been devoting special attention to coal traffic, particularly since Feb. 2, when its attention was called to local conditions of distress on account of shortage in northern New York. Severe weather since the middle of January and especially since Feb. 1 has caused delay, he stated. Despite this he said that 630 cars laid out at Mohawk terminal Feb. 1 had been reduced to 155 by Feb. 13, and 631 cars set out on twelve sidings had been reduced to 135 in the same period.

D. & N. Car Movement Reported Regularly

A subsequent storm caused further congestion, but voluntary priority given coal last Friday, Mr. McNeilly believed, would relieve the condition considerably. Priority, he stated, might continuously benefit the situation. He testified the Delaware & Hudson R.R. reports its car movement regularly and freely. It was stated at the hearing Monday, which was conducted before Commissioners Campbell and Cox, that while all of the stock of the Hudson Coal Co. is owned by the Delaware & Hudson R.R. only about half of the coal company's product consigned to Canada goes over the D. & H. and that the railroad handles considerable coal, both hard and soft, from other mines.

Following the hearing in New York City on Feb. 14 and 15, Washington officials apparently decided that an embargo is not the proper solution for the coal shortage in northern New York and New England. At the two-day hearing it was the opinion of several witnesses that it would be unwise to place such a restriction on shipments to Canada.

While the hearing was in progress in New York Senator Lodge, of Massachusetts, introduced into the Senate a bill similar to the one previously introduced by Congressman John Jacob Rogers, of that state, authorizing the President to declare an embargo on the exportation of coal whenever he "shall find that the public interest so requires." The bill provides that the embargo may include either anthracite or bituminous coal or both and may be complete or partial.

J. J. Hickey, of counsel to the commission, stated that a subpoena had been issued to the Hudson Coal Co. to furnish data regarding shipments of coal. He said he did not know if it had been served. Walter C. Noyes, of counsel for the Delaware & Hudson Railroad Co.., who was present, said that W. H. Williams, vice-president of the Hudson Coal Co., was on a vacation. He added that the Hudson Coal Co. had not been a shipper of coal for fifteen years, that it prepares and sells its coal at the mines direct to the wholesale dealer. He added, however, that the coal company stood ready to clear up any specific complaint by furnishing any data it has concerning such complaint. Commissioner Johnston B. Campbell, who presided, told Mr. Noyes that the data were necessary if the commission was to make a complete report to Congress.

During the second day's hearing Mr. Noyes promised he would do all in his power to have the data requested ready to present at the hearing in Washington. He was requested by Mr. Hickey also to have an operating official of the railroad present to explain the delay in shipments of anthracite to various points in northern New York State, it having been testified that the movement of loaded coal cars on the D. & H. ranged as high as thirty-five days from the mines to the railroad yards.

Representatives of the New York State Fuel Administration testified that it would require 20,000 tons of coal in addition to the present allotment to relieve the distress now existing in northern New York. It also was stated that the Hudson Coal Co. has promised to aid them in relieving the situation.

New England Receives More Than Allotment

During the hearing E. W. Parker, director of the Anthracite Bureau of Information and director of distribution for the Pennsylvania State Fuel Commission, produced statistics showing that the New England states under the 60-per cent distribution plan agreed upon by the various state fuel administrators was entitled to 3,857,682 tons of anthracite, that upon Jan. 20, 1923, they were entitled to 2,527,456 tons and up to that date had received 2,534,568 tons, or an excess of 7,112 tons, excluding the Hudson Coal Co. tonnage.

Representative Treadway, of Massachusetts, in Congress on Feb. 16 declared that the fuel situation in his state had reached "an acute stage"; that a 60-per cent allotment of anthracite is not sufficient and that the Interstate Commerce Commission should issue priority orders at once.

Congressman Winslow, from the same state, at the same time declared that there is coal enough within reach of New England to satisfy the present requirements if there were only sufficient motive power on New England roads to pull it, in the face of added difficulties because of ice and snow.

Congressman Treadway characterized as false a newspaper report that there were 1,900 cars of coal standing outside of Boston which the railroads were not moving. He said he got his information from the Fuel Administrator.

W. H. Towns, of the Boston & Maine R.R., testifying before the commission, said no embargo had been declared against anthracite shipments on his road. He said storms this winter had been unusually severe and that the temperatures were 3.9 deg. below normal. Mr. Towns furnished statistics showing the number of cars of anthracite shipped over the road from the D. & H. and other roads:

CARS OF ANTHRACITE RECEIVED BY BOSTON & MAINE FROM CONNECTIONS

	D. & H.		All Roads	
	1922	1921	1922	1921
October	3,983	4,527	5,293	5,587
November	4,489	4,001	5,746	4,914
December	4,124	2,883	5,355	4,020
	(1923)	(1922)	(1923)	(1922)
January	4,464	2,918	5,736	3,731
February (12 days)	1,650	1,864	2,376	2,377

R. Van Ummersen, freight traffic manager of the Boston & Albany R.R., compared the shipments of anthracite over his road this winter as follows:

	1921		1922
October	2,132		1,675
November	2,118		1,723
December	1,687		2,103
January (1922)	1,157	(1923)	1,888

Statistics produced by C. L. Bardo, general manager of the N. Y., N. H. & H. R.R., showed that the number of cars of anthracite received from connecting lines and loaded at tidewater points from April 1, 1922, to Feb. 10, 1923, was 42,887 as compared with 61,016 cars handled in the same

way from April 1, 1921, to Feb. 10, 1922, and that during the same periods the total number of cars of bituminous coal handled had been 66,684 and 73,583 respectively. Normal conditions regarding motive power and equipment would be reached, Mr. Bardo believed, in about four months.

In a statement made at the beginning of the hearing Congressman Rogers said that during October, November and December of last year Canada had received 30 per cent more anthracite and 70 per cent more bituminous coal than in the corresponding months of 1922 and that while retail prices for coal in Canada ranged from $15.50 to $16.50 per ton, in New England they ranged from $18 to $30.

He was followed by W. D. B. Ainey, chairman, and James S. Benn, a member of the Pennsylvania State Fuel Commission, who told of conferences held in Philadelphia at which those present, including operators and shippers of coal, decided that as a result of the strike of anthracite mine workers, production for the balance of the coal year could not be greater than 60 per cent and that it was concluded to make the distribution of coal on that basis. At a later conference held with C. A. Magrath and Frederick McCourt, members of the Advisory Fuel Commission of Canada, it was agreed that the Dominion should be placed on the same basis, but Mr. Benn said it was receiving less than 50 per cent of its allotment. He and Mr. Ainey said they felt that the United States was in duty bound to carry out its agreement with Canada.

Mr. Parker's statistics showed the allotment of anthracite for each state and Canada and the tonnage received by each up to Jan. 20, 1923. He said that under the plan of distribution Canada had received up to Jan. 20, 946,785 tons exclusive of Hudson Coal Co. shipments, out of a possible tonnage of 1,310,333 and that its allotment for the 1922-1923 coal year was 2,000,000 tons.

On Feb. 15 a telegram was received from A. P. Lane, Fuel Administrator for Maine, stating that he could get no information from the Hudson Coal Co. or the Delaware & Hudson Co. Railroad Co. regarding shipments of coal into that state.

One of those who declared it would not be fair to place an embargo on shipments of anthracite into Canada was John F. Bermingham, president of the Delaware, Lackawanna & Western Coal Co., who said that so far during 1922-1923 he had shipped 354,000 tons into Canada.

Mr. Bermingham said that on April 1, 1922, he had on Western docks 361,000 tons of coal. He also testified to making the following comparative shipments:

Shipped to	April 1-Dec. 31, 1922	1923 to Date
Illinois	149,000 tons	155,395 tons
Wisconsin	288,000 tons	227,809 tons
Minnesota	151,781 tons	150,916 tons
North Dakota	24,980 tons	19,185 tons
South Dakota	19,540 tons	17,746 tons
Nebraska	15,379 tons	16,231 tons
New York and East	2,339,000 tons	1,403,000 tons
New Jersey	772,417 tons	518,000 tons

At the first day's hearing Mr. Magrath told the commissioners that Canada's average need of anthracite and bituminous coal was 19,633,933 tons and that the average anthracite tonnage shipped into Canada for three years was about 4,000,000. He said that Canada exported to this country about 2,000,000 tons of coal annually, which, comparing the population of both countries, showed that Canada was doing nearly as well as the United States. He declared Canada was the most uniform market for coal operators because of its climatic conditions. Mr. Magrath said about 800,000 tons of Welsh coal had been imported into Canada. He was sure that the present difficulty regarding shipments would be solved satisfactorily and that Canada was always willing to do its duty toward the United States. Replying to a question Mr. Magrath said that the Government of Canada through the Department of the Interior had a committee looking into the fuel question with a view to using soft coal to a better advantage.

STATE DISTRIBUTION OF ANTHRACITE, PEA AND LARGER SIZES

(Showing 1921-1922 shipments, 1922-1923 allotment, total due, total shipped, overages and shortages as of Jan 20, 1923, in tons.)

(Excluding Hudson Coal Co. tonnage)

	1921–22 Shipments	1922–23 Allotment	Due To Jan. 20, 1923	Shipped To Jan. 20, 1923	Over	Short
New England	6,249,471	3,857,682	2,527,456	2,534,568	7,112	.....
Maine	443,582	266,149	174,382	201,659	27,277	.....
New Hampshire	180,954	108,572	71,136	70,913	.....	223
Vermont	88,463	53,078	34,770	35,584	814	.....
Massachusetts	3,491,070	2,094,642	1,372,351	1,384,964	12,613	.....
Rhode Island	587,877	352,726	231,097	198,483	.....	32,614
Connecticut	1,637,525	982,515	643,720	642,965	.....	755
Middle Atlantic	25,618,926	15,371,374	10,070,912	10,552,030	481,118	.....
New York	11,848,903	7,109,342	4,657,850	4,703,221	45,371	.....
New Jersey	4,689,480	2,813,688	1,843,456	2,079,781	236,325	.....
Pennsylvania	7,267,357	4,360,414	2,856,821	3,055,966	199,145	.....
Delaware	211,641	126,985	83,201	89,336	6,135	.....
Maryland	867,344	520,406	340,955	359,579	18,624	.....
District of Columbia	530,670	318,420	208,620	197,623	.....	10,997
Virginia	203,531	122,119	80,009	66,524	.....	13,485
Central	3,384,262	2,030,557	1,330,361	1,126,818	.....	*203,543
Ohio	352,972	211,783	138,757	119,143	.....	19,614
Indianapolis	248,213	148,928	97,565	60,576	.....	36,989
Illinois	1,780,412	1,068,247	699,884	678,202	.....	21,682
Michigan	1,002,665	601,599	394,155	268,897	.....	125,258
Northwest	2,279,716	1,367,830	896,097	728,880	.....	*167,217
Minnesota	758,361	455,017	298,110	366,302	68,192	.....
Wisconsin	1,326,979	796,187	521,645	294,841	.....	226,804
North Dakota	96,326	57,796	37,867	28,868	.....	8,999
South Dakota	96,776	58,066	38,038	38,378	340	.....
Montana	1,274	764	437	491	54	.....
Trans-Mississippi	316,533	189,920	124,412	113,566	.....	10,846
Missouri	87,134	52,280	34,257	45,913	11,656	.....
Kansas	7,257	4,354	2,850	1,591	.....	1,259
Nebraska	52,396	31,438	20,577	11,199	.....	9,378
Iowa	169,746	101,848	66,728	54,863	.....	11,865
Miscellaneous	90,044	54,029	35,275	25,117	.....	10,158
North Carolina	17,189	10,313	6,764	4,655	.....	2,109
South Carolina	15,583	9,350	6,118	5,038	.....	1,080
Georgia	12,285	7,371	4,826	3,561	.....	1,265
Florida	5,383	3,230	2,009	1,468	.....	541
Alabama	2,353	1,412	930	193	.....	737
Louisiana	9,243	5,546	3,629	1,031	.....	2,598
Tennessee	2,568	1,541	1,007	1,138	131	.....
West Virginia	10,750	6,450	4,218	3,877	.....	341
Arkansas	522	313	209	28	.....	181
Texas	10,121	6,073	3,971	3,033	.....	938
Kentucky	2,996	1,798	1,178	706	.....	472
Oregon	98	59	38	370	332	.....
California	66	40	26	.....	.....	26
Colorado	44	26	18	.....	.....	18
Idaho	2	1	.....	.....	.....	.....
Mississippi	316	190	125	.....	.....	125
Oklahoma	201	121	79	.....	.....	79
Washington	256	154	101	.....	.....	101
Wyoming	68	41	29	19	.....	10
Total U. S.	38,118,952	22,871,371	14,984,016	15,080,979		
Canada	4,035,014	2,000,000	1,310,333	946,785		

* These shortages would become an overage of 70,404 tons, if final distribution by states for 441,164 tons of lake tonnage were available. Including this undistributed lake tonnage in the total makes an overage of 538,127 tons, as compared with the 60 per cent allotment up to Jan. 20.

Coal Commission to Probe Violation of Civic Rights

In an announcement issued Feb. 14 the United States Coal Commission states that it construes as part of its duty in ascertaining "the conditions under which coal is produced" and "the causes which from time to time induce strikes," to make a fair and impartial investigation of the controversies which have arisen from time to time between operators and miners, touching what is known in general terms as the civic rights of American citizens. It has been put in possession of certain charges made by miners against operators and operators against miners, but it does not deem the charges and the character of proof heretofore submitted to the commission to be of sufficient value to enable it to reach conclusions upon these subjects.

It is, therefore, calling upon the United Mine Workers of America, the owners and operators of the mines and the public generally who may have any knowledge of the subject, not at second hand but actually ascertained, to submit to the commission in concrete form specific charges of the denial to any American citizen of any right guaranteed to him by the Constitution of the United States, the acts of Congress, and the decisions of the courts thereunder, definitely stating when and where such right was denied, what constitutional or other right was involved, who the witnesses are and where testimony supporting the same is to be found, and what decision of any court has been rendered on the proposition involved.

It also calls for specific instances of the breach of either the civil or criminal law of the United States or any of the sovereign states of this Union, identifying the crime and the criminal, the time and place such offense occurred, the names of the witnesses and their residence, with a statement as to what the testimony of each witness will be on the subject together with a citation of the constitutional principles, the laws enacted thereunder, or the decisions rendered which may have bearing upon the case.

It requests the presentation of the naked facts, unadorned by either oratory or vituperation. Commissioner Thomas R. Marshall has been authorized to examine and analyze all such complaints in order to facilitate their consideration by the full commission.

It asks that in the first instance these charges and briefs be marked in sending for Mr. Marshall, who is not to decide the question but is to collate and lay before the full commission the various propositions touching the rights of person and property, the denial of such rights, and the breaches of the law alleged to have occurred in the coal industry, to the end that the commission may determine what evidence is to be taken upon these questions, when and where, and to the further end that it may be put in possession of all the alleged facts and of the documentary or other evidence proposed to sustain the charges and the briefs, if desirable, of attorneys, upon the law bearing upon the disputed facts.

It welcomes and invites all information obtainable upon these questions.

The commission notifies the operators, the miners and the public that it reserves the right to fix a reasonable time prior to which it will not investigate.

Midwest Operators and Roads Get Nowhere In Car Rerating Parley

How can the evils of overrating coal mines for car allotment be remedied? The question was threshed for two days in Chicago last week without final decision. Several railroads serving Illinois, Indiana and western Kentucky proposed putting a new plan into effect under which a railroad bureau would fix every mine's car rating. Western Kentucky operators agreed it could be done fairly. But Illinois and Indiana disapproved stoutly. Those two states suggested a continuance of the present plan of rating a mine each month on its previous month's performance, adding compromise clauses, to create the proposed railroad mine-rating bureau and give it the power to quiz every doubtful rating and prove that rating by a three-day test run of the mine where necessary, penalizing every mine that failed in such a test. The railroads took the suggestion under advisement for two weeks.

The conference was called by W. L. Barnes of the Chicago, Burlington & Quincy R.R. The only other railroad taking a leading part was the Illinois Central, represented by J. F. Porterfield. The railroads' proposal was that a railroad board or bureau be created to undertake at once the rerating of all mines on the lines affected, the board to consider past production, labor conditions, track facilities and other physical and economic factors in fixing the number of cars to which each mine is entitled. The carriers further proposed that each rating should stand until changed by the board but that any mine owner who felt aggrieved at any time could ask a re-examination and that in case the board did not get around to make it within 15 days, the mine would automatically take a 10-per cent increase until such time as the examination was made.

The Illinois and Indiana operators were agreed to a man that this plan would work great hardships on the mines, first, because ratings might be fixed by men not expert in coal mining, because ratings would be "frozen" and could not be changed within three or four months in spite of rapid changes in mining and markets which regularly require new ratings for many mines, and because tipple hours would not be the basis for determining working time at a mine. There were other objections, but these were the principal ones.

The basic principles in C. S. 31, under which ratings have been determined for some time past, were held by most of the operators to be the best ever devised. Under that car service circular, now in effect, each mine's car rating is determined each month upon the performance of the month preceding. The reports of the mines to the railroads of hours worked is the basis for fixing the normal rate of output.

In the two-day conference the railroads declared there are all sorts of deceptive reports made by mines as to hours worked and other subterfuges resorted to which have increased car ratings in some mines, principally those of southern Illinois, far above a proper allotment. The railroads declared it to be impossible to check up such reports and that all they can do is to accept the reports, false though they may be. For this reason the railroads want to do their own rating.

Some of the operators frankly admitted the charges. Others stalwartly declared they never had falsified reports and never would. It was contended that the roads could easily check up such false reports and correct the evils existing under C. S. 31 if they only would. The trouble is the roads do not and will not police these reports. Thus they permit falsifying by the unscrupulous operators and make it necessary for some of the others to overrate their mines in order to get anywhere near an even break in car supply. It was freely held that C. S. 31 is entirely adequate if properly applied by the roads.

New Basis for Mine Ratings Near

The recent conference on mine ratings appears to be bearing fruit, according to reports received by the Traffic Bureau of the National Coal Association, which indicate that committees of operators and railroad representatives are making progress toward mutual agreements for the formation of new bases for ratings. At present mine ratings are based upon the tonnage loaded per hour, a factor which increases during periods of car shortage and therefore has a tendency to inflate ratings. It was suggested at the recent conference on this subject in Washington that ratings be based on the physical ability of a mine to produce and load coal in an 8-hour day, and reports indicate that agreements along this line are practically within sight.

Charge Jersey Central Directors Restricted Bids for Lehigh Wilkes-Barre Stock

In the hearing now on in the U. S. District Court in Philadelphia into a complaint involving the sale of the stock of the Lehigh & Wilkes-Barre Coal Co. to the Jackson Reynolds syndicate of New York it was charged that the directors of the Central Railroad of New Jersey had "resorted to every means" to restrict bidding for the stock of the coal company so that they might award it to the Reynolds syndicate.

Testimony was given that an offer of $32,259,720 for the stock by the Lehigh Coal & Navigation Co. had been rejected in favor of the Reynolds bid of approximately $31,500,000, and that the bid of the Franklin Securities Co. of Philadelphia was about $2,000,000 higher than that of Reynolds.

The case is an outgrowth of the order of the U. S. Supreme Court that the Reading company and its underlying corporations be dissolved. The objection to the sale of the stock was made by Isaac T. and Mary T. W. Starr, Jersey Central stockholders.

C. J. Hepburn, counsel for the complainants, said that the directors of the Jersey Central, which owned the Lehigh & Wilkes-Barre stock, had disposed of property worth about $40,000,000 to the lowest bidder. He also charged that Reynolds, who was a director of the Jersey Central and the coal company at the time of the dissolution order, had received "inside information," while the data furnished to other prospective purchasers "was meager and indefinite."

Why the Price of Anthracite Has Risen*

The anthracite operators have estimated that the mines would be able to produce between Sept. 11 and March 31 next, the end of the coal year, 60 per cent of the production of the preceding year, and at the joint request of the Federal Fuel Distributor, the Pennsylvania Fuel Commission and the administrators of the several states they designated a Committee on Anthracite Distribution, whose duty it has been to endeavor to obtain an equitable distribution of the tonnage available, giving to each community in each state its proper proportion, the allotments being based on 60 per cent of the tonnage shipped to each community during the previous year.

There are between 15,000 and 18,000 of these anthracite-consuming communities, and there is an average of about five companies shipping to each community. Every operator, with one or two exceptions, makes a weekly report of his shipments to each community and to Canada. These are all combined on tabulating cards and summarized, shippers being advised from time to time of the communities which shows shipments in excess of allotments in order that they could divert tonnage, if necessary, to points where necessities were greater. The tabulating and summarizing of these returns necessitates the handling of some 100,000 recording cards each week.

The matter of the price you pay for your fuel is not so easy to present in an understandable way. Let me assure you of one thing, however, and that is that with the possible exception of some of your articles of food, you are paying as much of an advance over pre-war prices for other commodities as you are for anthracite. A representative in Congress, a few days ago, was making an attack on prices of coal. He was from Massachusetts. A colleague from Indiana told him that the people of his state were complaining bitterly about the price of shoes, but the gentleman from Massachusetts said he knew nothing about that. Shoes are the chief product of Brockton and some other Massachusetts towns. He knew about the prices his constituents paid for coal but he did not know anything about the prices his constituents got for shoes. And relative to the increase in cost of production I doubt if the price of anthracite has advanced in proportion to the prices of other commodities. It seems to affect one more because it is bought by the ton, instead of by the pound, quart or dozen.

In 1900 the actual labor cost per ton of coal produced averaged about $1 for all sizes. At present the average labor cost is between $4.10 and $4.15. In 1900 the average hourly rate paid to all classes of labor including boys, was about 16c.; in October, 1921, the average rate was about 73c., and there has been no reduction since that date. In 1900 the cost of supplies ran about 25c. per ton of output. At the present time the cost of supplies runs about $1.05 per ton.

In 1900 general overhead expense—that is, the cost of administration, office force, sales agencies, local taxes, etc.—did not exceed 25c. a ton. At the present time they are about 61c. a ton. In 1900 the length of the working day was 10 hours. Today it is 8 hours. The contract miner seldom works 7 hours.

That is to say, the price of anthracite stove size at the mine today has advanced 181.3 per cent over 1900, but the cost of labor has increased 311 per cent. The average hourly rate paid all classes of labor increased 356 per cent. The cost of supplies has increased 320 per cent. The overhead expenses have increased 132 per cent. The length of working day has decreased 20 per cent.

These will give you some idea of the increases in cost that have contributed to the cost of your fuel supply, but they do not tell the whole story. You have read recently in the newspapers of the new tonnage tax imposed upon anthracite and consequently upon you if you are a user of anthracite, as I suppose you are. The tonnage tax is only a part in the great scheme of anthracite taxation. This is to be piled on top of other increases.

*Abstract of an address by E. W. Parker, director of the Anthracite Bureau of Information, delivered at the annual meeting of the New York Section of the American Institute of Mining and Metallurgical Engineers, New York City, Feb. 14, 1923.

Alex Drops in Again—for a While

Alex is "in again," or was for a while. No power of the courts nor of the Governor of the sovereign state of Kansas can keep the ertswhile czar of District 14, U. M. W., out of jail for long. Governor Jonathan Davis thought he had the matter nicely arranged a few days ago when he commuted Howat's sentence in the Cherokee County jail. Alex had only recently moved over to the Cherokee County jail from that in Crawford County, from which he had been evicted by a recently elected district judge.

Howat had just got comfortably settled when the Governor interfered. His only ray of hope was in an addenda to the Governor's commutation by Judge Boss of the Cherokee County District Court, to the effect that before he left jail he must dig up $500, the money it had cost the state to put him there. This little detail delayed Alex's adieux somewhat, but on Feb. 12 some miners of the district contributed the money and Alex was out again.

About this time he received word that the State Supreme Court had affirmed a fine of $100 and a peace bond of $5,000 imposed by former Judge Curran of the Crawford County District Court. And on the morning of Feb. 15 the sheriff of Crawford County was awakened by Alex pounding on his bastile gate. Alex again had decided he would rather be in jail than out—with a $5,000 peace bond cramping his style. So he dropped in for a while. On paying his fine he was released, the judge suspending the $5,000 peace bond.

Negotiation of Contracts Lags Because of Uncertainty on Assigned Cars

Some confusion exists among both railroad purchasing agents and mine operators regarding new contracts for railroad fuel which are to be negotiated before the beginning of the coal year on April 1 because of the uncertainty about the assigned-car situation. The assigned-car case is to come before the Interstate Commerce Commission with oral arguments set for March 1, just a month before the beginning of the coal year. It is not considered possible that a decision will be handed down before April 1. If the commission were to abolish the practice of assigning cars for railroad fuel or were to change the practice it would affect contracts which are made on this basis, hence the atmosphere of uncertainty between the parties to these usual contracts.

Coal Commission Expects to Obtain $400,000 Asked; Plans to Complete Work in September

By Paul Wooton
Washington Correspondent of *Coal Age*

Competition is so rampant in the production of coal that price control hardly would be within the range of probability, even were the operators inclined to attempt it. That the President's Coal Commission has reached that conclusion was clearly deducible from statements made by Chairman Hammond and Commissioner Smith during the course of their conference with representatives of the press on Feb. 17. Other important pronouncements on that occasion were to the effect that for the next few weeks the commission would concentrate much of its attention on anthracite matters; that the commission is not in sympathy with the agitation for an embargo on anthracite exports; that sentiment within the commission is stronger than ever against the railroad practice of commandeering coal and that certain coal rail-rate structures need to be scrutinized carefully.

The comment as to price control followed a statement by Chairman Hammond to the effect that the commission intends to study coal prices over a period of several years. Mr. Hammond predicted that certain economies would be recommended which will have an effect on prices, but he said there is no evidence that producers ever have considered any combination with the idea of bringing about higher prices for coal. On the contrary, he said, there is plenty of evidence of competition of the cut-throat variety. Dr. Smith added the opinion that, were operators to agree on a price for coal, some one of them would cut the price before he had been an hour out of the meeting. These points were emphasized to make it clear that the commission's exhaustive study of prices has as its objectives things other than any thought of uncovering a price-fixing conspiracy.

Prior to the settlement of the wage controversy the commission had in mind the issuance of a labor report on March 15. It now is pointed out by Mr. Hammond that the urgency for that report is passed. For that reason it will be formulated more deliberately. On the other hand, the commission must make its anthracite report on July 1. The study which has to be made of that industry, particularly that phase of it which deals with the royalty problem, is intricate and of the greatest public importance. For that reason an increasing amount of attention is to be given to anthracite during the next few weeks. This will not be to the exclusion of certain work which the commission will do on bituminous coal.

Each time members of the commission have referred to the anthracite export situation, attention has been called to the fact that this lies clearly within the jurisdiction of the Federal Fuel Distributor. At last week's conference, however, Mr. Hammond and Dr. Smith showed some disposition to discuss the matter. It was apparent that each of them is entirely out of sympathy with the agitation for the embargo. Reference was made to the slowness which has characterized the utilization by the Northeast of anthracite substitutes. It was pointed out that, even were an embargo laid, it is doubtful whether that section of the country would benefit, due to the transportation situation and to the probability that Pennsylvania would insist on using that surplus at home. Were the Pacific Coast states, which use British Columbia coal, to be convinced that the embargo is being considered seriously, it was predicted that a protest would go up that would eclipse the agitation for the embargo, to say nothing of the stand that would be taken by American consumers of Canadian power, wood pulp and other imports which might be withheld in retaliation.

The presentation made by the Northwestern Coal Dock Operators' Association apparently impressed the commission deeply. Chairman Hammond called attention to the far-reaching effect of railroad-rate schedules on the coal problem as a whole. He was careful to point out, however, that the commission recognizes the Interstate Commerce Commission as the specialist on these matters and that no recommendation with regard to rate structures will be made until full advantage has been taken of the views of that body.

Chairman Hammond admitted that the importance which he attaches to storage amounts almost to an obsession. He strongly commended the public-utility companies for the progress that they have made in establishing a policy whereby most of their plants provide ample storage reserves. Inducements will have to be held out, he said, to encourage such a policy among the small consumers, but the commission expects to find a way that will result in large storage on the part of the railroads. He pointed out in no uncertain terms that there is no such thing as a "right" whereby railroads commandeer coal. It was revealed that Governor Marshall calls this practice "stealing." Other references made to coal commandeering indicate that sentiment against it is well crystallized among the commissioners.

The commission evidently is fully confident that Congress will furnish the additional $400,000 for which it has asked and will pass the amendment to the act covering legal responsibility for answers to questionnaires. Commissioners Hammond and Smith had a satisfactory conference with the members of the House Committee on Interstate and Foreign Commerce and have assurances from the chairman of the Appropriations Committee that their request for additional funds will be granted. It was stated, however, that the plan for prolonging the work of the commission until Dec. 31 had been abandoned. If the additional $400,000 is granted the commission will have been voted a total of $600,000 for its work. This, it was pointed out, is $153,000 less than the original estimate made by the commission's staff. Even with the additional $400,000, it was asserted, it will be necessary to curtail the contemplated investigation to a considerable degree.

Among other things, the commission expects to establish accurately the percentage of foreign labor employed in American coal mines, along with pertinent data in that connection.

One of the points emphasized at Saturday's conference was the matter of public responsibility in obtaining a greater degree of stability in the coal industry. The real problem of the commission, it was said, is to eliminate the peaks and fill up the valleys of the line indicating coal production. If that is done, the consumers must participate in a large way, it was declared.

In response to inquiries, Chairman Hammond stated that he is not considering the acceptance of any Cabinet or diplomatic post. He believes a greater opportunity for public service is presented in the post he now occupies. Moreover, he has devoted four months to this work and he construes it to be incumbent upon him to go through with the task.

Union's Logan Injunction Plea Dismissed

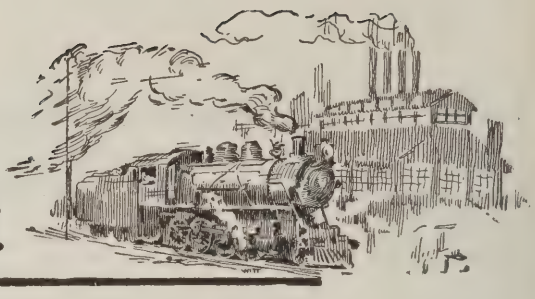
Judge George W. McClintic, in the U. S. District Court at Charleston, W. Va., on Feb. 17 dismissed the petition of the United Mine Workers for an injunction to prevent Sheriff Don Chafin of Logan County and others from interfering with the organization's activities in that county.

Judge McClintic ruled that any of the acts of the Logan County Sheriff complained of were done without authority of the laws of the state and were punishable by the state and that therefore the federal courts had no jurisdiction.

Judge McClintic said he understood the plaintiffs relied entirely on the Fourteenth Amendment to the Constitution in their belief that he had jurisdiction in this case, and quoted at length from decisions holding that the amendments did not apply to individual invasion of individual rights, but only to state action.



Production and the Market



Weekly Review

Every dog has its day—so it is said—but this does not appear to be coal's day. While the price of almost every other important commodity is starting a spring ascension, bituminous coal, the fuel of industry and of half the households of the country, is experiencing a steady decline in price. For six weeks, without a break, the *Coal Age* Index of spot prices of bituminous coal has continued the descent. On the first of this week, Feb. 19, it stood at 288, a drop of 8 points from the previous week and of 87 points from Jan. 8, which corresponds to a decline in average price of more than $1.

While soft coal is failing in price, lumber, iron, steel, sugar and many other commodities are steadily going up in price. In fact the lumber producers are reported to have advised their trade recently that they were facing a runaway market, orders and demand far exceeding their ability to ship, because of an acute car shortage. But if soft-coal prices are dragging, consumption is holding up as industrial activity expands and the cold weather holds on. As an evidence of what is happening in those lines that consume steam coal in summer as well as in winter, and that therefore will put a load on the coal-producing industry this year, the following indications may be noted:

Conditions Favorable to Steam-Coal Trade

Railroad loadings overtopped the best previous record for this time of year, the largest production of pig iron in January since March, 1920, the purchase of cotton by spinners in January at a rate never but twice exceeded in any month, both during the war, and with the number of spindles active on Feb. 1 the greatest ever recorded.

Production of bituminous coal remains fairly constant at a figure just under 11,000,000 tons per week, the operators west of the Mississippi report considerable time lost because of lack of market and those in Illinois and Indiana also charge lack of orders with much of the time not worked at the mines. In the East, however, there is yet sufficient demand to give cause for attributing the present lack of full time output by the mines to car shortage.

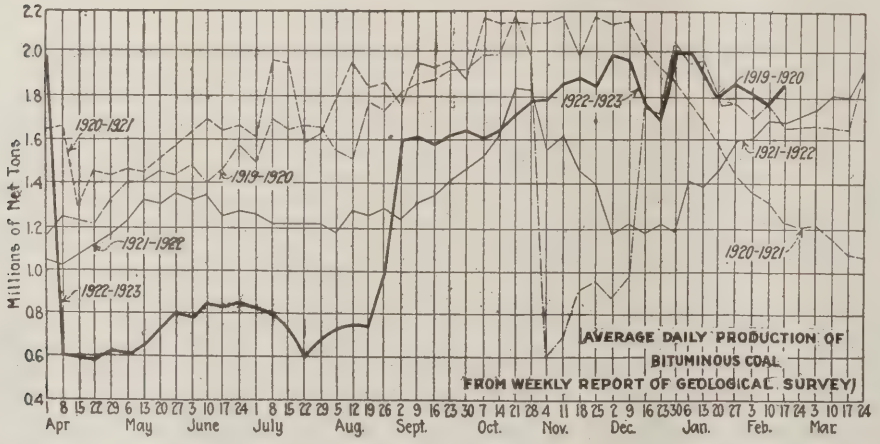
There is little forward buying of coal beyond the present month, although some have sold as far ahead as the middle of March, particularly of the best southern West Virginia grades. Consumers hold that there is no telling how low the spot market will fall this spring and they are sure to get coal on the open market at better figures this summer than is possible on any contract they can get a producer to sign today. As a sample, it is noted that shippers are asking $3.25@$4 on pool 9 or its equivalent in the Eastern market, but a contract for high-volatile coal has been closed at $2.65.

Inquiries Made on European Shipments

There have been a number of inquiries from abroad for quotations on possible shipments to Europe, and one cargo of 10,000 tons for Italy has been closed. There is much talk in Germany of getting coal needed to replace that cut off from the Ruhr by shipments from this country. While Europe is talking about buying coal here, vessels are bringing English coal into our ports, two cargoes totaling nearly 12,000 tons reaching Baltimore the first week of this month. Any English coal coming in this year was bought last year.

Preliminary estimates for the week ended Feb. 10 indicate that the total tonnage of soft coal raised was 10,836,000 net tons, which is an increase of 150,000 net tons over the revised estimate for the week ended Feb. 3, says the Geological Survey.

Preliminary reports of cars loaded during the present week (Feb. 10-17) show 40,000 cars on Monday, a drop of 32,787 cars on Tuesday, and further decline to 28,428 cars on Thursday. Thus the indicated total output for the present week is about 2 per cent less for the week



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Jan. 27	9,615,000	10,985,000
Feb. 3 (*b*)	9,714,000	10,686,000
Feb. 10 (*a*)	10,309,000	10,836,000
Daily average	1,718,000	1,806,000
Coal year to date	359,664,000	346,226,000
Daily average coal year	1,357,000	1,350,000
ANTHRACITE		
Jan. 27	1,607,000	2,119,000
Feb. 3	1,811,000	2,056,000
Feb. 10	1,822,000	2,023,000
Coal year	76,419,000	42,754,000
COKE		
Feb. 3 (*b*)	122,000	348,000
Feb. 10 (*a*)	128,000	359,000
Calendar year	706,000	2,010,000

(*a*) Subject to revision. (*b*) Revised from last report

preceding, and may be expected to be about 10,600,000 tons.

Continued cold weather has maintained the pressure for anthracite deliveries, and as respects northern New York and parts of New England has greatly accentuated them. Towns on the line of the D. & H. have made numerous complaints to the Fuel Administrator of New York about inability to obtain hard coal. The matter is now well in hand, the Interstate Commerce Commission having interested itself at the request of the Federal Fuel Administrator. Emergency shipments have been forwarded.

Midwest Cuts Prices

By all odds the most interesting development of the past week in Chicago was a drop in the circular on southern Illinois prepared sizes Saturday, Feb. 17, from $5.50 to $4.75. Mine-run held at $3.50 and screenings at $2.50@ $2.75. This drop has been a long time coming but it created a stir of surprise because it broke on a Saturday and because the break came right in the middle of a cold wave scheduled by the weather cracks to last a few more days. Bell & Zoller made the first move at the opening of business that morning. The rest fell in line perforce as soon as they heard about it. A great deal of southern Illinois domestic coal has been selling considerably under the circular for some time, and in spite of the cold wave and a considerable call for coal in small lots from dealers everywhere the association price of $5.50 has been almost impossible to get.

Other prices were not materially affected at once by the southern Illinois cut. Central Illinois list still calls for $3.50 for lump, Fourth Vein Indiana, $4.25@$4.50 and western Kentucky $3.50@$3.75. Dealers' yards have been pretty well drained by a sudden heavy call for domestic coal during the past blizzardy week. They are expected to take on a good deal of coal during the next couple of weeks, especially southern Illinois at the new low price, which includes every size from 6-in. lump down to furnace egg. But spring is just around the corner and nobody looks for any long run of strong business.

All through the Middle West domestic demand has been heavy enough lately to give most mines all the running time they could get cars for, and with screenings thus produced in larger quantity, steam buyers hung back and waited for a softening. In slight degree it took effect in

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

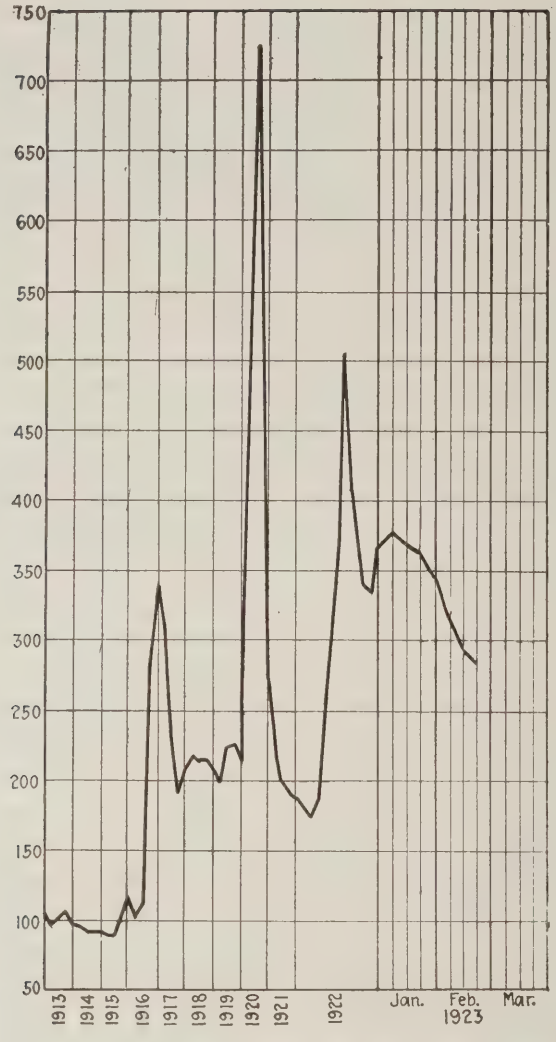
	Market Quoted	Feb. 19 1922	Feb. 5 1923	Feb. 12 1923	Feb. 19 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.25	$6.75	$7.00	**$6.50@$7.50**
Smokeless mine run	Columbus	2.10	5.50	4.75	*4.25@ 4.50*
Smokeless screenings	Columbus	1.55	5.50	4.75	*4.25@ 4.50*
Smokeless lump	Chicago	3.15	7.75	7.00	6.75@ 7.25
Smokeless mine run	Chicago	2.15	4.85	4.75	4.50@ 5.00
Smokeless lump	Cincinnati	3.15	6.50	7.10	**7.50@ 7.50**
Smokeless mine run	Cincinnati	1.75	5.25	4.75	4.50@ 5.00
Smokeless screenings	Cincinnati	1.15	5.25	4.50	*4.75@ 5.25*
*Smokeless mine run	Boston	4.55	8.00	7.15	*6.50@ 6.90*
Clearfield mine run	Boston	1.95	3.85	3.85	3.50@ 4.25
Cambria mine run	Boston	2.45	4.15	4.50	4.25@ 4.75
Somerset mine run	Boston	1.90	3.90	4.10	3.75@ 4.50
Pool 1 (Navy Standard)	New York	3.00	5.35	5.25	*4.50@ 5.15*
Pool 1 (Navy Standard)	Philadelphia	3.05	5.45	5.10	*4.65@ 5.00*
Pool 1 (Navy Standard)	Baltimore	2.55	4.60	4.60	.....
Pool 9 (Super. Low Vol.)	New York	2.50	4.75	4.60	*3.75@ 4.25*
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	4.80	4.60	*4.20@ 4.50*
Pool 9 (Super. Low Vol.)	Baltimore	2.25	4.35	4.35	*3.50@ 3.75*
Pool 10 (H.Gr.Low Vol.)	New York	2.10	4.10	4.10	*3.25@ 4.15*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	4.30	4.10	*3.65@ 3.80*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.05	4.10	4.00	*3.25*
Pool 11 (Low Vol.)	New York	1.75	3.50	3.35	*2.70@ 3.15*
Pool 11 (Low Vol.)	Philadelphia	1.75	3.25	3.10	*3.00@ 3.35*
Pool 11 (Low Vol.)	Baltimore	1.75	3.35	3.00	*2.60@ 2.75*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	3.10	2.95	*2.40@ 2.80*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	3.15	2.95	*2.65@ 2.90*
Pool 54-64 (Gas and St.)	Baltimore	1.40	3.00	2.85	*2.45*
Pittsburgh sc'd gas	Pittsburgh	2.65	4.50	4.10	4.00@ 4.25
Pittsburgh mine run (St.)	Pittsburgh	2.15	3.10	2.75	2.75
Pittsburgh slack (Gas)	Pittsburgh	1.65	3.30	3.25	*2.75@ 3.00*
Kanawha lump	Columbus	2.65	5.25	4.50	*4.00@ 4.65*
Kanawha mine run	Columbus	1.65	3.15	2.60	2.50@ 2.75
Kanawha screenings	Columbus	1.30	2.85	2.35	2.25@ 2.50
W. Va. lump	Cincinnati	2.35	4.60	4.25	4.00@ 4.50
W. Va. Gas mine run	Cincinnati	2.05	2.75	2.60	**3.25@ 3.50**
W. Va. Steam mine run	Cincinnati	1.50	2.75	2.60	**3.25@ 3.50**
W. Va. screenings	Cincinnati	1.20	2.25	2.25	**2.25@ 2.50**
Hocking lump	Columbus	2.65	4.50	4.50	*4.00@ 4.50*
Hocking mine run	Columbus	1.90	2.80	2.50	2.40@ 2.65
Hocking screenings	Columbus	1.30	2.60	2.10	2.00@ 2.25
Pitts. No. 8 lump	Cleveland	3.10	4.00	4.20	*4.00@ 4.50*
Pitts. No. 8 mine run	Cleveland	1.95	3.15	3.15	*3.15@ 3.25*
Pitts. No. 8 screenings	Cleveland	1.65	2.85	3.10	3.05@ 3.20
Midwest					
Franklin, Ill. lump	Chicago	3.30	5.35	5.35	*4.50@ 4.75*
Franklin, Ill. mine run	Chicago	2.50	3.85	3.85	*3.25@ 3.50*
Franklin, Ill. screenings	Chicago	2.00	2.60	2.55	2.50@ 2.60
Central, Ill. lump	Chicago	3.00	3.60	3.60	*3.25@ 3.50*
Central, Ill. mine run	Chicago	2.35	2.85	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.80	1.60	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.25	4.35	4.35	4.25@ 4.50
Ind. 4th Vein mine run	Chicago	2.50	3.10	3.10	3.00@ 3.25
Ind. 4th Vein screenings	Chicago	2.00	2.30	2.30	*2.00@ 2.25*
Ind. 5th Vein lump	Chicago	3.20	4.10	3.60	3.50@ 3.75
Ind. 5th Vein mine run	Chicago	2.25	3.10	2.60	2.50@ 2.75
Ind. 5th Vein screenings	Chicago	1.75	1.80	1.80	1.75@ 1.85
Standard lump	St. Louis	2.75	3.10	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.95	2.25	2.25	2.25
Standard screenings	St. Louis	1.20	1.45	1.45	1.40@ 1.50
West Ky. lump	Louisville	2.50	3.85	3.85	*3.25@ 3.50*
West Ky. mine run	Louisville	1.85	2.35	2.35	*1.85@ 2.25*
West Ky. screenings	Louisville	1.40	1.90	2.10	*1.75@ 2.00*
West Ky. lump	Chicago	.....	3.85	3.85	*3.50@ 3.75*
West Ky. mine run	Chicago	.....	2.35	2.00	*1.90@ 2.00*
South and Southwest					
Big Seam lump	Birmingham	2.90	3.95	3.95	.....
Big Seam mine run	Birmingham	1.85	2.35	2.35	*2.00@ 2.25*
Big Seam (washed)	Birmingham	2.10	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	6.00	4.85	*4.50@ 4.75*
S. E. Ky. mine run	Chicago	.....	3.25	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.60	5.75	5.25	*4.00@ 5.50*
S. E. Ky. mine run	Louisville	1.55	3.25	2.60	2.25@ 3.00
S. E. Ky. screenings	Louisville	1.20	2.85	2.35	2.25@ 2.50
S. E. Ky. lump	Cincinnati	2.50	4.35	4.25	*4.00*
S. E. Ky. mine run	Cincinnati	1.50	2.75	2.35	**2.50@ 2.75**
S. E. Ky. screenings	Cincinnati	1.10	2.25	2.10	**2.25@ 2.50**
Kansas lump	Kansas City	5.00	5.50	5.00	5.00
Kansas mine run	Kansas City	4.00	3.60	3.50	3.50
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	Feb. 12, 1923 Independent	Feb. 12, 1923 Company	Feb 19, 1923† Independent	Feb 19, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.50	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	5.00@ 5.50	4.00@ 4.10	*4.50@ 5.50*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00@ 5.50	4.00	5.00@ 5.50	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 2.75	2.75@ 3.00	**2.25@ 3.00**	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.50@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 288, Week of Feb. 19, 1923. Average spot price for same period, $3.49. This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighed in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

a number of places. It cannot be said the market is strong anywhere in this region. The Standard district east of St. Louis, Mo., felt car shortage probably more than any other region. Even the short lines have fallen down. In the Mt. Olive, Duquoin and Carterville regions mines worked a little less than three days during the week. Railroad tonnage fell off in most Illinois fields.

St. Louis Prices Weaken Too

In St. Louis everything moved hard during the week except Mt. Olive and Standard district. Though domestic demand was fair, the trade did not absorb high-priced fuels from elsewhere. All buying was picayunish. Wagonload trade was a good deal more prevalent than carload business both in the city and in the country. Steam was almost dead. Many small steam plants are picking up the little storage piles they have had on hand, and have stayed out of the market. At the end of the week prices were breaking noticeably.

In that city transportation is a hard problem. Both the Missouri Pacific and the Frisco railroads are hard put for power. Both are borrowing Terminal engines in order to keep the main lines open. Perishable freight is all that gets reasonably speedy dispatch through there. However the Missouri Pacific expects 75 engines out of the Alliance (Ohio) shops soon.

The Kentucky fields worked fair time during the past week, feeling enough domestic demand to absorb about all that was shipped under a 22-per cent car supply on the Louisville & Nashville and approximately 45 per cent furnished by the Illinois Central in the west. On Monday, Feb. 12, the Illinois Central supplied 980 cars out of 1,086 ordered, which was the best transportation performance seen in Kentucky in a long time.

While cold weather created a little better demand for prepared sizes at the same time it was noted that retailers were endeavoring to work yard stocks down and hold them low, with the result that the call was largely for coal at delivery point, or coal that is rolling.

There has been just a little railroad demand with some coal moving to utilities and gas plants, but the demand for gas coal is not especially heavy. Steel-mill demand is light, although consumption is reported heavy, and the big utility buyers probably will be forced back into the market before long, as a result of inroads that are being made on storage stocks.

Screenings are holding up very well in price, due to the fact that there has not been any overproduction, as general industrial consumption has been taking the fuel output. Movement is scattered, going to various sections of the country, but orders are not in large amounts and there is little demand other than for immediate shipment, which is placing the mines almost on a day-to-day basis.

There has been better buying in the South as a result of blizzards extending as far as the Gulf, while an excellent boating stage in the Ohio and Mississippi rivers has resulted in better movement from the west Kentucky field by river, although there are no large river shippers other than the West Kentucky Coal Co.

Northwest Trade Stiffenes

The continued cold and stormy weather kept the domestic business of the Northwest at top notch and stimulated industrial demand some. At the Head-of-the-Lakes prices rose. Splint advanced to $9.50@$10 for lump, $8.75 to $9 for pile-run and $6.75 for screenings with Youghiogheny and Hocking only 50c. off these ton prices. Pocahontas at the Duluth docks is selling for $13 for lump, $9.50 for pile-run and $8.25 for screenings with the supply short indeed. Coke sells for $12. The demand for these two anthracite substitutes is strong. Dealers both there and at Milwaukee are being bombarded by domestic orders they cannot fill. Rough weather has not only delayed all-rail coal but has seriously interfered with receipts by car ferry on the west side of Lake Michigan.

West Remains Tranquil

The stormy cold of last week caused no great hubbub in Utah, Colorado or the coal markets observed from Kansas City. In the mountain states producers found dealers were stocked to care for the swelling demand but that nobody was stocking up for continued cold. Utah slack demand has been heavier than domestic. Mining fields in the mountains as well as in Kansas and Oklahoma having been droning along with market enough to keep prices at the levels of a week ago.

Conditions Firmer in Ohio

A rigid embargo put against connecting lines of the north of the river was the outstanding matter of importance at Cincinnati. Frigid weather to the north and the whole of the immediate valley being caught in the grip of winter has given Cincinnati a chance to catch its breath. There has been a slight stiffening in prices. The market for smokeless coal is stiff. There is more mine-run bringing $4.75 than is being sold at the lower figure, the range being $4.50@$5.

At Columbus weather conditions caused a firmer tone. Buying was stimulated, but the net result was not to advance prices but rather to clean up a lot of coal which was on track. Steam business is slow as consumers are using reserve stocks. Retail dealers are slow to buy, not wishing to accumulate heavy stocks at this period.

The output of the eastern Ohio mines during the week ended Feb. 10 was 288,000 tons. This was the lowest of any week during the past six weeks, being about 20,000 tons under the preceding week. Receipts of bituminous coal at Cleveland were 2,645 cars, 1,940 cars consigned to industries

and 705 cars to retail dealers. This was a total of 242 cars below the receipts of the previous week. Figures given out by the operators indicate that the mines in the eastern Ohio district are not exceeding 35 per cent of full time because of poor car supply.

The Pittsburgh district is suffering from poor car supply. Demand for 2-in nut from New England has practically disappeared.

At Birmingham, Ala., production is on a basis of about 385,000 tons per week. The output for the first five weeks of 1923 was about 1,899,000 tons, or about 750,000 tons over the same period in 1922. Demand for domestic coals is strong but the commercial trade is soft, consumers aside from contract customers buying in limited quantities.

Bituminous Moves to New England on Permit

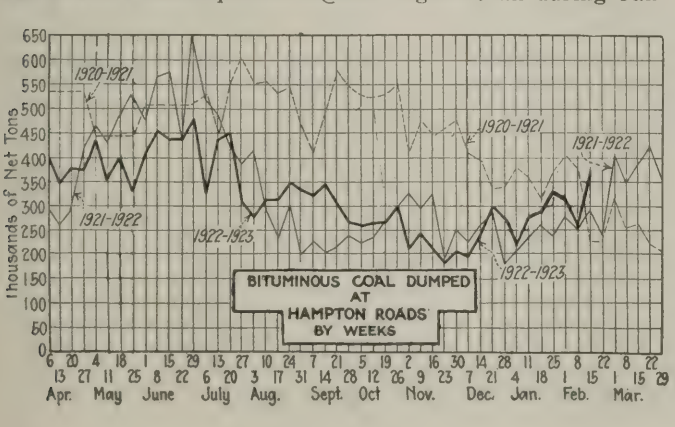
Shipments of bituminous coal to New England are at present moving only on permit, engine fuel alone excepted, and because of the accumulation at Rotterdam Junction the New York Central is even withholding permits for steam coal destined to Boston & Maine points. Receipts of commercial coal, therefore, are unusually light, although for heating purposes permits are freely granted to territory except that served by the Boston & Maine. The demand for water coal is slightly firmer, but when congestion at the Hudson River gateway is relieved the trade looks for much lower prices on Southern coals for inland delivery.

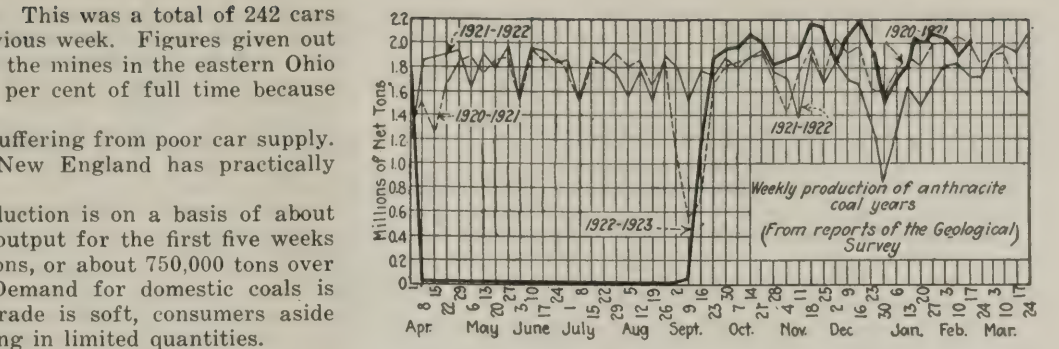
In New England the steam grades are in easy supply except all-rail, and for rail and water delivery, especially via Hampton Roads, quotations are even lower than a week ago. In fact, several of the smokeless agencies have recently made such determined efforts to place spot coal that prices are well down to a $6.50 level per gross ton f.o.b. Norfolk and Newport News. At Mystic Wharf, Boston, the West Virginia grades have offered freely at $9.75, and at Providence $9.25 has been quoted on No. 1 coals for prompt shipment.

Western demand for Pocahontas and New River is reported less insistent, and for that reason the coastwise market is being closely canvassed. Most shippers realize that the March average is reasonably certain to be less than in February and no efforts are spared to place coal that will hardly be mined until March 10 to 15. One or two operating interests have already named a price basis for April, but beyond this there is little disposition to name contract prices for deliveries after March.

Due to transportation difficulties there is a largely increased volume moving via the Philadelphia and New York piers. Gas companies, for instance, have chosen the water route from Philadelphia and New York in order to be assured continuing supplies, and certain of the railroads are taking much more coal by that route than would normally be the case. At Port Richmond January was the largest month for some years, and doubtless other piers would show a correspondingly large tonnage dumped for coatswise shipment.

The continued unfavorable weather has very much delayed movement of steamers and barges, and while a week ago freights were as low as at any time the past season there is enough shortage now of spot tonnage to make rates 10@20c. higher on large bottoms, while light-draft barges are in some cases quoted 25@35c. higher than during January. Receipts here of all grades have shown a marked falling off the past ten days as compared with receipts during January.





New York Buyers Hold Off

Buyers in the New York market are holding off. Operators in some instances are hungry for business. It is believed that some buildings that changed from coal to oil for heating purposes will soon return to the use of coal. In some instances owners of such buildings have made inquiries concerning the possibility of making contracts for coal. Cars at the local terminals numbered 2,327 on Feb. 16, a lower number than in several weeks. Shippers to a large degree have refrained from sending coal forward unless it is on order.

Export coal movement has been renewed from Baltimore, although in light volume, it is true. During January and February four vessels cleared from Baltimore with export coal, the total reaching only 6,768 tons. The largest single cargo was one of 2,649 tons, shipped on Feb. 5 to Havana. Two ships went to Cuba, one to Porto Rico and one to San Domingo. It is noteworthy that not a single cargo went to a European port. The import movement of Welsh coal consisted of 11,478 tons, one cargo being received from Cardiff on Feb. 5 and one from Barry on Feb. 9. This was the first coal importation since Feb. 28 of last year. The coal come to the Consolidated Gas, Electric Light & Power Co., the local lighting corporation. It was explained that this coal was on an old contract, made at a time when the fuel situation was very tight.

Anthracite

Retail dealers in various parts of the West who a few weeks ago cancelled on the belief the coal would not reach them in time to be sold last week asked shippers to reinstate their orders because of the continued cold weather. The producers have no difficulty in moving domestic sizes, but the steam coals are easier.

Production of anthracite showed a small decrease in the week ended Feb. 10. The total output, including mine fuel, local sales and dredge and washery output, is estimated at 2,023,000 net tons on the basis of 38,689 cars loaded as reported by the principal anthracite carriers. Preliminary returns for the first four days of the present week (Feb. 12-17) indicate an output of about 2,000,000 tons.

Coke

The spot market for coke seems to have practically ceased to decline. Quotations are slightly below those of last week. Foundry coke quotations range $8@$8.50. There is a prospect that coke production will increase during the next two or three months, as the high wages in the region probably will prevent men being drawn away for road building and other construction work.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Feb. 3, 1923	865,675	189,773
Previous week	871,164	194,738
Same week in 1922	747,895	184,298

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
Jan. 31, 1923	26,588	7,208	73,269	38,477
Same date in 1922	296,659	81,592		

Foreign Market And Export News

Export Demand for British Coals Strong, Production Recedes Slightly

After a week of record-breaking production, the British output for the week ended Feb. 3 was reported at 5,601,000 tons, as compared with 5,644,000 tons the previous week, a decrease of 43,000 tons, according to a special cable to *Coal Age*.

Very strong conditions prevail in the Welsh coal market and the immediate prospects are very rosy. There is no lack of business, and if export facilities are increased the pre-war volume of business will be considerably exceeded.

So far as the Welsh market is concerned there is not any great amount of business actually accruing from the French occupation of the Ruhr coalfield. The European demand is heavy, France continues to buy well, Italy has improved. In the past week some substantial contracts have again been secured, and order-books will be well filled for many weeks to come. Belgium is in the market for heavy quantities of small coal.

In addition to the French and Belgian inquiries, there are also further inquiries from Spain, Holland, Norway, and a number of other foreign countries. South America is a big buyer, while the United States is taking Welsh coal to the extent of between 70,000 and 80,000 tons weekly. An order for 30,000 tons of coal has been placed by the Egyptian State Railways for delivery before March 25, while other considerable business includes coal for the north of Spain railways and for several of the French railway companies.

Market Falls at Hampton Roads

A continued falling market at Hampton Roads produced dullness in the trade, but gave promise of reaching a basis soon on which shippers may compete with British coal abroad. Movement coastwise showed some improvement, while bunker business held up well.

Recent storms delaying shipping caused an unusual store of coal to be laid up at the piers, but this was soon dissipated, and the car situation showed little improvement. General shipping appears to be on the increase, with the consequent boost in demand for bunker coal.

Cut in price of retail coal is thought to be imminent, in view of reduction in prices at the mines. Pocahontas coal is being delivered to dealers here at approximately $9.50, and the retail price is $14, while run of mine coal costs $6.75 on the yards and is sold for $11. The tone of the market was not strong, but prospects were unusually bright in view of the general belief that buying will pick up by March 1.

French Coals Firm

The interruption in the arrivals of German reparation fuel and the violent rise of imported British coal prices have increased the firmness of French industrial coals. There is some rumor of an increase in the prices of the Nord and Pas-de-Calais collieries. There is also a possibility, in the present circumstances, of a reversion to some amount of government control over the French coal trade in view of securing for essential industries and public services, such as metallurgy and railways, a complement of fuel supplies to replace the defaulting German deliveries.

The output of the Nord and Pas-de-Calais collieries is steadily increasing. On the other hand, a strike of the Saar miners is now being threatened, and if this eventuality was realized, a greater rarefaction of industrial coals on the French market would of course ensue.

From Jan. 1 up to Jan. 9, the following tonnages were shipped to France and Luxemburg:

From the Ruhr:	Metric tons
Coal	57.364
Coke	135.795
From Aix-la-Chapelle:	
Coal	3.901
Coke	9.410
From Cologne:	
Lignite briquets	16.841

Since Jan. 10, no shipment was made from the Ruhr; but the following were made from Aix-la-Chapelle and Cologne (also to France and Luxemburg): Aix-la Chapelle (from Jan. 10 up to Jan. 18):

	Metric tons
Coal	1.729
Coke	9.809

Cologne (from Jan. 10 up to Jan. 13):
2.882 metric tons of lignite briquets.

On the other hand the following tonnages of German coke were received by French blast furnaces (the dates hereafter mentioned are dates of arrival, while the above ones were dates of shipment).

	Metric tons
From January 1st up to January 12th	151.500
From January 13th up to January 15th	18.200
On January 16th	4.600
January 17th	1.394
January 18th	603

Since then, no shipment of German coke was received, and a great number of blast-furnaces in the East and in Lorraine are now being blown out.

In December, the quantities of coal received in French seaports were as follows:

	Metric tons
British coals	1,455,645
German coals	99,519
Belgian coals	1,372
Dutch coals	543
Total	1,557,079

Export Clearances, Week Ended Feb. 17

FROM HAMPTON ROADS

For Cuba:	Tons
Dan. SS. Hans Maersk, for Havana	2,589
Nor. SS. Christian Krogh, for Havana	1,728
Am. Schr. Anthony D. Nichols, for St. Georges	1,036

FROM PHILADELPHIA

For Cuba:
Br. SS. Almors, for Havana ...

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	Feb. 8	Feb. 15
Cars on hand	1,027	1,013
Tons on hand	69,314	64,679
Tons dumped for week	112,289	98,848
Tonnage waiting	17,300	3,575
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,815	1,420
Tons on hand	107,750	83,670
Tons dumped for week	60,691	119,021
Tonnage waiting	43,563	13,251
C. & O. piers, Newport News		
Cars on hand	1,489	1,509
Tons on hand	87,285	79,790
Tons dumped for week	60,222	105,269
Tonnage waiting	9,185	24,311

Pier and Bunker Prices, Gross Tons

PIERS

	Feb. 10	Feb. 17†
Pool 9, New York	$7.25@$7.50	$7.25@$7.50
Pool 10, New York	6.75@ 7.00	*6.50@ 7.00*
Pool 11, New York	5.75@ 6.25	5.75@ 6.25
Pool 9, Philadelphia	7.25@ 7.60	*7.00@ 7.25*
Pool 10, Philadelphia	6.70@ 6.90	*6.50@ 6.75*
Pool 11, Philadelphia	6.00@ 6.40	*5.65@ 6.15*
Pool 1, Hamp. Roads	6.85@ 7.15	6.25@ 6.50
Pools 5-6-7 Hamp.Rds.	7.00	6.40
Pool 2, Hamp. Roads	6.85@ 7.15	6.25@ 6.50

BUNKERS

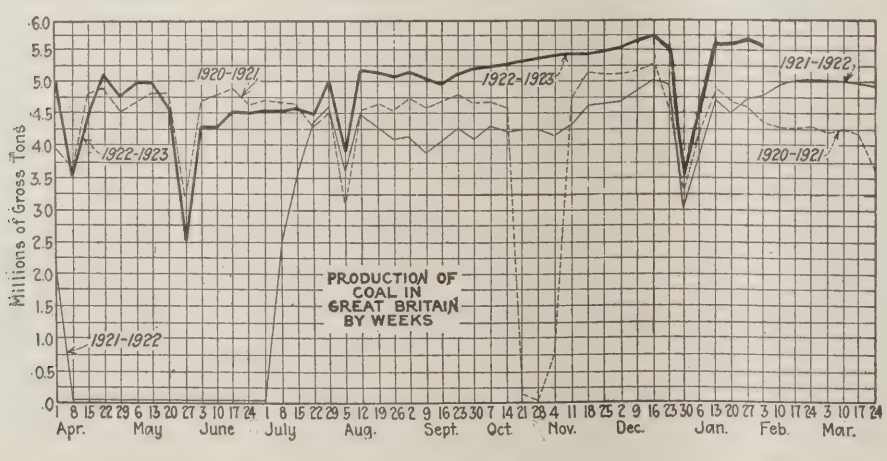
Pool 9, New York	$7.60@$7.85	**$7.65@$7.90**
Pool 10, New York	7.10@ 7.35	*6.90@ 7.40*
Pool 11, New York	6.10@ 6.60	**6.15@ 6.65**
Pool 9, Philadelphia	7.35@ 7.75	*7.30@ 7.60*
Pool 10, Philadelphia	7.00@ 7.25	*6.85@ 7.10*
Pool 11, Philadelphia	6.25@ 6.55	*6.00@ 6.40*
Pool 1, Hamp. Roads	7.15	6.50
Pool 2, Hamp. Roads	7.00	6.50

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Feb. 10	Feb. 17†
Admiralty, large	29s.6d.@30s.	*29s.@29s.6d.*
Steam, smalls	19s.@21s.6d.	*19s.@21s.*
Newcastle:		
Best steams	27s.6d.@28s.	**28s.**
Best gas	26s.6d.@27s.	**27s.@28s.**
Best bunkers	26s.@27s.6d.	*25s.6d.*

† Advances over previous week shown in **heavy** type; declines in *italics*.



News Items From Field and Trade

ALABAMA

The mine of the **United States Coal & Coke Co.** at Lynch celebrated Lincoln's birthday by **breaking the world's record for a day's output.** The tipple poured out 12,820 tons, or 256 gondolas of fifty tons capacity, in nine hours.

The County Coal Co. has increased its capital stock from $100,000 to $200,000. The company operates a mine on a spur of the Central of Georgia Ry. in the Cahaba valley, maintaining offices in the Jefferson County Bank Building Birmingham.

The Buck Coal Co., of Helena, Shelby County, has been incorporated by G. E. Warwick and others, with a capital of $10,000, all paid in and will engage in mining operations in Shelby County.

ARKANSAS

Mine No. 15 of the **Central Coal & Coke Co.** has resumed operations, having been idle since Feb. 4, 1921. The mine has been brought up to date with new equipment, including mining machines.

Settlement has been made of the entry dispute at the Blue Hill mine at Alexander, and on the advice of the arbitration commission work has been resumed.

COLORADO

Governor Sweet is strong for the Moffat tunnel project, which would open transportation facilities to one of the largest coal fields in the world. There is an available coal deposit in the new field estimated at 39 billion tons.

Colorado mines produced 9,140,545 tons of coal during eleven months of 1922 and part of December, 1922.

CONNECTICUT

Governor Templeton has put **Superintendent Robert T. Hurley** of the state police **in charge of the fuel situation** in the state. He succeeds Thomas W. Russell, who resigned as State Fuel Administrator.

DELAWARE

H. G. Horton, of the explosives department of the du Pont company has been named as Western representative of the contractors' division of that department, with headquarters in the McCormick Building, Chicago.

GEORGIA

T. I. Cleary, who recently opened an office in Atlanta for the sale of power-plant equipment, has been appointed Southern agent of the **Combustion Engineering Corporation.**

ILLINOIS

The Clover Leaf Coal Co. has been incorporated by Ralph B. Mitchell, H. W. Ragle and Wm. H. Warder. The capital is $150,000. Mitchell is in charge of the Cosgrove interests at Marion and Warder is attorney for them.

Officers of the Silver Creek Colliery Co., Galesburg, have been elected as follows: H. W. Stewart, Monmouth, president and treasurer; W. D. McCollough, Monmouth, vice-president, and George C. Gale, Galesburg, secretary. Ten years ago the company operated one mine with a production of 200 tons of coal daily. Now its two mines can produce 2,000 tons daily. The mines are electrically equipped and are among the best in Fulton County.

Drilling for coal will be begun soon in the fields **north of Edwardsville.** The first drill will be put down in Big Mooney Hollow, northwest of Edwardsville. Judging by the mine of the Newcastle Coal Co., it is probable that the hole must be sunk between 150 and 180 ft., to get coal. The Newcastle mine is 180 ft. deep. At least a dozen other holes will be drilled on farms upon which options have been secured by Edward Gaertner. The options were obtained on approximately 10,000 acres of land and tests will be made at a number of spots over the area.

Harvey Sconce, of Sidell, **has leased over 2,000 acres** of coal lands near that village. Four test drills have been put down in different sections of the leased area and several good veins have been discovered.

George F. Campbell, C. F. Hamilton and R. Crawford have incorporated the **Pyramid Coal Co.** at $225,000 to mine and handle coal.

Harry N. Taylor, of Chicago, head of the United States Distributing Corporation and who has succeeded Peter Kooi as president of the Sheridan Wyoming Coal Co., made an inspection trip through the Wyoming properties during the latter part of February.

An electrification program at the Moffat mine of the Moffat Coal Co., at Sparta, has been carried forward by the installation of a 525-kva. generator driven by a 26 x 32 in. Corliss engine in a new section of the power plant. Alternating current at 2,300 volts is transmitted along the surface and down a borehole a mile from the plant to three 150-kw. motor generator sets placed advantageously near the working faces which supply cutting machines with direct current at 275 volts. The main generator supplies current also for three pumps underground—two rotary portables and one duplex, which bring the water to the steam pump at the bottom—and to a 40-hp. motor driving the shaker screens and a motor of half that size in the shop building driving a power saw, emery wheel, drill press, bit sharpener and two power hammers. A 202-ft. brick stack built last summer attracts attention to the plant. Other improvements may be made at the mine soon.

Fire recently destroyed a portion of the top works of the **Jackson Coal Co.** at Hallidayboro, the cause of the fire being unknown at this time. The combination blacksmith and machine shop was totally destroyed while adjoining buildings were damaged. W. D. George is superintendent of the plant with offices in Hallidayboro.

The Joseph P. Rend Co., of Chicago, has filed articles of incorporation with a capital of $1,500,000 and will mine and deal in coal, oil, gases and the like. The incorporators are Joseph P. Rend, James E. Rend, George B. McKibbin.

The Ernest Coal Co., of Marion, has installed Nolan automatic cagers, of the style having two sets of horns, at their Pittsburg and Johnston City mines.

E. S. Van Sant is retiring from the coal business. He has already withdrawn from the **Globe Coal Co.,** of Chicago, of which he was vice-president and has sold his interest in that company. He is also to leave the **Eureka Coal & Dock Co.,** of Chicago. He has been a vice-president of that concern also.

Executives and mine officials of the Union Colliery Co. were banqueted recently at the St. Nicholas Hotel, Duquoin. The event is an annual one and was enjoyed by everyone who attended. Dr. L. E. Young, president, and E. S. Stevens, chief auditor, both of St. Louis, were present at the banquet, the former acting as toastmaster throughout the evening.

Reports have been confirmed that the **Lumaghi Coal Co.** of St. Louis **will soon sink a new coal mine near Johnston City.** The new mine will be started on a location on the James Hartwell farm near Johnston City and work will probably be started in a few weeks. First reports were that the St. Louis Coke & Chemical Co., which concern makes coke and byproducts from Southern Illinois coal at its Granite City (Ill.) plant, was going to finance the sinking of the new mine but these have proven false. A. B. Dowell, of St. Louis, has obtained the contract for the sinking of the shaft.

INDIANA

Suits have been filed at Petersburg **to foreclose mortgages** on coal property held by the Vulcan Coal Co. Seven suits were filed by farmers who had contracted to sell about 1,000 acres of good stripping property to the company, which was to pay a third of the purchase price in money and give a first mortgage on the farms for the other two payments. The farmers allege the payments are overdue. The farmers seek to recover the land so that they can sell it to other coal companies.

The **Bogle mines, No. 1 and No. 3,** near Blanford, seven miles west of Clingon, **have been sold to the Binkley Coal Co.** The Binkley company bought the Pine Ridge mine, near New Goshen, from the Bogle company about two years ago. The company owns another mine in the Herrin field. Since the death about a year ago of Mr. Bogle, his properties have been in the hands of an administrator. Henry Stark, formerly secretary of the company, has been president. He is to go with the Binkley company as sales manager under R. B. Starek, vice-president. Mahlon B. Stark, of Clinton, a brother, is manager of the two Bogle mines and it is reported will remain in that capacity. These mines employ about 1,000 men. A new preparation plant is to be installed at the No. 1 mine.

The Linton Summit Coal Co., Linton, raised 2,343 tons of coal in 1,087 hoists on Feb. 8. This is the more remarkable when the primitive conditions at the mine are realized. It is a one-sided mine with a single loaded and single empty track shaft bottom.

The Mt. Pleasant Coal Co., of Terre Haute, has increased its capital stock from $25,000 to $50,000.

Coal operators of Indiana are considerably elated over the decision of the Indiana Supreme Court knocking out the legislative enactment of 1913 under which employers must pay twice a month and in cash. The hold-up evil has been severe of late, and there have been numerous cases where payrolls were stolen, with the result that employers in various lines have been anxious to see a decision on a test case. In fact some of the employers at some points were steadily violating the law. They argued that a check was merely an order on a company treasurer for cash and that the bank as a depository of the company drawing the check was acting as treasurer.

IOWA

The Adelphi Coal & Mining Co., Des Moines, has been incorporated with capital of $50,000 by B. B. Hulsman, president and treasurer; B. F. Foreman, vice-president; R. H. Cook, secretary, and Frank L. Hall, assistant secretary.

To protect Sioux City coal consumers, the dealers of the city who are members of the Coal Exchange have under consideration a plan whereby **all dealers will adopt an emblem guaranteeing the weight** and quality of all coal delivered. This plan follows that adopted in many other cities.

The Pearson Coal Co., Clarinda, is opening a new mine west of that city. A switch track will be built to connect with the Tarkio branch of the Burlington R.R.

KANSAS

Part of the top works, including fan house and cribbing to the bottom of the airshaft, were **destroyed by fire** recently at mine 21 of the **J. R. Crowe Coal Mining Co.** Possibly two months will be needed to rebuild.

H. P. McCaustland is trustee for a syndicate to develop a part of the 20,000-acre coal field in Clark County, 16 miles west of Bucklin.

The Tulsa County Coal Co. has been incorporated for $50,000 by B. C. Connor, H. O. Tallman and E. E. Henning. They have acquired a large acreage near Pleasanton.

Robert Howell, a shotfirer, was killed and Mine No. 16 of the Jackson Walker Coal Mining Co., at Capaldo, near Pittsburgh, was badly damaged by an explosion resulting from a **"blow-through" shot,** Jan. 31. James Sherwood, Kansas state mine inspector, discovered that the shot that caused the explosion lacked only 6 in. of being drilled through into an adjoining room. The shot, heavily charged with black powder, ignited gas and dust in the mine, and timbers were set fire more than 600 ft. away.

Frank Schopflin was elected vice-president of the Central Coal & Coke Co., at Kansas City, Mo., Feb. 7, to succeed Harry N. Taylor, who recently resigned to become head of the United States Distributing Corporation. Mr. Schopflin came to the company in 1902 as an assistant to the president, C. F. Keith. During the last year he has been general manager of the lumber department of the concern. Whether Mr. Schopflin eventually will assume the duties performed by Mr. Taylor, who was active directing head of the coal department of the company, has not been announced. For the present, various heads of departments in that branch of the firm's activities are reporting directly to Mr. Keith. Before entering the service of the Central Coal & Coke Co., Mr. Schopflin was in the Kansas City offices of several railroads.

A co-operative organization of miners, operating under the name of the Osage City Labor Exchange has **purchased the mine of the McCune Coal Co.**, near McCune. The organization had been operating the mine six months under lease. It plans to sink a second shaft early this spring in order to extend development of the mine without violating a Kansas law which limits the number of men employed in a single shaft mine.

Two damage suits for personal injuries which resulted from pit cars running wild down inclines of strip mines and striking workers were filed recently in District Court at Pittsburgh. One, for $7,623.48, against the Mackie Clemens Coal Co., was filed by Asa Musgrove, a general utility man. The other, for $5,541, against the Pittsburgh-Oskaloosa Coal Co., was filed by Fred W. Kirk, a track layer.

KENTUCKY

The Virginia Coal & Coke Corp., a new organization with headquarters in Roanoke, Va., is contemplating **extensive development in the eastern Kentucky coal fields.** It is said the firm will spend $1,000,000 in development, part of which will be done in Harlan, Perry and Letcher counties. It is reported the company will build a branch line in Harlan County, while in Letcher County the main development will be in the Elkhorn field, arrangements for workings there already having been consummated.

The Edyth Coal Co., of Beattyville, which was recently incorporated for $20,000, has organized with Robert Jameson as president-manager and Beatrice Jameson as secretary-treasurer. The company has taken over the properties of the Sturgis Creek Coal Co. and will develop 600 acres of coal land at Idamay. The company expects to have a daily capacity of 400 tons of coal and has purchased the equipment necessary to carry out the development work.

The Kentucky Cooperative Coal Corporation has been incorporated at Lexington, with a capital of $30,000, and C. C. Perry, C. R. Taylor and Ernest C. Brown as the incorporators.

The Flynn Coal & Coke Co. has been incorporated at Sunnyside by D. K. Flynn, H. B. Beury and A. S. Guthrie with a capital of $50,000. The post office address of the company is Grafton, W. Va.

The Morganette Coal Co., which was recently incorporated at Morganette, has perfected its organization with the election of the following officers: President and manager, T. R. Ragland; secretary, C. O. Dunn; treasurer, W. A. Stanley. The company has taken over the leaseholds of the Hawley Coal Co., the Combs Coal Co. and the W. E. Griffiths Coal Co., all in Fayette County. The company has about 1,600 acres under development and the present output is about 500 tons a day.

The Fire Creek Pocahontas Fuel Co. has been incorporated at Huntington with a capital of $150,000. The incorporators are H. A. Smith, of Mt. Hope, and G. T. Smith and William G. Harvie, both of Huntington.

The Coal Exchange Co. has been incorporated at Covelle, with a capital of $500,000, and with D. C. Schonthal, W. E. Deegans and G. D. Miller as the incorporators.

The Coe Pocahontas Coal Co. has been incorporated at Covelle, with a capital of $200,000, and has its post office address at Romney. The incorporators are E. J. McQuaid and C. E. Lilley, both of Bluefield, and H. D. Smith, of McComas.

T. P. Colgan, of Middlesboro, has been employed by the State Tax Commission to collaborate with J. L. Smith, of Danville, in making a survey of the coal fields for tax assessment.

Amended articles of incorporation have been approved by the State Department at Frankfort for the **Amburgy Coal Co.**, Louisville, with mines in eastern Kentucky. The capital has been increased from $175,000 to $225,000. **The name has been changed to the Letcher Coal Mining Co.**

Whitesburg reports that the **Elkhorn and Hazard fields are again humming** with coal production, after a temporary tie-up as a result of landslides on the B. & O., which dammed up Elkhorn Creek, flooding several mining towns and closing down the Consolidation Coal Co., and many other big operations, until the B & O. was able to clear the tracks. It took the better part of a week to get the road open again. It is reported that mines in that section are getting a good car supply and are quite busy.

The Southern Coal Co., has filed suit in the Jefferson Circuit Court, Louisville, **against the Mountain Gem Coal Co.**, asking for damages of $3,238.07, alleging that breach of contract in failure to deliver fifty cars of coal. The buyer claims to have been forced to take a loss of the amount sued for in filling orders from the open market.

Western Kentucky Democratic leaders meeting at the Watterson Hotel, Louisville, **proposed to run James R. Rash**, of the St. Bernard Coal Co., Earlington and Madisonville, **for governor** of the state, and showed opposition to other western Kentucky men who have been mentioned as possible candidates. The meeting also favored a general income tax for the state instead of a coal tonnage tax, as is being argued in some circles.

State militiamen are in charge of the situation at Corbin, where there has been considerable violence, the town having been unsettled ever since the railroad strikes last summer. Corbin is a big junction point of three branches of the Louisville & Nashville R.R., and a shop town. The company never gave in to the unions, and miners in the district and loafers sympathized with the railroad workers. A curfew law has been passed by the council, and an effort is being made to clear up the situation. A workingmen's boarding house was recently dynamited and several men have been shot. This is an important point to coal operators of southern Kentucky and Tennessee.

MISSOURI

Mining permits have been granted by the Circuit Court at Huntsville to the **Black Diamond Coal Co.**, of Huntsville, and to **John Lumb**, of Huntsville, both of whom furnished bonds. Mining activities have increased in the western part of Randolph County to such an extent that new mines will be opened and operations of several old shafts resumed in the near future.

Initial steps have been taken at Huntsville **to open another coal field** and men employed at the Powhattan mine have taken the initiative and it is believed that the business men of the city as well as the Chamber of Commerce will assist in the project. It will be necessary to build a track, considerable trestling and tipple to the new field and the miners have generously signed up to donate a week or more of their time to accomplish the job.

A local syndicate is forming to **exploit the coal acreage around Prairie Hill.** Reports have it that a number of shafts will go down this spring.

NEW JERSEY

Halden-Kelley Coal Co., Inc., Clearfield, Pa., announces the opening of a branch office at 38-40 Clinton St., Newark, N. J.

NEW YORK

Justice Lydon in the Supreme Court of Manhattan has **set aside a verdict returned by a jury last month against Willard, Sutherland & Co.**, bunkering contractors, in favor of the old Tidewater Coal Exchange. The action was brought by Receiver Coyle of the Tidewater Exchange to set aside certain settlements between debtor and creditor members. In his opinion Justice Lydon stated that the jury's verdict was clearly against the weight of evidence submitted by Willard, Sutherland & Co., that the latter's accounts with the old exchange have been completely balanced, and that the exchange has no claim whatever upon Willard, Sutherland & Co.

Douglas M. Deringer, for several years fuel engineer with the New York Central R.R., has resigned from that company and become associated with Dickson & Eddy, New York City.

Raymond O'Brien, formerly of the Allan Coal Mining Co., has been engaged as manager of coal and coke sales of the Iron Trade Products Co., of Pittsburgh, Pa., for the New York district with headquarters at 30 Church St., New York City.

OHIO

As a result of a recent decision of the State Supreme Court, holding that the Southern Ohio Power Co., of Maine, operating the big electric power station at Floodwood, Athens County, and supplying current to a number of Hocking Valley municipalities, cannot operate in Ohio, reorganization is proposed whereby a new Ohio corporation known as the Southern Ohio Power Co. is to acquire the properties of the old Maine corporation and the various distributing companies. The court held that the Maine corporation is in fact a public utility because of the interlocking directorates with the distributing companies it sells its current to, and under Ohio laws no other than an Ohio corporation can engage in the electric light and power business. Application to the State Public Utilities Commission to approve the reorganization plans calls for an issuance of $3,200,000 by the new Ohio corporation to be exchanged for assets of the other companies, estimated at that value.

The Cantwell Coal Co., Bridgeport, has been chartered with a capital of $10 000 to mine coal in the Pittsburgh No. 8 district. Incorporators are John E. Barth, Robert Barth, William Rennis, Jacob Barth and Martin Cantwell.

The tipple of the White Coal Co., located near Bellaire, was **destroyed by fire**, entailing a loss of $7,000. Just a day previous the **warehouse** of the Pultney mine of the Cambria Collieries Co. was **destroyed by fire** causing a loss of $5,000.

James C. Layne, Jr., Cincinnati; Albert E. Scherm, Cincinnati; Joseph G. Walton, Pittsburgh, and John Daker, Cleveland, have been admitted as partners to the firm of Eaton, Rhodes & Co., Cincinnati. William G. Eaton and Frank R. Rhodes are the other members of the firm.

OKLAHOMA

Prospecting for location of coal goes on **along the Oklahoma-Kansas line.** The latest acreage is in the so-called Angola field, which is independent of the Edna-Welch field. Favorable reports come from the drillers all over Labette County. The two heavy leasers in the new fields around Welch are the Central Coal & Coke Co. and the Hartford Valley Coal Co. Railroad extensions are to be put through this spring. The Central Coal & Coke Co. is reported to have paid in cash for leases more than $25,000 for acreages near Hollow, Okla. In the Quapaw territory report has it that the Charles M. Schwab interests have leases on 2,700 acres, and $25,000 to $30,000 has been spent by the agents of these interests.

The Oak Ridge Coal Co., capital $200,000, has been organized by Vince Davis, Ray Morgan, James Hilling and others, to sink a mine at Red Oak.

PENNSYLVANIA

Louis J. Bradley has joined the Keister-MacQuown Fuel Co., Pittsburgh, as Eastern sales manager. Mr. Bradley has been actively identified with the bituminous trade since 1909. Starting as weighmaster at the Edna Mine of the Pittsburgh & Baltimore Coal Co. in Westmoreland County, his early training carried him through the various positions of inspector, shipper, mine clerk



LOUIS J. BRADLEY

and superintendent of the mine to the position of Eastern representative for the United Coal Co. with headquarters in Philadelphia, Pa. With this company he was identified until it was disbanded, when he joined the Quemahoning Coal Co. During 1917-18 he was engaged in war work, resuming coal work at the close of the war. The Keister-MacQuown Fuel Co. plans to engage extensively in export business.

The following bituminous coal companies were recently incorporated at the State Department at Harrisburg: **Baton Coal Co.**, Pittsburgh, $50,000; Chester J. Nicklas, W. W. Booth and George S. Baton, Pittsburgh, incorporators. **Mt. Hope Mining Co.**, Kersey, $10,000; A. C. Hau and W. G. Hau, Kersey, Pa., and Joseph J. Szukalski, Buffalo, N. Y., incorporators. **Walnut Hill Coal Co.**, Connellsville, $10,000; Louis Hetzel, John Swope and William G. Duncan, Connellsville, incorporators.

A state charter has been issued to the **George H. Foster Coal Co.**, Pittsburgh. The capital stock of the company is $25,000 and E. E. Beardsley, Point Marion, is treasurer and one of the three incorporators, the others being George H. Foster, Pittsburgh, and H. E. Hackney, Uniontown. The purpose of the corporation is the mining and producing of coal and the manufacture of coke.

Since the No. 7 breaker of the Susquehanna Collieries Co. burned down Feb. 6 the company is making arrangements to prepare the coal at its Glen Lyon Mines and hopes to have the colliery in operation soon.

Fourteen hundred men went on strike Feb. 13 at the Kaska Williams colliery of the Lehigh Coal & Navigation Co. as a result of a dispute over wage rates and mining conditions. Approximately 8,300 men at the other fourteen collieries of the company had walked out on the preceding day for the same reason. Three thousand mine workers in the Mt. Carmel district quit Feb. 12 at the Reliance and Alaska collieries of the Philadelphia & Reading Coal and Iron Co., in sympathy with the miners at Locust Spring, who claim that men working in slopes received $8.01 a yard at one place and $11.03 for the same in another. District officials of the Miners' union are making an effort to settle the difficulty. They declined to state whether the strike had the sanction of the union.

Three thousand anthracite mine workers employed by the Susquehanna Collieries Co. at Nanticoke and Glen Lyon struck Feb. 16 because of local grievances. One of the complaints is that the company is asking the men to pay 90c. a ton more for coal, due to the fact that a breaker had burned, compelling the company to haul the fuel a longer distance.

The following officers and directors of the mining section of the **Engineers' Society of Western Pennsylvania** have been elected for the ensuing year: Chairman, H. M. Eavanson; vice chairman, E. H. Coxe; Directors, J. O. Durkee, J. R. Elliott, M. D. Gibson, J. M. Rayburn and E. S. Taylor.

The following bituminous-coal companies were granted charters at the State Department at Harrisburg recently: **Ramsey's Run Coal Mining Co.**, Indiana; capital stock, $50,000. **Appalacha Coal Co.**, Pittsburgh, $150,000. **Anderson-Rees Coal Co.**, Pittsburgh, $15,000.

Representative David Fowler, Lackawanna County, on Feb. 7 introduced a bill in the House **to repeal the anthracite tax law.** The bill is similar to that offered the week before by Representative Wilson G. Sarig, Berks County. Thirty-five members from the anthracite regions of the state have formed an organization which will work for the repeal of the tax. The new organization will ask the House Ways and Means Committee for a hearing on one of the two identical repealers now before that committee and will urge that one of the bills be reported out affirmatively.

A bill prohibiting understandings and agreements which would prevent, restrict, obstruct or delay the sale or delivery of coal and making it **unlawful to refuse the sale or delivery of coal** was introduced in the State Senate Feb. 12 by Senator George Woodward, of Philadelphia. Persons who violate the provisions of the measure are guilty of a misdemeanor and upon conviction shall be sentenced to pay a fine of $25 for each ton of coal the sale or delivery of which was refused or delayed. The bill relates to dealers and officers of coal companies and also to partnerships and officers of corporations engaged in the operation of any mines or collieries.

The Senate bill providing for grading of coal was **reported out of committee this week with an affirmative recommendation** and passed by the Senate on first reading. When it came up in its second reading stage on Feb. 13 it was recommitted to the Judiciary General Committee.

Representative David Fowler, Lackawanna, has introduced a bill in the House **amending an act of 1921** relating to the examination of inspectors in the anthracite mines. The measure increases the maximum age of applicants from fifty to sixty years.

Indications that there will be **no mine-cave legislation put before the Legislature this year** by members of the House from the anthracite district of the state. It is said that local efforts will be made to meet the surface subsidence trouble.

The end of the Stavitsky bill, prohibiting sheriffs from aiding in quelling riots and disturbances without a call from local police authorities, came soon after it was introduced. The House Law and Order Committee reported it out during the past week with a negative recommendation.

The Bethlehem Steel Co. purposes building a new battery of coke ovens at its Lackawanna plant.

Attorney George R. McLean, of Wilkes-Barre, has been named a director in the Lehigh & Wilkes-Barre Coal Co., to succeed the late H. H. Ashley.

The Jefferson & Clearfield Coal & Iron Co., of Indiana, Pa., has declared a dividend of $1 a share on the common stock, payable Feb. 15 to stock of record Feb. 13. This is the first dividend ordered on the common stock since November, 1920, when a disbursement of $8 a share was made, which was the first distribution since 1905. A stock dividend of 150 per cent was distributed Jan. 18, last.

RHODE ISLAND

State Fuel Administrator George H. Webb has received **many complaints of inferior coal** sold in that state. Seventeen samples taken from the bins of firms against whom complaints had been made showed that the combustible material ranged from 40.5 per cent to 76.4 per cent.

UTAH

The U. S. Fuel Co. has appointed **A. D. Pierson**, formerly of the Utah Fuel Co., fuel agent in charge of railroad tonnage.

Following urgent requests from numerous farmers' organizations in Idaho, the Denver & Rio Grande Western Ry. and Oregon Short Line have established **a special emergency rate on coal from Utah mines** to various points in the Gem state. The rate will average about 50c. lower than at present, with the present rate on slack as the minimum in each instance. The new rate is an emergency measure and is designed specially for Idaho farmers. It will also have the effect of lessening the advantage Wyoming mines now have over Utah mines in this field.

It seems that the law passed six years ago setting up a Public Utilities Commission will not be repealed though it is likely to be modified. There is a feeling, a canvass of the legislators shows, that the public would be left without adequate protection if the commission were abolished. Senator Peters, of Brigham City, has introduced two bills on the subject, in addition to the one by another legislator which would repeal the act. One of the new bills would make it compulsory for municipalities to have a representative at all rate hearings and other business affecting price or quality of service. The other bill would take from the commission the power to create a monopoly by granting but one person at a time the privilege of conducting transportation service over the roads of the state.

WEST VIRGINIA

W. E. Hatfield, H. H. Randolph and W. H. Bronson, of Williamson, have incorporated the **Pigeon Creek Coal Co.**, at Bias, with a capital stock of $50,000.

The Millstone Coal Co. has been incorporated at Burch, with a capital stock of $10,000. The incorporators are G. W. Hatfield, H. H. Randolp and G. T. Conley, of Williamson.

J. A. Adams and W. R. Harris, of Morgantown, and D. C. Evans, of Uniontown, Pa., have incorporated the **D. & A. Coal Co.** at Morgantown, with a capital of $25,000.

John Laing, president of the Morrison Coal Co., of Charleston, has announced that the company has under contemplation the **purchase of 4,600 acres of coal land** in the Winding Gulf district.

The Glenbar Coal Co. has been formed at Clarksburg, with a capital of $100,000. The incorporators are L. O. Knipp, of Philadelphia; C. Valdois, of Clarksburg, and C. M. Knipp, of Glenside.

T. W. Miller and C. B. Cushwa, both of Youngstown, Ohio, have become associated with A. M. Cunningham, of Elkins, in the incorporation of the **Rich Mountain Sewell Coal Co.** at Elkins with a capital stock of $75,000.

The Morganette Coal Company at Beckley, W. Va., has been incorporated for $400,000 and has as its incorporators J. Q. Hutchinson, J. R. Ragland, and C. H. Meador.

The Morrison Coal Co., of McGraws, of which John Laing, of Charleston, W. Va., is president, **is purchasing mine motors, machines and cars**, preparatory to developing coal lands. The company has under development 4,600 acres, which promise an output of 1,500 tons daily.

The McKone Coal Co. has been incorporated at Tunnelton, with a capital stock of $200,000. The incorporators are J. J. McCone, L. H. Borgman and F. W. Borgman.

Charles Prafeta and D. A. Ritchie, of Fairmount, and Charles Canarata, of Uniontown, Pa., have formed the **Prafeta Coal Co.** here, with a capital of $10,000.

The Shady Fuel Co. has been incorporated at Oxley with a capital of $25,000; J. A. Lilly, A. A. Skaggs and J. H. Wilson are the incorporators.

Not since 1918, when 27,576,710 tons was handled, has the Chesapeake & Ohio been able to move so large a tonnage of coal as it did during 1922, when **25,703,490 tons were transported** to market from the five great coal fields on the general western division of the road.

The Virginian Ry., it is understood, **will convert into coal-carrying cars several hundred stock cars** which have been lying idle since the war. The Government acquired the stock cars for the Virginian during the war at a cost of approximately $2,000,000 and threw them back on that road after the war was over. As the road has no cattle shipments to speak of, it is proposed to scrap the bodies of the cars and utilize the running gear alone, constructing steel box cars.

Fire destroyed the tipple at the Hickory Camp mine of the Paint Creek Coal Mining Co. about the middle of January, three dwelling houses adjoining the tipple also being destroyed. The fire had its origin in one of the three dwelling houses. Until a new tipple can be constructed the mine will be closed down.

Announcement has been made by Secretary A. H. Crane of the West Virginia Coal & Coke Co., of the appointment of **J. W. Bischoff as vice-president and general manager** of the company.

WISCONSIN

The Packard Coal Mining Co., of Columbus, Ohio, announces the **opening of a Northwestern office** in the New First Wisconsin Bank Bldg., Milwaukee, in charge of Charles Becker.

The Reiss Steamship Co., an auxiliary of the C. Reiss Coal Co., of Sheboygan, **has placed an order for a new steel steamer.** This will make the company's fleet consist of ten steel vessels, with a combined capacity of about 85,000 tons. The steamers are employed by the coal company, which maintains coal docks at Sheboygan, Manitowoc, Two Rivers, Green Bay, Ashland and Superior, Wis.; at Escanaba, Mich. and Waukegan, Ill.

The warehouse and coal sheds of the **Saul Sinaiko Coal & Fuel Co.**, at Madison, burned early on the morning of Feb. 6, causing a loss estimated at $25,000.

CANADA

Men at all the mines in the Drumheller field went on strike on Feb. 1, following a reduction in the number of men employed at the Hy-Grade collieries. The miners demanded that the men at Hy-Grade be kept on the payroll and that the work be distributed among them proportionately, a course that the management refused to adopt. On the morning of Feb. 2 all pits were picketed, and miners were not allowed to go to work. Robert Livett, of the International Board of the United Mine Workers, came up from Calgary, and ordered the men to go back to work, an order with which the men refused to comply. Mr. Livett stated that some drastic course would have to be taken to discipline the men. There is a large quantity of coal on the tracks, so no serious shortage is feared, unless the strike should be a long one.

The Canadian Pacific Ry. completed a branch line last November from Acme to Drumheller, Alta., and since then **there have been five new coal mines opened** and put on a shipping basis along this line. The coal is of excellent quality for domestic use. Charles Murphy, general manager of the Western lines, observes that there is no likelihood of a fuel famine in this particular territory, inasmuch as he has seen farmers digging coal from the surface and shoveling it into waiting wagons.

Thomas J. Brown, formerly manager of the Nova Scotia Steel & Coal works at Sydney Mines, has assumed the duties of **Deputy Minister of Works and Mines** at Halifax. He succeeds Hiram Donkin, who retired from office on Feb. 1 after serving since 1904.

WASHINGTON, D. C.

Bids are solicited for the transportation of two cargoes of Navy coal from Hampton Roads, Va., one to the Melville, (R. I.) Naval Fuel Depot and one to the Portsmouth, (N. H.) Navy Yard in vessels of American registry. To the first-named destination the cargo will consist of 4,000-6,500 gross tons, to be loaded at Hampton Roads about Feb. 28 and discharged at a guaranteed daily rate of 500 tons. The cargo to the Portsmouth Navy Yard also is to comprise 4,000-6,500 gross tons, to be loaded about March 3 and discharged at the rate of 400 tons per day.

Publications Received

Proceedings of the twenty-fifth annual meeting of the American Society for Testing Materials, held at Atlantic City, N. J., June 27-30, 1922. Vol. 22. Part I contains committee reports and new and revised tentative standards and has 1,023 pages. Part II contains technical papers and has 591 pages. Two coal papers: "A Rational Basis for Coal-Purchase Specifications," by E. B. Ricketts, and "Forms of Specifications for Purchasing Coal," by Hubb Bell, with a discussion on coal-purchase specifications, appear among the technical papers.

Twelfth Annual Report by the Director of the Bureau of Mines to the Secretary of the Interior for the fiscal year ended June 30, 1922. Pp. 33; 6x9 in.; organization chart and tables.

Proceedings of the Conference on Mine Taxation, held in conjunction with the twenty-fifth annual convention of the American Mining Congress at Cleveland, Ohio, Oct. 9-14, 1922. Pp. 174; 6x9 in.

Second Annual Report of the Federal Power Commission for the fiscal year ended June 30, 1922. Pp. 309; 6x9 in.; tables.

Fourteenth Census of the United States, taken in year 1920. Mines and Quarries, 1919. Vol. XI; 443 pp.; tables. Prepared under the supervision of Eugene F. Hartley, chief statistician for manufactures, and Frank J. Katz, special agent for mines and quarries.

An Investigation of the Properties of Chilled Iron Car Wheels, by J. M. Snodgrass and F. H. Guldner. Engineering Experiment Station, University of Illinois, Urbana, Ill. Part II; bulletin No. 134; pp. 72; 6x9 in.; illustrated. Covers the determination of the strains which may occur within a car wheel and a study of the limitations of present designs.

Chemical Engineering. Rensselaer Polytechnic Institute Bulletin, Troy, N. Y. Vol. 21; pp. 30; 5x8 in.; illustrated. Describes the course in chemistry at the Institute.

Trade Literature

American Hose and Spray Nozzles. The American Safety Lamp and Mine Supply Co., Scranton, Pa. Bulletin No. 641. Two-page folio giving sizes and prices of iron, brass and bronze nozzles.

Reading Cast Steel Valves. Reading Steel Casting Co., Inc., Bridgeport, Conn. Pp. 8; 6x9 in.; illustrated. Describes its new cast steel gate valves designed for 350 lbs. working pressure at a total temperature not exceeding 800 deg.; or 500 lbs. working pressure at a total temperature below 100 deg.

The International Combustion Engineering Corp., of 43 Broad St., New York City, has issued a 16-page catalog covering all its products, including stokers, fuel oil burners, Lopulco pulverized fuel systems and coal dryer, ash conveyors, Green pressure waterback, sealflex arch, fuel retarder, etc. The book is 8x11 in. and well illustrated.

Duraloy. Cutler Steel Co., Pittsburgh, Pa. Bulletin No. 221. A four-page description of the physical properties, composition and characteristics strength at high temperatures, machining and welding qualities of duraloy, also its oxidation and heat resistance.

Safe Tapping and Stopping. The Medart Co., St. Louis, Mo. Four-page folder describing apparatus invented for removing hazards from cupola tending.

The following catalogs have been published by the De Laval Steam Turbine Co., Trenton, N. J.: **Instruction Manual Small Single-Stage Centrifugal Pumps,** Type F. Pp. 12; 8x11 in.; illustrated. Gives complete tables and instructions for selecting pumps for different conditions, explains how to determine the proper speeds and how to select piping, valves, fittings, and driving pulley or motor. **Plants and Products.** Catalog P. Pp. 24; 4x9 in.; illustrated. Briefly describes the single- and multi-stage steam turbines, centrifugal pumps, blowers and compressors, and speed-reducing gears manufactured by this concern. **Equipment for Marquette Cement Manufacturing Co.** This is a four-page folder describing the power equipment at this plant where direct current is used.

How Hell Gate Station Handles Coal with Maine Electric Machinery. The Maine Electric Co., Portland, Me. Bulletin No. 4. Pp. 12, 9x12, illustrated. Describes the large coal-handling hoists installed at the Hell Gate Station of the United Electric Light & Power Co., said to be the largest and most rapid electric coal hoist of its kind in the United States.

Traffic News

Reduction of freight rates on coal shipped from Indiana fields to Irvington, a suburb of Indianapolis, and from Clinton, Ind., to Putnamville, Ind., is sought in exceptions to an Interstate Commerce Commission order on which evidence has just been heard before an examiner of the commission. Rates on coal shipped to Irvington are higher than the rates on coal shipped to Indianapolis. Shippers want them to be made the same.

Obituary

James D. Bastin, 83, died at Stanford, Ky., Feb. 12. He is survived by two sons who are coal producers, these being John W. Bastin, of Central City, Ky., and Sam M. Bastin, an operator in the Letcher County field.

Charles K. Wagner, one of the well known operators in the Big Sandy Field of the Northeast Kentucky district, died at the Kessler-Hatfield Hospital, Huntington, W. Va., Sunday, Feb. 11, from injuries received in an accident at the mine of the Elkhornseam Collieries Co., Elkseam, Ky., one of the mines in which he was interested. The accident, which occurred Feb. 7, was caused by a runaway car on the incline which is used to convey the men to and from their work in the mine.

Mr. Wagner became interested in this field in 1917 and had been actively engaged in its development and progress since. He and Charles W. Connor became closely affiliated in the Elkhornseam Collieries Co., of which he was secretary and treasurer. He also was president of the Excelsior Byproduct Coal Co., Shelbiana, Ky., and vice-president of the Kentucky Block Fuel Co., Jonancy, Ky., located on the Sandy Valley & Elkhorn Division of the B. & O. in Pike County. He also was interested in several operating companies in the Pocahontas Field on the N. & W. He was 42 years of age and is survived by his wife and four children.

Death has claimed **Heber J. Stowell,** oldest coal prospector in Carbon County, Utah. Mr. Stowell was born in Ogden. Among the mines he located was the Kenilworth now operated by the Independent Coal & Coke Co.

Association Activities

Northern West Virginia Operator's Association

The annual meeting of the Northern West Virginia Operators' Association held in Fairmont on Feb. 13 was attended by about 100 operators from all parts of northern West Virginia. John A. Clark, Jr., of Fairmont, was elected president of the association, succeeding A. Lisle White, who was presented with a gold watch.

Other officers elected at the annual meeting were as follows: George S. Brackett, Fairmont, executive vice-president; J. Oliver Caldwell, Fairmont, secretary; A. C. Beeson, Annabelle, treasurer; E. S. McCullough, Fairmont, labor commissioner.

The question of car rating absorbed the attention of the members of the association during a part of the meeting. The scale committee which had just completed negotiations at Baltimore for a new scale presented its report. During the course of the meeting a resolution was adopted, the sense of which was that the association would recognize and stand by its associate members. Instead of having its banquet in the evening, the association staged that function at one o'clock in the afternoon at the Fairmont Hotel. There were splendid addresses by Director Smith of the U. S. Geological Survey and Attorney Wilbur LaRoe, of Washington, D. C.

Upper Potomac Coal Association

Members of the Upper Potomac Coal Association met in annual session at Cumberland, Md., Feb. 10, the attendance representing a large portion of the tonnage of the Upper Potomac and Georges Creek fields. Keen interest was manifested in the discussion of problems affecting the coal industry. The following directors were elected: W. F. Ambrose, Cumberland; J. G. Emmons, Philadelphia; R. A. Smith of Blaine, W. Va.; S. D. Brady, Fairmont; A. S. Brady, Elkins; Marsh Dean, Elk Garden; T. M. Dodson, Bethlehem, Pa.; Douglas Gorman, Baltimore, Md., and Carroll Pattison, Bloomington, Md.

At the banquet which followed the annual meeting addresses were delivered by Senator Sutherland, of West Virginia; Judge A. A. Daub, of Cumberland, and B. F. Biser, of Cumberland. All the speakers joined in urging business men to bring about industrial rest. In his address Senator Sutherland said, among other things: "If a failure of fuel production should persist through unfortunate misunderstanding or clash of interests, the specter of government operation or ownership will again arise. It is quite possible that if the patience of the public becomes wearied because of an uncertainty of fuel supplies, drastic and unwholesome legislation may be expected."

Monongahela Coal Association

Work was planned for the year at the meeting of the Monongahela Coal Association held in Morgantown during the second week in February, when consideration was given to a number of questions of particular interest to members of the association. John H. Jones, of Pittsburgh, elected president at the annual meeting, presided and announced the appointment of committees. Following the meeting of the membership of the association, the board of directors held a session.

Coming Meetings

The Rocky Mountain Coal Mining Institute will hold its winter meeting Feb. 26-28 in Denver, Colo. Secretary, Benedict Shubart, Boston Building, Denver, Colo.

American Institute of Mining and Metallurgical Engineers will hold its annual meeting Feb. 19-22, 1923, at the Engineering Societies Building, New York City. Secretary, F. F. Sharpless, New York City.

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

Northwestern Pennsylvania Coal Operators' Association will hold its annual meeting March 6 at the William Penn Hotel, Pittsburgh, Pa. Secretary, T. F. Diefenderfer, Butler, Pa.

Canadian Institute of Mining and Metallurgy's annual meeting will be held March 7, 8 and 9 at the Mount Royal Hotel, Montreal, Quebec, Canada. Secretary, George C. Mackenzie, Montreal, Quebec, Canada.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

Indiana Bituminous Coal Operators' Association will hold its annual meeting March 14 at Terre Haute, Ind. Secretary, P. H. Penna, Terre Haute, Ind.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Southern Appalachian Coal Operators' Association will hold its annual meeting Feb. 23 at Knoxville, Tenn. Secretary, R. E. Howe, Knoxville, Tenn.

The executive board of the **Coal Mining Institute of America** will meet in Pittsburgh, Pa., Saturday, March 3.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

The Tri-State Coal Stripping Association will hold its annaul meeting March 1 at Pittsburgh, Pa. Secretary, Geo. A. Blackford, Wheeling, West Va.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Classification of Coal

NOTHING is more certain than that coal is a complex substance made of many forms of vegetal matter mixed with various kinds of ash-forming material. We cannot expect the "pure coal matter" from many beds or from the various strata of any one bed to be of the same specific gravity. Heavy coal may consist of heavy vegetal material and little ash. Light coal may be composed of light coal matter and more ash or an ash of low specific gravity, for the "ash" itself may vary in density. Coal resins, as witness those at Coalmont, B. C., may have a density of 1.03, whereas coaly matter is generally of much greater weight.

In view of these facts it might seem remarkable that coal can so readily in most cases be classified by gravimetric methods. Its weight usually is an indication of its degree of purity, but it may not always be so, and the assumption that it is so is not quite safe, as has been shown on Vancouver Island. Where classification by specific gravity of the seam or seams coming to a washery is not parallel to a classification by ash content, separation of good coal from bad cannot be left to the arbitration of gravity classifiers no matter how well they perform their tasks. They might be perfect in achieving what they attempt to do but fail utterly to do what they should do, namely, separate clean from dirty coal.

Most of our classifiers which operate on other physical qualities than specific gravity do their work somewhat imperfectly. Some rely on the rounded form of coal and the bedded form of slate. One, the flotation process, the possibilities of which are intriguing, depends on the surface tension of a mineral body like coal as compared with that of gangue like slate or sandstone. Here also are assumptions. To begin with, the pyrite which is found with coal is a mineral and disposed to float on a froth. However, it is heavier than coal and perhaps for other reasons is not as ready to float as is that mineral. At least, flotation experts tell us that coal floats more readily than pyrite. If so, this is well indeed. The industry will be pleased and surprised to see it sink, in some percentage at least, with the gangue.

Still we do not know that the selective action of a froth in contact with coal increases regularly with the purity of the mineral. Is the attraction of all pure coal substance equal and, even if it is, may not some ashy materials decrease that selective action more than others? To determine if this is so is perhaps a hopeless task at this stage of the art. The only way is to test coals to see which gives the best result. It is important, however, to remember that all classification proceeds on the doubtful premise that by grading the coal according to certain physical qualities we are classifying it according to its calorific value. In some cases it may be true, or true enough for practical purposes; in others it may be far from the truth. Let us in any event proceed with an open mind lest the operation be successful yet the patient die.

It must be remembered also that the flotation process depends on the most superficial of externals and in any particle of variable material external impurity will have more effect than impurity that is internal. Thus another variable is introduced, one that in gravimetric methods does not exist.

Publicity for Coal

PEOPLE like to read that which pleases them. They buy the newspaper that says the things they like to hear. They read the books that tell the story in the way they think it should be told. It is confirmation of their worst fears, their strongest likes and dislikes, that the average reader seeks. The public believes many strange and fearful things about coal—that the coal men are in combination to rob them, that dishonest and iniquitous practices prevail throughout the trade, that so many things are wrong with the whole business that "something" should be done to fix it up, that "the government should take a hand" in straightening out a snarl so complicated.

It is interesting to note how the newspapers help this warped understanding to grow. Some weeks ago there was much in the public prints to the effect that a strike in the soft-coal fields was imminent. The miners and operators met in New York to talk over the matter of an agreement to continue work after the present contract expired. The papers carried front-page headlines about the meeting that was to be and during its progress held the public in suspense as to its fearful outcome. Then when all was amicably settled and the strike cloud was dispelled for some fifteen months to come, did the public learn in the same front-page headlines that a great thing had been accomplished, that the thing which appeared doubtful was in fact to be, that there would be no strike? By no means, for the news that an agreement had been reached was buried well inside the sheets with inconspicuous headlines. Small wonder then that some do not know that the mines are working. Four months after resumption of mining, on Dec. 29, 1922, Henry W. Rose, general manager of the Republican National News Service, wrote to the chairman of the U. S. Coal Commission, saying: "The mines should reopen, and the men should go back to work."

It is a poor coal famine that does not freeze someone, so the papers carried front-page headlines on Feb. 19 telling the world that an aged woman, lacking coal, had perished from cold in northern New York. Later editions advised, with notable inconspicuousness, that she really had plenty of coal on the premises, but the correction will never overtake the headlined error. One victim at least will popularly be charged to the coal shortage of this winter.

Last week the United Mine Workers broadcasted a statement well calculated to inflame a near coalless

public. With all the care in the use of facts that marks the prospectus of a bogus oil promotion, this statement concludes that "the present monopoly organization of anthracite, through overcharges in each branch of the business, adds at least $3.61 per ton, which is immediately discoverable, to the present price the consumer pays, and much more which cannot be exactly estimated." Such an opportunity for headlines could not be resisted by newspapers, as the authors of the statement well knew and calculated. The reply of the anthracite operators, calling attention to the fact that the U. S. Coal Commission is now engaged in an investigation designed to settle that important and controversial point, and suggesting that such assertions from the miners are but attempts to prejudge the case and mislead the public, was fortunate in getting publicity here and there as inside filler.

Now this is not mere caviling at the press. By all the modern tenets news is news when it is startling, novel, sensational. If the coal operators rob the people, that is news, but if they do not that is not news. If the miners go on strike, that is news, but if they do not strike, such is not news. Not all readers care for sensation; some desire plain facts. Thus we find different publications catering to a large number of different tastes.

Men in the coal trade have as wide a variety in taste for "news" as any other section of the public. Some read only that which pleases them, and, caring for warped news and peddled gossip, they have created a market for what, for want of a better designation, may be called coal-trade scandal. Such a one, either fearing the light of day on the facts of his business or considering lightly the task of the Coal Commission, indulges himself in a printed sheet advising and encouraging the belief that the best and surest way to ward off the consequences of national public dissatisfaction with the coal men is to tell the public to go to hell, that questionnaires are violations of constitutional rights of private business, that everyone in Washington save a very select few is secretly plotting to take over the coal and all other business.

On the one hand, headlining news when it makes coal out the scapegoat; on the other hand, gossip, some quite original, hawked for a consideration, attempting to make the public the scapegoat. There is mightly little distinction in the doing or the believing between the two.

How Many Cars Should a Mine Get?

ALTHOUGH tastes may and do differ as to method, the purpose of all plans for coal-car distribution is to furnish equitable division of the means of getting coal to market. It really matters little whether the rating by which the cars are apportioned is inflated, provided the inflation as between the mines on a given railroad is uniform, for the figure purporting to represent the capacity to load is but a ratio, an abstract figure. Simple as it may appear to be to determine such ratios and to apply them in practice, the difficulties are great.

Prior to the war every road had its own method, and it is to revert to this condition after five years' of trial of uniform rules, known as CS31, that present effort is being directed.

There is a plain need in many a coal-mining field for a correction in the number of cars each mine may order in a day. Abuses under CS31 have made rank overrating altogether too easy. Everybody admits it. Fervently it is to be hoped that the new methods of rating mines about to be adopted in some of the Eastern fields will have a salutary effect for the benefit of the whole industry. But the fact that both carriers and operators in those fields may agree upon the fairness and success of any method for their own use does not prove that the same method should work everywhere in the United States. Where the grip of unionism is as strong as it is in Illinois and Indiana and where slope and drift mines are so few, the limited time of each working day and the limited storage capacity for loaded pit cars at each operation put the unionized shaft mines in a class requiring separate treatment.

The Illinois Central and Chicago, Burlington & Quincy railroads wish to create a railroad board for each line to fix arbitrarily the car rating of each mine, after considering various factors, following after the Chesapeake & Ohio and the Norfolk & Western plans. They cannot be blamed for wishing to take into their own hands the vexing question. Too many wiles have been practiced. Something is the matter when the mines of a single railroad system are rated at 6,400 cars a day, based on the mine operators' reports, and when 4,400 cars stands as the maximum ever ordered in any one day and 2,500 cars is the average loaded out! Something certainly needs correcting in a car-rating system when it is freely admitted by operators, as it was recently in a Chicago conference of mine men and railroaders, that the mine reports of hours worked are deliberately falsified and that double sets of records are sometimes kept! Who can blame the railroads for growing weary of it?

Under CS31, now in effect, mine ratings for each month are determined upon the number of hours worked and cars loaded under the tipple during the preceding month. There is no better and fairer basis providing the data are correct. The railroads have taken the mining companies' reports on the hours worked. They say they could do nothing else. It would have cost too much. And in cases where they have declined to accept a mine report and have reduced a mine's car rating, they have drawn harrassing and expensive lawsuits. It is easy to say that CS31 is adequate and requires only that the railroads police the reports to make it equitable and successful. It must be admitted that policing has its difficulties. The policing should not be required of the railroads alone. Mine operators themselves should assume a large responsibility and, having done their part, they should suffer in their car rating no stint from the carriers or any other source.

The compromise plan suggested by Illinois and Indiana that the preceding month's production basis be retained and that a railroad board examine any mine suspected of falsifying reports of time worked has its possibilities. Its penalty clause, empowering the board to run a three-day test in case of disagreement with the mine owner and to dock him in subsequent car supply to the extent to which he benefited by padding his report, is a real weapon in the railroads' hands, poor a device as is such a test would be. The suggestion should be seriously considered. It certainly would cost the railroads something to maintain such a board, but if they intend, under their own proposed plan, to make an adequate study of each mine's condition in order to arrive at a proper rating, then the compromise plan would be no more expensive than their own; it probably would be less costly.



Betsy Layne Mine Presents Unusual and Suggestive Methods of Construction and Operation

Dump Houses Separate from Tipple Structure—Belt Conveyors to Commercial Screens—Preliminary Screening Protects Belt by Putting Slack Under Lump—Well-Equipped Isolated Power Plant—Roof Gunited and Stoppings of Concrete

By F. R. Morris*
Betsy Layne, Ky.

ONE of the most recent of the large modernly equipped coal plants to be opened up in the eastern Kentucky field is the Betsy Layne mine of the Pike Floyd Coal Co., a subsidiary of the Pittsburgh Coal Co. The mine lies on a two-mile spur from the tracks of the Chesapeake & Ohio R.R., in Floyd County, seven miles northwest of Pikeville, Ky. In few places in this field is construction of so permanent a character or the mechanical detail carried to such a degree of refinement.

This property, comprising approximately 2,000 acres, lies on the east side of the Big Sandy River. Of this area, 1,400 acres is underlaid by two seams of coal of commercial value. These are known as the "Elkhorn" beds, no satisfactory correlation having been made between these measures and the coals of West Virginia and of other bituminous fields. In many respects, nevertheless, they correspond to the Kanawha River series.

These two measures are separated by a short interval, 40 to 70 ft. thick. They lie not far from water level. Consequently the coal area is not cut up by ravines into narrow fingers but is of such a shape that a regular system of mining can be adopted. The hills in this locality are broad and gently rounded, which accounts for the occurrence of a large unbroken tract of coal in a field where most of the bodies of coal are of such a shape that a simple mine layout is impossible.

The upper, or No. 3, seam, which is the one now being mined, has an average thickness of 5½ ft., as determined by careful drilling and prospecting made when the property was acquired. It is a high-volatile coal similar to those from the No. 2 Gas and Pond Creek seams of West Virginia, though lower in sulphur content and suitable for byproduct coking. The coal is fairly hard and stands preparation well.

The presence of two partings in the coal, the thickness of each averaging 3 in., makes mining difficult; these partings occur 15 in. and 36 in. respectively from the bottom. They are of hard blue shale and, though not difficult to remove from the coal, must be broken by a charge of explosive. This greatly increases the percentage of fine coal obtained. In some cases the top is a hard, evenly bedded shale; in others, and especially near the outcrop, it is soft and laminated with coal, which is unevenly bedded and filled with fossils.

The location of the property on the east side of the river made it necessary to construct a bridge and build



FIG. 1—RAILROAD BRIDGE CONSTRUCTED TO MINE

Our railroad work has passed the stage of wood. In the most remote sections of the country, railroad bridges, even when made for temporary use, are built on stone or concrete foundations and constructed of steel. But reasons seem always ready at hand for justifying the use of wood in mine structures. Is it really reason or merely habit?

*Resident Engineer, Pike Floyd Coal Co.

NOTE—The headpiece of this article illustrates the Betsy Layne tipple of the Pike Floyd Coal Co., Betsy Layne, Ky. No cars pass over any part of the trestle structure, nor is the trestle subjected to dumping strains. Note how firmly planted on the hillside is the dumphouse on the right and also how satisfactorily the belt conveyors lift the coal from a point below true tipple height to the elevation required. This plant is planned to dump 5,000 tons in a day. Note on the left the housing of the flight conveyor. This conveyor carries coal to the boiler room.

two miles of standard-gage road to connect with the Chesapeake & Ohio R.R., which is the outlet for this district. Because the railroads constantly tend to increase the size and weight of their coal-handling equipment, this bridge has been of heavier construction than present requirements would justify. It is composed of seven plate-girder spans with one 200-ft. through-truss span over the main channel.

The capacity of the yards is greater than is customary, as space is provided for 100 cars above and for an equal number below the tipple. Two systems of turnouts above the tipple permit the cars to be switched to any track; thus the equipment received can be sorted out to suit the day's loading and any particular size can be loaded into such equipment as the order specifies. In order to facilitate the movement of cars all loading tracks are constructed on a grade of not less than 1.14 per cent. Directly under the tipple the grade is increased to 1.75 per cent.

At the point where the coal lies at tipple height the valley has widened out to 380 ft. and divides the property approximately into two halves. These conditions favored the construction of one tipple which would handle the output of two mines, one on the north side and one on the south side of this valley. The plan thus offered was adopted and a twin tipple erected with a capacity to handle 300 tons per hour from each side, or a total of 5,000 tons per day. For an elevation of this two-unit tipple see Fig. 2.

As much of the coal goes to the domestic market, one of the major points considered in the design of this tipple was the elimination of all such equipment as would break the coal unnecessarily. In order to clarify my description I shall describe only one dumphouse and conveyor gallery, as the others on the opposite side of the valley are duplications of these. The wooden superstructure of the dumphouse rests on 16-in. basement walls of concrete in which are included a concrete receiving bin underneath the dumping floor. This heavy concrete foundation absorbs the shock of dumping so that it is not transmitted to the tipple structure.

By means of a crossover dump the coal is discharged into an 8-ton bin and is then fed by an apron feeder over a 1½-in. bar screen to a rubber-belt conveyor which carries it to the shaker screens on the tipple proper. The bar screen under the feeder separates the slack from the lump so that the former drops directly on an inclined pan discharging to the belt conveyor.

The coal which passes over the screen is discharged onto a rubber-belt picking table. Here two men are

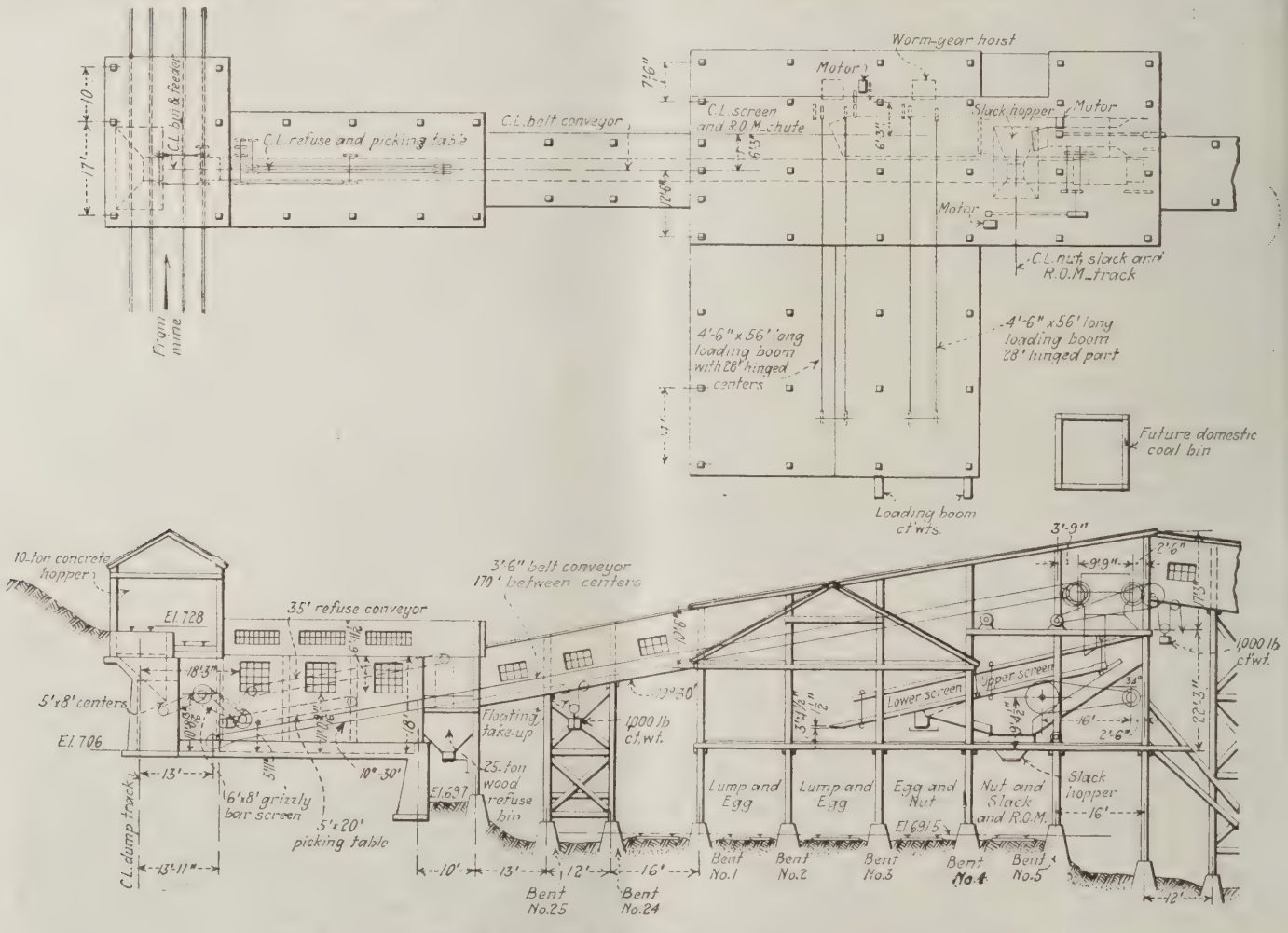


FIG. 2—PLAN AND ELEVATION OF A TWO-UNIT COAL TIPPLE AT THE PIKE FLOYD COAL CO.'S MINE, BETSY LAYNE, KY.

The tipple consists of the part over the railroad tracks and of the buildings at either end in which the preliminary dumping and cleaning is performed and the belts are loaded with the coal. These latter are almost exact duplicates, so only one is shown here. The coal lies almost at full tipple height in the hills on both sides of the valley where the dumping point has been established and the output from the mines is loaded into the cars on a single five-track yard. The dump cars do not go on to the tipple but are discharged by crossover dumps in dumphouses on either side. The coal falls into an 8-ton bin and is fed by an apron feeder over a bar screen. Whatever goes through passes to a long rubber-belt conveyor. The larger material goes to a rubber-belt picking table and receives at least a preliminary cleaning. Reaching the end of the table it is discharged onto the long rubber belt previously mentioned and passes to the part of the tipple over the railroad. The tipple is high, the comb of the roof being about 63 ft. above the top of the foundation and about 55½ ft. above the elevation of the track.

employed to clean the coal thoroughly before it reaches the center of the tipple, in the event that it is to be loaded as run-of-mine, or to give it a preliminary cleaning before it reaches the screens and picking tables above the railroad tracks in case sized coal is to be loaded. Above the picking table in the dumphouse is a scraper conveyor which discharges the refuse into a 25-ton wooden bin under which a mine track has been laid. Mine cars are spotted under the bin, and when loaded are hauled to a horn dump on the slate pile.

The conveyors which carry the coal from the dumphouse to the tipple proper are made up of six-ply rubber-composition belting 42 in. wide. When delivering their full capacity of 300 tons per hour each they run at a speed of 225 ft. per minute. The power cost of driving these conveyors is low. A 30-hp. motor drives each



FIG. 3—FEED-WATER HEATER AND STIRLING BOILERS

The Betsy Layne boiler house is equipped with two 270-hp. boilers, operating under a pressure of 300 lb. per square inch. The water for these boilers comes from the Big Sandy River, which is four-fifths of a mile away. It is delivered to the power plant by centrifugal pumps located in a submerged pumphouse.

belt. They are about 200 ft. long between centers and operate on a 7-deg. slope against the load. They require no attention other than the oiling of the idlers and pulleys. This is done by a man who looks after the operation of all tipple machinery and is responsible for its proper performance.

Leaving the belt the coal goes into a pocket, from which it may be diverted by a system of flygates to either of the screening rigs or to the run-of-mine chute, which leads directly to the railroad car. The fines are diverted and run back to be loaded into railroad cars through the run-of-mine chute. The egg and lump sizes go from the screens to loading booms having a 27-ft. table on the tipple deck for any further cleaning that is necessary. The distribution of the sizes and the combinations that may be obtained are best indicated by referring to Fig. 2.



FIG. 4—REPAIR HOUSE IS BUILT OF STEEL

Too many of the repair shops around mines are constructed of wood with a few small inadequate window lights. The form of building here illustrated is substantial, inexpensive and fireproof and adapts itself readily to adequate lighting. The main building houses the carpenter and blacksmith shops and the annex the electrical-repair shop.

The method by which power is distributed and the motors controlled in this tipple is of special interest. The main feeder leading from the power house comes to a panel at a central location. From this board independent circuits are carried to each motor, and switches and fuses for these circuits are mounted on the main switchboard. With such an installation it is unnecessary to stop the entire tipple should trouble occur on any one circuit. All motors are operated with automatic starters having remote control and may be started or stopped from the trimmers' platform. A system of pushbutton alarm signals also keeps the men on the trimmers' platform in touch with the dumphouse. This system provides a flexible control and eliminates the employment of men who otherwise would be required to look after the operation of motors.

Because the tipple is constructed of wood some adequate means of fire protection is imperative. The problem is solved by placing a 4-in. main up the center of the tipple from the boiler-feed pumps. From this main 2½-in. branch lines are taken to hose connections so distributed that any point of the structure can be reached. The tipple was erected and furnished by the Webster Mfg. Co., of Chicago, Ill.

Two 300-kw. units driven by Ball and Skinner engines generate a 275-volt direct current which is used throughout the operation for light and power. The generators were designed for 575 volts, but the armatures were



FIG. 5—UNUSUALLY WELL-LIGHTED REPAIR SHOP

Quite in contrast with the dingy workshop at the average coal mine but wholly in keeping with modern factory-building practice in the matter of lighting is the repair shop of the Betsy Layne mine.



FIG. 6—BATHHOUSE WITH SHOWERS

This building is supplied with heated air. The clothes are not suspended from the roof but are kept in lockers. The floor is of concrete as also is the wash trough. In this building are ten showers and thirty-two wash faucets.

rewound for 275 volts and the fields reconnected in multiple.

The original intention was to equip this plant with turbine units, and the boiler equipment was put in with this idea in mind. The installation is provided with two Stirling-type boilers each of 270 hp. The boiler pressure is 300 lb. per square inch. The feed-water piping is so arranged that either of the two pumps which are installed can supply hot or cold water to the fire line on the tipple.

Feed water is obtained from the Big Sandy River, which lies at a distance of 4,200 ft. It is pumped by two De Laval double-stage centrifugal pumps located in a concrete dry well at the river bank. These deliver water to a 60,000-gallon steel tank at the power house which is elevated on steel legs 40 ft. above ground level. The pumps each have a capacity of 125 gallons per minute, work against a discharge head of approximately 145 ft. and are driven by 20-hp. motors equipped with remote control starters which can be operated from a switch panel in the power house.

Pump Room Set Below Level of Water Supply

In order to have the pumps properly primed at all times they are set below the level of the water in the river. Thus installed the well would be flooded should the pumps leak. To guard against this contingency a float switch is installed in a small sump within the well. Then if the water rises to a certain height the switch closes an independent circuit which passes through a lamp on the switchboard in the power house. When by reason of the current the lamp is ignited the engineer is warned and the pump can be shut down and repaired before serious damage is done.

The coal supplied to the power house is dropped from the tipple by means of a chute coming from under the 1½-in. screen. It is then transported by a small flight-conveyor to two 25-ton cylindrical hoppers in the boiler room. The boilers are fired by hand.

The switchboard in the generator room has eleven separate panels which give the following independent circuits: trolley, machine-feeder, fan, tipple, river pumps, street lights and house lights. Each panel is equipped with ammeters and automatic circuit breakers; the generator panels also have voltmeters and an under-voltage release.

Though the first cost of such a system of distribution is high, much is saved by the early detection and localizing of short-circuits, especially when the plant is of the size of that herein described. The system is further carried out in the mine by sectionalizing all branch feed-

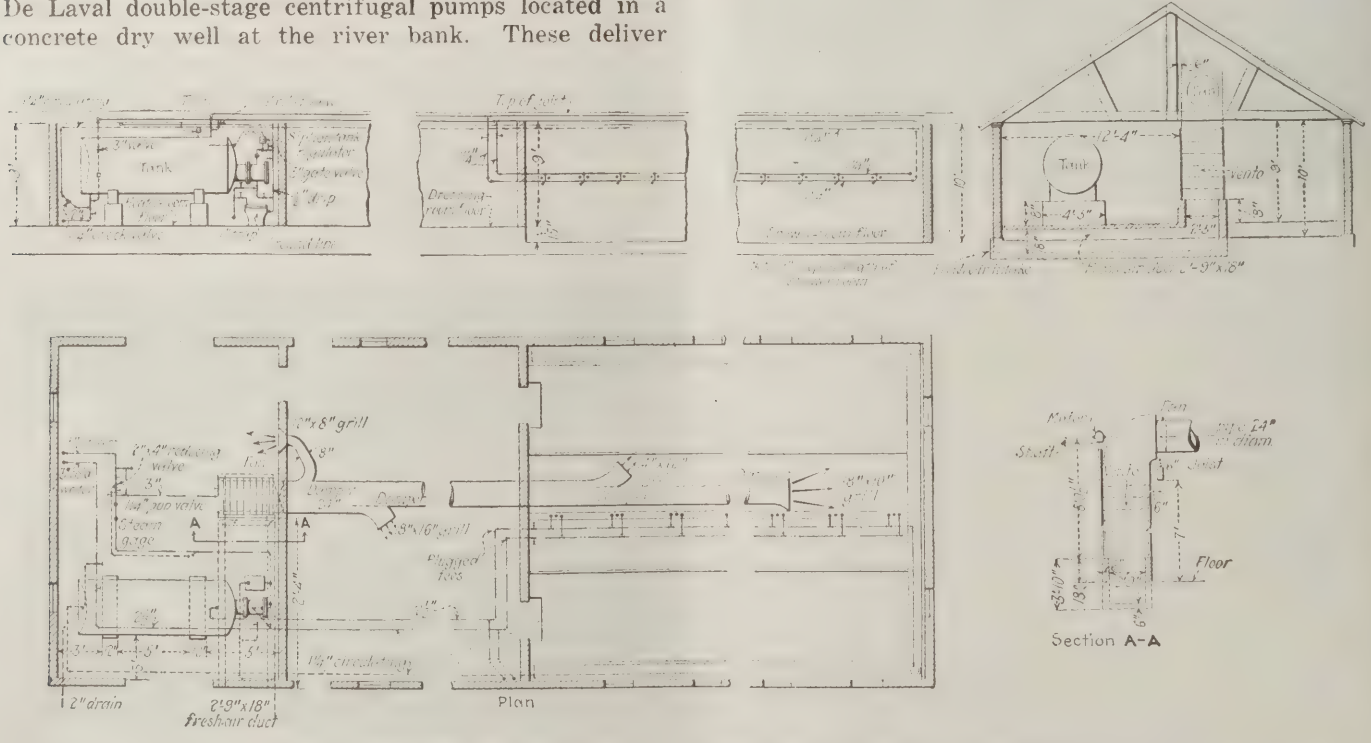


FIG. 7—SYSTEM OF HEATING OF BATHHOUSE AT BETSY LAYNE, KY.

An air intake under the floor measuring 33 x 18 in. encircles coils filled with exhaust steam from the power house. This heats the ventilating current. The warm air is then forced into an overhead air duct which discharges into the locker or shower rooms. Thus the bathhouse is under a pressure of air, and when the doors are opened the air tends to escape, whereas in most bathhouses the air enters in copious measure whenever the doors are opened, that being inevitable where the air in the bathroom is at a lower pressure than that outside. No cry is more frequent around a bathhouse than "keep that door closed."

ers and trolley circuits. In carrying direct current at this voltage over the distance required at this operation the system of distribution just mentioned is aided by the proper suspension of lines and efficient bonding, which aid in insuring continuity of service. Particular attention is paid to return lines, negative lines of 750,000 c.m. cross section being carried to the generators from a point in the mine track not far distant from the drift mouth.

The building which houses the machine, electrical-repair, carpenter and blacksmith shops is shown in Fig. 4. It is a standard Truscon steel-and-glass structure of saw-tooth design. The merits of this type of building are its low first cost and the short time required for erection; this particular building was completed in less than two weeks. It is fireproof and the large area of sash assures an abundance of light. Because of the isolated location of this plant the shop is prepared to take care of all electrical and mechanical repairs. The machinery is driven by one electrically-driven line shaft and all belts are protected by wooden guards.

The bathhouse is a frame building which is heated by a Vento heater utilizing the exhaust steam from the power house. As indicated in Fig. 7, an air intake under the floor encircles the steam coils, which thereby heat the air by which the building is ventilated. The dry warm air is then drawn into an overhead air duct which discharges into the locker and shower rooms.

Fig. 8 is a map of the territory surrounding the mine plant on which are shown the buildings and the mine



FIG. 8—MINING PLAN AND SURFACE LAYOUT

Not all the houses are shown, two small groups being at the head of Tuscaroare branch, one up each fork. The long easy curves of 200-ft. radius used at this mine for underground roadways are much in evidence. Unfortunately, the fossily roof is too weak to hold up over the places in the headings where such long curves fork and in future the curves in the outgoing tracks will be made shorter, evidences of that intention being seen in the more remote workings of the mine.



FIG. 9—WELL TRIMMED TWELVE-FOOT ROADWAY WITH HALF-INCH GUNITE COATING ON ROOF

Gunite not only covers the roof but is carried down the coal rib as shown. Of all roofs few are more trying then one filled with coal and especially fossil ferns. This roof is of that character. The cemented roof not only does not fall but keeps up the trolley wire. When the number of fires resulting from fallen trolley and other electric wires is considered the advantage of such guniting becomes the more evident. A little work of this kind may be looked upon as insurance against electric fires. It also reduces the hazard consequent on the use of timber for mine supports and serves to make the illumination of the roadways more effective.

layout. The tentative system of development may be changed at a later date if conditions warrant a change. As already stated, the roof of these mines is a blue shale, full of fossils and laminated with coal. This top is readily slacked by the air current, and for this reason the practice of driving double-track rooms, 30 ft. in width, was abandoned in favor of the 25-ft. single-track room shown in the illustration.

This top also prohibited driving curves of 200-ft. radius at the mouth of each butt, which was the practice first adopted. With a curve of this length the unsupported span was too wide at the point where the entries diverge, and the increased efficiency in the haulage was not sufficient to justify the expenditure for elaborate steel timbering.

To overcome these difficulties with the mine roof a cement gun was installed, and gunite is used on all main haulageways and entries wherever they are not subject to excessive weight such as will bring down the roof. On some of the entries the gunite has been in place more than four months and has so far checked cutting and weathering actions. In this case it is cheaper in first cost than timber and it saves maintenance charges by preventing the scaling and spawling of rock and the expense entailed in cleaning up the roadways thus encumbered. Furthermore, the trolley wire no longer comes down. The coating applied is about $\frac{1}{2}$ in. thick and costs approximately 80c. per linear foot in a 12-ft. entry. The type of stopping used on all permanent entries is constructed of 8x8x20 in. concrete blocks laid up in cement mortar, as shown in Fig. 10. The sides are hitched into the ribs and plastered. Gunite is used to seal the top and sides. This coating is extended if necessary from 12 to 18 in. each way from the edges of the stopping. This eliminates the possibility of small leaks.

Concrete Stopping Blocks Made at Mine

The concrete blocks are made at the plant by day laborers who use a machine designed to facilitate their construction, and thus far the only aggregate used has been the fine coal recovered from the stockpiles which accumulated when the mines were first opened. These blocks were given thorough tests to determine whether the coal aggregate would lower their fire-resistance. It was discovered as a result of these experiments that the



FIG. 10—CEMENT-BLOCK STOPPING WITH GUNITE EDGES
Though the Betsy Layne mine is just starting, it is not handicapped by poor stoppings which will leak and soon rot and have to be replaced by something tighter and more permanent. The weak point in most stoppings is around the edges. Even a cement stopping may fail here. With gunite, not only are the cracks between the stopping and the roof and sides calked but the natural or developed cracks through the roof and the pillars can be entirely shut off if the gunite is carried far enough.

blocks in which coal had been used in place of gravel would resist fire as readily as if gravel were used.

Each mine is ventilated by a 3x8-ft. centrifugal fan which is rated at 120,000 cu.ft. against a 3-in. water gage. It is driven by a 35-hp. motor equipped with a remote-control starter and a field rheostat which is used at present to reduce the speed into keeping with the limited area of the workings. This rheostat is mounted on a panel which also has an automatic circuit breaker and an undervoltage release. The fan is equipped with explosion doors and is housed in a brick and concrete building.

The coal is undercut by shortwall machines and the haulage equipment consists of 4-ton cable-reel gathering locomotives and 13-ton haulage locomotives. The mine cars are of 2½-ton capacity and are equipped with roller bearings. All main haulroads are laid with 40-lb. and the butt entries and rooms with 20-lb. steel. No. 5 turnouts with cast frogs are used for main-haulage roads and No. 3 turnouts have been adopted as standard for rooms and secondary haulageways.

At this time development has not progressed far enough to connect the North and South mines underground. In order to get machinery and equipment from the South mine for repairs and to permit the refuse from both mines to be handled over one dump, the outside tramroads on each side are connected by a steel



FIG. 11—MINE SHOWING STEEL CONNECTING TRESTLE
As the North and South mines are not yet connected and as any connection will be quite roundabout a steel trestle has been built connecting the mines, making it possible to take cars, locomotives, mining machines and other equipment to the repair shop and to discharge all refuse over one dump.

trestle which crosses over the railroad tracks. This trestle is designed for a load of 50,000 lb. and carries a walkway in addition to the track. The bents of the trestle are constructed of 12-in. I-beams set on a batter. They are spaced on 20-ft. centers though there is one span of 30 ft. The bents are tied together with angle-irons. The deck is composed of 18-in. I-beams with diagonal bracing and struts. The trestle floor is supported over the 30-ft. interval by 20-in. I-beams.

The management aimed to have the mechanical and electrical equipment complete in every detail and to install this quipment in such a manner that the expense for upkeep and repairs would be a minimum. As far as is possible under the conditions to be met the surface plant has been concentrated so as to simplify the problem of supervision and to eliminate all needless expense in the hauling of coal and the handling of supplies. By careful development and a concentration of the mine workings the mine equipment can be made to operate with maximum efficiency, thereby furnishing a large tonnage at a low cost.

Manufactured Fuel Valued at $3,178,000 Produced in 1921 by 14 Plants

THE value of products of establishments engaged primarily in the manufacture of fuel, according to reports made to the Bureau of the Census, the Department of Commerce announces, amounted to $3,178,000 in 1921, as compared with $1,974,000 in 1919, and $863,000 in 1914, an increase of 61 per cent from 1919 to 1921, and of 268.2 per cent for the seven-year period 1914 to 1921. The industry includes establishments engaged in the manufacture of briquets from bituminous coal and anthracite dust mixed with tar and pitch as a binder; a composition of charcoal, pitch, tar and soda; also fuels made of crude oil and sawdust, etc. Of the 14 establishments reporting in 1921, 2 each were located in Indiana, New York, Pennsylvania, Virginia and Wisconsin, and 1 each in California, Missouri, New Jersey and Washington.

In January, the month of maximum employment, 440 wage earners were reported, and in April, the month of minimum employment, 284, the minimum representing 64.5 per cent of the maximum. The average number employed during 1921 was 371 as compared with 171 in 1919. The statistics for 1921, 1919 and 1914 are summarized in the following statement; the figures for 1921 are preliminary and subject to such change and correction as may be found necessary from a further examination of the original reports:

	1921	1919	1914
Number of establishments	14	11	14
Persons engaged	464	228	174
Proprietors and firm members	3	.....	4
Salaried employees	90	57	29
Wage earners (average number)	371	171	141
Salaries and wages	$721,000	$356,000	$143,000
Salaries	237,000	134,000	31,000
Wages	484,000	222,000	112,000
Cost of materials	2,280,000	1,386,000	609,000
Value of products	3,178,000	1,974,000	863,000
Value added by manufacture[1]	898,000	588,000	254,000

[1] Value of products less cost of materials.

IN CO-OPERATION WITH the Combustion Engineering Corporation, tests are to be conducted by the U. S. Bureau of Mines at the River Rouge plant of the Ford Motor Co. on the largest boilers so far constructed. These tests will supplement the knowledge gained in previous tests on differently designed boilers when heated by powdered coal.

Blowouts in Belgian Coal Seams and the Way in Which These and Like Phenomena May Be Explained

Seams Which Sing and "Walk"—Morin's Theory of Expansion of Coal—Preliminary Warnings — Bumps, Vibrations and Breaking of Timbers — First and Second Winds—Grappe Blowout and Explosion—Ruelle's Polymerization Theory

By F. C. Cornet.*
New York City

THERE may be much that is not novel in the following article, but it contains also a few facts that are not as generally known as they should be. I mean especially L. Morin's theory of seam expansion and H. Ruelle's hypothesis of methane polymerization.

Morin is a Frenchman; Ruelle is a Belgian. The former is chief engineer for the Lievin Coal Mining Co., of France; the latter occupies the same position with the Houssu division of the Ressaix Coal Co., of Belgium. In those countries, where only duly qualified mining engineers are employed in any position of responsibility in or around mines, the chief engineer always is the operating manager, having full charge of everything except the sales department.

With both Morin and Ruelle blowouts are a matter of hourly concern, their respective mines experiencing in the course of the year scores of such manifestations. The precautions which rendered the mining of other seams that were subject to blowouts comparatively safe failed so completely to protect the miners in the Houssu mines of the Ressaix Coal Co. that for many years these workings could not be operated. As a result of Morin's investigations new safety measures have been put in force which make the working of these abandoned seams reasonably safe.

It is due to such men as Ruelle and Morin, who have spent their whole business life in daily contact with the operation of seams of this kind, studying their frequent manifestations under their different aspects and applying continuously new preventive measures based on knowledge thus gained day by day, that it is now possible to mine, with profit and little loss of life, coal beds that only a few years ago were shunned by even the most enterprising and daring of coal-mining men.

Belgians Drive Tunnels from Hoisting Shaft

In Belgium, where the coal measures pitch at all kinds of angles (see illustration), the coal seams are entered through tunnels driven from the hoisting shaft. These tunnels are excavated across the strata on an upgrade such as will insure drainage and facilitate the haulage of loaded cars. The Belgian terms such a tunnel a *bouveau*.

We will suppose that a *bouveau* is being driven through the measures to top beds which are subject to blowouts, these beds being found only in the deeper measures at the base of the coal-bearing formation. On such a *bouveau* reaching a seam, the gas in the latter—that is, the methane it contains—begins to issue from the coal with a rustling noise called the "song of the seam" (*le chant de la veine*). As the *bouveau* drives through the seam, the latter, becoming freer and freer, immediately starts to expand into the empty space thus afforded.

The coal thereby loses some of its cohesion and lustrous appearance, the movement and the release of pressure modifying the condition of the coal from a depth varying from less than an inch to possibly 2 ft., depending on whether the seam is hard or soft, but without any regard to the quantity of gas per cubic foot of coal that the seam may contain. Two seams may be equally gaseous, but while the harder one will perhaps be altered to a depth of less than an inch, the softer one will soften and discolor for a depth of perhaps 2 ft. all around the opening which the *bouveau* makes in the seam. But no matter how deeply or how shallowly the coal may be affected, if the softened coal be dug out, the alteration in both color and cohesion will progress further into the solid.

Soon after the *bouveau* reaches the far side of the seam the latter ceases to expand. The cessation of expansion always coincides with a marked decrease in the emission of gas. The seam does not cease to emit gas, however, until some time thereafter. The period of time during which the emission continues at the abated rate is short where the seam is hard and difficult to mine. It is much longer when the seam is soft and is dug with ease, this, despite the fact that both seams may be equally gaseous—that is, contain the same amount of gas per cubic foot of coal.

Expansion Continues as Long as Face Is Worked

In regular mining operations, the same results are obtained. The only difference is that they take place on a much larger scale, in proportion to the development of the workings and the rate at which the faces are driven. It may be said that the expansion of the seam never ceases so long as the faces continue to be worked. The expansion of the coal bed when intersected by a *bouveau* is almost inappreciable in linear extent, but it becomes plainly visible in regular workings, where whole longwall faces may sometimes be found in the morning to have advanced—that is, expanded—several inches over night. On noticing this when they come to work in the morning, the men say: "the seam has walked" (*la veine a marché*).

When workings for any reason are stopped for a sufficient length of time, there is at first no marked decrease of gas emission, and there is none until the expansion has run its course. In the case of extensive workings this may take weeks if the seam is a soft one. After expansion ceases, gas, especially in the case of a soft seam, may continue to issue from the workings, but at a reduced and continuously decreasing rate.

The seam often expands suddenly. When it does, a rumbling sound like that of underground thunder makes itself heard. This sound is always accompanied by a concussion, plainly felt in the coal and adjoining strata. Simultaneously the coal is loosened at the face. Clouds

*Consulting Engineer.

of dust obscure the lights. The timbers suffer considerably from crushing. If one happens to lean against the coal or has his hand on the roof above, he feels a distinct shock, as he does under his feet. Extraordinary quantities of gas flood the return airways. The latter fact does not permit us to doubt that a close relationship exists between a sudden expansion and an extraordinary gas emission.

Until about ten years ago the majority of Belgian and French mining men were of the opinion that what has since come to be called seam expansion resulted from the action of high-pressure gas forcing its way in great abundance through the coal. This idea has gradually ceased to prevail since Morin published the result of his extensive research work concerning the effects of pressure on deep coal deposits. (See Bulletin de l'Industrie Minérale, Paris, December, 1912.)

Firm Coal Emits Gas Readily

It is a fact that in all cases where a uniformly gaseous seam contains zones of easily mined coal and others where the coal is hard, the coal of the firm description always emits its gas readily, none or practically none of it being found in the mined product reaching daylight. Not so with the other kind of coal; it retains its gas so tightly that days, weeks and even months may pass before it sheds the last of it. If, however, the latter coal be submitted to crushing, the gas it retains so tightly is emitted. It all comes out promptly if the grinding is sufficiently thorough.

This Morin proved. He took 4 kg. of hard, gaseous, freshly mined coal and submitted it to three successive grindings each of two hours' duration. During the first grinding, the coal emitted 13.683 liters of methane. The second and third operations yielded 2.302 liters and 1.660 liters, respectively, of the same gas. The total gas collected was 17.645 liters, making 4.410 liters per kilogram of coal. This is equivalent to 122 cu.in. of gas per pound of coal. Or, putting it otherwise, every cubic inch of that coal yielded practically 6 cu.in. of methane.

Easily mined coal, which is coal lacking in cohesion, is really crushed or expanded coal. Consequently Morin's tests indicate that coal must be expanded to cause it to yield its gas promptly. Hence the theory that the emission of gas causes expansion is no longer defensible.

Gas Pockets Are a Myth

Another ancient theory, the oldest of them all, I think, that gas stored under pressure in underground pockets is the cause of what is now known as seam expansion, was discarded long ago. No such pockets have ever been found, and none of the hundreds of blowouts that have occurred in Belgium has ever disclosed empty spaces larger than could be accounted for by the quantity of solid material which is ejected with the gas.

Sudden expansion and its accompaniment of underground thunder and timber crushing are far from being unknown in non-gaseous seams. But, beyond material damage and scaring timid souls, they do no harm. In seams subject to blowouts, sudden expansion always is an ominous sign, for it may be the beginning of a disastrous, death-dealing gas outburst. The subterranean noise, the breaking of the timbers, the jolt the men get from the strata, are a signal for everybody to seek safety by the shortest possible route.

Of the hundreds of blowouts concerning which survivors have been able to give detailed and reliable evidence, there is no record of a single one having failed to announce its imminence in the same way. Many are the men who, having gone several times through the same kind of experience, can remain sufficiently cool in the presence of danger to notice and remember what takes place. The cracking of the timbers has never failed to be reported as being simultaneous with the underground thunder. Scores of men have reported seeing the faces advance bodily toward them. Several have compared the coal thus moving to coke issuing from a byproduct oven, a natural comparison for men to make who, in many cases have to cross coke yards in going to and from work.

When a blowout occurs it follows the sudden expansion of the seam by only a few seconds. But, short as may be the notice given, it has saved thousands of lives in those Belgian collieries classed by that country's Department of Mines as being of the "third category." In this list are placed exclusively the mines operating in the group of seams that are subject to blowouts.

In all the mines of the third category auger holes varying in diameter from 2 to 3 in. are drilled in the solid ahead of the face. This is done to investigate the condition of the seam and to drain it at the same time of at least some of its gas.

Cleavage Joints Contain Gas

When a borehole is drilled across the joints of cleavage the reaching of every one of these joints by the auger is marked at the mouth of the hole by a puff of gas the strength and volume of which increases from cleavage to cleavage as the hole grows deeper, ending often by being strong enough to blow the dust produced by the auger 20 or 30 ft. to the rear.

When the hole is so placed and so directed that it runs between cleavages without running into any, the drillhole may be completed without the detection of gas. Sometimes the auger will run into coal so soft that drilling becomes surprisingly easy and rapid. In such cases, the gas always blows out of the borehole in great abundance and with terrific force.

A hole of this kind either stops itself promptly by caving or grows rapidly to a large diameter, reaching sometimes 15 or 20 in. or more and violently ejecting at the same time large quantities of fine coal and dirt together with large volumes of gas. This indicates that the coal has lost much of its cohesion, that the seam has suffered from crushing and that perhaps the coal was still being crushed at the time the hole was drilled. The crushing stage reached by the seam is indicated by the more or less fine condition of the solid materials ejected.

From the facts mentioned above as well as from others that will appear later the opinion now prevails among Belgian mining men that methane is present under two different conditions in all coal seams subject to blowouts:

First, as a free gas confined under more or less considerable pressure in the joints of cleavage, fissures and other empty mechanical spaces existing in the seam; second, under a special form making it, so to say, a part of the coal itself. This form, of which more will be said later, might be termed "latent methane." This is the gas that only expansion of the coal will liberate.

Whatever be the exact form under which latent methane exists in the coal, it seems safe to assume that it is one that is unstable except at pressures above that of the atmosphere. It also seems certain that the critical pressure of latent methane (the pressure at which, for such temperatures as rule in the coal, latent methane

becomes free methane) is inferior to 42.5 atmospheres, which is the highest pressure ever recorded in Belgian seams subject to blowouts. This pressure was recorded by V. Watteyne and A. Macquet in the "Mouton" bed, at the Bellevue Shaft, in the Mons district of Belgium.

That the pressure is no higher disposes of a theory still given credence by some on both sides of the Atlantic. This theory is that latent methane is that gas in liquid form. Under such pressure as 42.5 atmospheres methane cannot exist in a liquid state except at the low temperature of —100 deg. C. (—148 deg. F.) The temperature of the coal measures in Belgian mines of the third category is certainly not less than 28 deg. C. (82.4 deg. F.), a temperature at which methane will not turn liquid unless subjected to a pressure of 350 atmospheres.

That which happens when a borehole reaches a body of crushed coal brings to the mind the well-known example of water at high temperature in a boiler. Vaporization stops when the pressure corresponding to the temperature of the boiler is reached. This pressure is called the critical pressure of water for the temperature considered. Now, if without changing this temperature, whatever it may be, a hole of small diameter be drilled through the side of the boiler, an emission of steam mixed with water will take place. Similarly, when a borehole penetrates a crushed part of a seam, gas is ejected mixed with fine coal and dirt.

To push the analogy further it may be remarked that, just as the escape of steam and water lowers the pressure in the boiler and re-establishes vaporization, so the discharge of gas, coal and dirt through the borehole lowers the pressure in the zone affected by the drilling below the point at which latent methane will become unstable at the temperature of the seam. All latent methane thus affected becomes free methane, which in turn in forcing its way through the borehole carries along with it some of the coal and slate of the zone from which it comes.

We all know that when for some accidental reason vaporization in a boiler becomes instantaneous, great mechanical forces come into play. It requires no great stretch of the imagination to understand that powerful mechanical effects similar to these are bound to result when in a large area of crushed coal, the ruling pressure falls everywhere at once sufficiently to permit all the latent methane present to become free methane. For this to happen the barrier of coal separating the mine workings from the high-pressure area of crushed coal must fail suddenly just as the shell of the boiler must fail if an explosion is to occur.

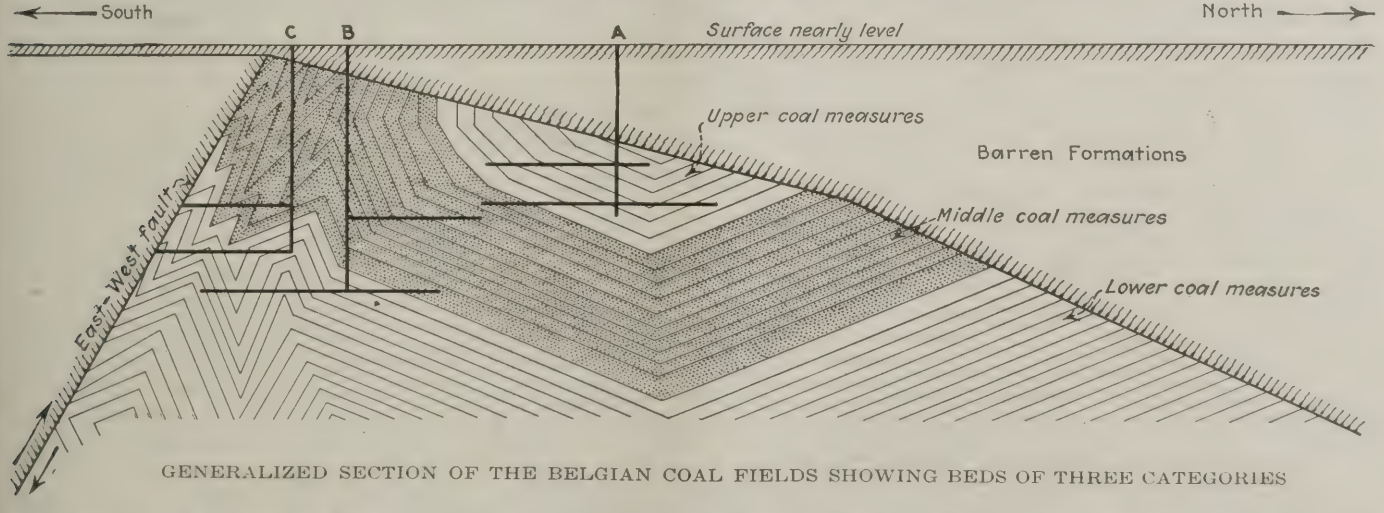
Many years ago the analogy between a boiler explosion and a mine blowout was used as the foundation for a theory that the later is in reality a case of instantaneous vaporization of liquid methane. This theory, however, was disproved, when it was shown, as previously explained, that methane cannot exist in a liquid state in seams subject to blowouts.

It is the pressure of the strata that causes a seam to expand. This pressure depends on the depth at which the seam is operated and the state of tension existing in the strata, including the seam, as a result of past geologic upheavals. What these disturbances have, in some typical cases done to the coal measures of Belgium is shown in the geologic section illustrating this article.

Uneven Geologic Pressures Have Existed

It makes evident the topsy-turvy conditions that predominate in those part of the Belgian coal fields where up to the present time, the seams subject to blowouts have been exclusively operated. The greater depths—4,000 ft. or more below the surface—where the same seams are expected to be found in regular formation have only just been reached.

Looking at the illustration it is not difficult to understand that some of these areas in the past may have been submitted to greater pressures that others. Even at the present time it is a fact of daily observation that there are in all seams subject to blowouts areas still under pressures that are entirely out of proportion to the weight of the overlying strata. This explains why



GENERALIZED SECTION OF THE BELGIAN COAL FIELDS SHOWING BEDS OF THREE CATEGORIES

Seams which do not generate gas are in the first category. Those in the second category generate gas but do not have blowouts. Those in the third category have blowouts and, of course, generate gas. The upper coal measures consist of thirty-five seams and are non-gaseous. In the illustration they are unstippled. The middle coal measures are all gaseous with the quality progressing with geologic depth. They number in all some eighty seams. These seams, which belong to the second category, are stippled in the illustration. The Lower Coal Measures likewise are not stippled in the illustration. All of them probably belong to the third category, though in what are known as the "flats," where the measures are not badly disturbed, blowouts may be less frequent. As these seams have not been extensively worked their number is unkown. It is, however, large. In shaft A, *bouveaux* have been driven at two levels. The upper-level workings are all in the first category, the lower-level workings to the north and part of those to the south being in seams of the first category. Some, however, are in the second category, having extended to the middle coal measures. In shaft B the workings on the *bouveaux* to the south are all gaseous but have no blowouts. Those connected to lower *bouveaux*, north and south, are nearly all subject to blowouts. In shaft C the *bouveaux* both run to the south and largely tap seams subject to blowouts, the lower *bouveaux* developing, however, none but seams of the third category. The folds in the seams to the south, badly contorted as they appear to be, are actually even more severely folded than the illustration shows, for the folds instead of being simple, as portrayed, have minor irregularities that the illustrator has not introduced because they are almost too small for portrayal, though they add greatly to the difficulties in operation.

in seams subject to blowouts the cohesion of the coal varies widely from one area to another. While in one area the coal may have remained comparatively hard, in the next it may have been pulverized so completely that, to use the miners' expression, "it runs like water." Any degree of crushing between these two conditions may be met in any area.

It is not uncommon at all for a *bouveau* to tap a seam at some point of an area sufficiently crushed for a blowout to take place then and there. It is not even always necessary in such a case actually to reach the seam before the interruption starts. I remember an occasion most vividly, probably because it was my first experience of the kind, when the face of a *bouveau* gave out without any of the holes bored ahead having touched the seam, although when I measured them barely two minutes before, the length of none of them was shorter than 3 m., or practically 10 ft. The seam, where it was struck by the *bouveau*, was practically vertical and the roadway intersected it at right angles.

I also remember a case, although I did not happen to be in the mine when it occurred, where after four boreholes had reached the seam at depths between 9 and 11 ft. a blowout occurred while the fifth and sixth holes were being drilled.

Many instances of blowouts occurring at the faces of *bouveaux* have been recorded. In every such case the usual eruption of gas mixed with fine coal and slate was preceded by the familiar underground thunder and the crushing of timbers.

In regular mine workings, in areas where the coal has remained hard or has not been badly crushed, conditions generally will remain reasonably safe so long as the faces do not reach too close to a dangerously crushed zone. Boreholes driven sometimes 10 m. (33 ft.) ahead have, so far, proved the best means of ascertaining the closeness of danger, although such holes have long ago demonstrated their uselessness for gas drainage purposes. Nor must one rely too much on the margin of safety which boreholes may seem to indicate. Boreholes 2 in. in diameter showing no activity at all in the morning, before the day shift goes home may blow gas in torrents and dust by the ton through openings enlarged to 15 or 20 in., and this may occur even without the holes having been drilled deeper in the meantime.

Squeeze Started Blowing

This probably is due to the fact that the boreholes in the first instance had reached close to a zone of badly crushed coal, that the barrier of safe coal remaining ahead of the men, critically thin and weak anyhow, was by the day's work further weakened and brought to a point where it ceased to offer sufficient resistance to the crushing action of the strata. A partial squeeze resulted that caused the dangerously crushed zone to grow sufficiently in extent to reach the inside ends of the boreholes, causing these to blow.

Eruptions of this kind follow by a short interval the usual thundering noise and cracking of timbers. The men flee in haste, although what is left of the barrier of safe coal sometimes resists until the fury of the manifestation has spent itself, which may take days, during which a large tonnage of fine coal and dirt will accumulate in the workings.

The results are much worse when the barrier of safe coal succumbs entirely to a squeeze. Then what constituted the barrier becomes as badly crushed as the zone immediately ahead, becomes in fact one with the said zone. Under the now unopposed action of the strata compressing it the whole body of crushed coal expands into the workings. The pressure ruling in the freed, nearly fluid mass drops suddenly to that of the mine, causing the latent methane in that mass to become free methane with a rapidity that reasonably can be termed instantaneous.

I have laid emphasis on the subterranean, thunderlike noise and the crushing of timbers that never fail to announce the imminence of a blowout because they afford proof of a sudden increase in the pressure of the strata. This augmentation in the stress results in the final expansion of the seam and this in turn creates the blowout. All mining men know that what I have designated as underground thunder means a settling of the strata. The breaking of the crossbars and the bending of the props mean that the strata in settling bear directly upon the workings and the seam.

Considering the topsy-turvy lay of the strata, the sudden settling that takes place may as well originate in the floor as in the roof side, or it may come from both sides at once. It matters little which, for the results are the same. At any rate only a guess could be made as to the source of the pressure, especially as the natural floor may be over the roof in some instances. The seams pitch at all possible angles from level to plumb vertical, the roof being as often under as above the men's feet, a fact that causes Belgian mining men to use one or the other term, geologic floor or mine floor, depending on the idea they wish to convey. For the same reason they differentiate also between geologic roof and mine roof.

A Squeeze Sometimes Starts from Below

That the sudden squeeze of the strata often proceeds from below is proved by countless instances of rocks being dislodged from the mine floor and thrown clear above it, only to be carried laterally sometimes for long distances by the force of the hurricane coming out of the seam. It must not be thought that the rocks thus carried far from their original locations are always small chunks of slate or sandrock. Masses weighing tons quite often are found to have been projected out of the mine floor and carried laterally over considerable distances.

A case in point I well remember. It occurred when, in 1896, I was visiting my old Belgian home. A block of sandrock found by measurement to weigh 3,700 kg. (more than 8,000 lb.) was thrown out of the mine pavement and carried up a 39-deg. incline, a distance of 10.5 m. (34.5 ft.) measured horizontally. This blowout occurred at the face of a slope in the coal at the Bellevue Shaft in the Mons district of Belgium.

The projection of rocks, large or small, out of the mine floor proves that the sudden squeeze of the workings and seam may come from below as well as from above. As such rocks could not be carried laterally by the blowout or any other agency unless first lifted above the mine pavement, it is clear that the lifting of the rock precedes the blowout. As the former is due to the same cause and occurs at the same time as the final crushing or expansion of the seam, it shows that the expansion precedes the blowout and is not the result of it, as was the general belief only a few short years ago.

The breaking of timbers and underground thunder are always accompanied by a puff of wind the intensity of which depends on the extent of the workings affected

by the sudden squeeze. This puff, called by the men "the first wind," is another phenomenon which the survivors always mention. It evidently is due to the sudden compression of the mine air by the squeezing of the measures.

Following on this comes the "second wind," which is incomparably stronger than the first and which is generally reported by the last of the fleeing men as coinciding with the report made by the final annihilation of the barrier of safe coal. The second wind, however, travels faster than the sound of the blowout itself. When giving their evidence as to what happened the men working at the shaft landing generally are unanimous in saying that they felt the second wind quite an appreciable time before hearing the report of the blowout.

The cagers often feel the second wind, despite the fact that, by reason of their distance from the seat of the blowout, they may fail to hear the sinister sound which accompanies it. This is interesting for in order to reach the hoisting shaft, which in Belgium is always the downcast, the second wind must be powerful enough to overcome the action of the fan.

Gas Traveled Back Against Air

In a number of instances the pull of the fan did not prevent a torrent of dustladen gas from reaching and ascending the hoisting shaft. Of course, a similar stream passes out by way of the upcast and through the fan. In 1879, when I was only a boy, an outburst occurred practically across the street from my Belgian home, and No. 2 Shaft of Agrappe colliery, Mons district, Belgium. To this day this disaster has remained unparalleled, at least in Belgium.

Perhaps on account of its strikingly spectacular features and the excitement it created, it gave a much-needed impetus to the study of blowouts and of the means by which they may be prevented or, at least, made less disastrous to life and property. Although ever since 1847 blowouts had occurred now and then in Belgian mines, they never had attracted much public attention, probably because the public was not allowed to learn much about them. Those were the days of conservative journalism in Belgium.

In the case of the Agrappe blowout streams of gas and dust ascended both the hoisting and fan shafts simultaneously. As usual at the time, the headframe and hoisting engine were in a large one-room brick building the walls of which were some 4 ft. thick at the base and not less than 2-brick thick under the eaves. In winter the place was carefully closed against the weather, except for a pair of openings in an iron floor, through which the coal was dumped onto the screens. These passages served as inlets for the air being drawn through the mine by the fan.

The day was cold. An immense coal fire was burning in a monumental fireplace behind the engineer's seat. No one who was unlucky enough to be in the building on that day came out alive. It is easy, nevertheless, to understand what took place in that engine house. The gas pouring out of the shaft spread rapidly through the almost tightly closed building, mixing with the air and finally igniting at the open fire. The building blew up like a bomb, gas at the mouth of the shaft, the diameter of which was 18 ft., continuing thereafter to blaze, as illuminating gas burns at the tip of a burner.

Burning more fiercely and brightly as it went up further and found more air, the immense gas jet sometimes reached a height of 200 ft., dying down only to ascend again after a few seconds, making all the time a tremendous roar and exploding at short intervals, with terrific violence and with a noise that could be heard for miles. The flame and especially the black clouds of dust that went with it were visible from the City of Mons. After two hours the great gas jet suddenly ceased to burn. The torrent of gas, however, continued to roar for five hours longer, throwing high into the air clouds of dust of varying blackness and thickness, and at intervals pieces of clothing and harness, fragments of mine cars and doors.

A large Guibal fan was used to ventilate the mine. The top of its chimney was only a few yards from the hoisting building. When the latter was demolished by the explosion, the gas pouring out of the chimney ignited, and another explosion occurred that put the fan out of commission. No more flame was seen thereafter at the chimney of the fan or at any other place round about it. To the present day this has been the only example in Belgium of a mine fan being disabled as a result of a blowout or any other kind of gas accident.

Surprising as it may seem and did seem at the time, out of 288 persons who were in the mine 42 came out alive. One was a woman. The last of the dead were not found until more than two months later, after the workings had been cleared of an immense tonnage of fine slack and dust that had penetrated everywhere, on the intake side as well as in the return airways as far as the fan shaft, the sump of the latter being filled with coal as was also that of the hoisting shaft on the very bottom of which the bodies of the cagers were found.

All Theories but One Disproved

What safety regulations were formulated and enforced as an immediate result of the Agrappe blowout will be mentioned in another article. The desirability of keeping this article within permissible limits does not allow a review of all the theories that have been advanced to explain the presence in coal seams of such enormous quantities of methane as are revealed by blowouts. With the exception of the Ruelle theory, the latest, which I now will try to explain, they have all been scientifically disproved. There is one, however, of those now obsolete theories that I desire to mention briefly for the reason that it was only quite recently that its definite refutation was made possible by Morin's experiments.

This theory is that the large quantities of methane found in the coal had been absorbed by it just as gases are absorbed by charcoal that has been allowed to cool in a vacuum. Such charcoal will absorb ninety times its own volume of ammonia gas, eighty-five times its volume of hydrochloric acid gas or large quantities of other gases.

It is admitted that the charcoal possesses this property of absorbing such great quantities of certain gases only by reason of its great porosity. Hard and compact carbon, like diamond and graphite, does not absorb any of the gases in any quantity whatever. This would show that the property of carbon to absorb certain gases depends wholly on its porosity. Evidently coal does not have the ability to absorb quantities of methane, for it is not porous until it has been expanded. But Morin has demonstrated that the capacity of coal to retain methane decreases as it expands.

Bold as at first may seem Ruelle's theory of latent methane, or polymethane, as he sometimes calls it, it

has the great merit of resting on a sound scientific basis, agreeing at the same time with all the facts and phenomena currently observed in connection with blowouts. This is much more than can ever be said of even the most plausible theories advanced in the past to explain the probable nature and real properties of the gas that causes seams of coal to blow out practically without notice.

Many Changes Accompanied Coal Formation

Ruelle, explaining his theory before the Mons Society of Mining Engineers, goes into a mass of comprehensive and detailed scientific explanation to which I feel unable to do justice in a statement sufficiently abbreviated to fit within the limits necessarily put on this article. However, the scientific data upon which he bases the few assumptions he makes are undisputed and can be found in all up-to-date chemical reference books. I must be satisfied with presenting the following short statement of the new theory.

Ruelle is of the opinion that in past geologic times, when the wooden substance called cellulose, that was later to become coal as we know it today, went through the decomposition process that caused it to liberate the gas known as methane, it was in a condition still soft and doughy enough to supply the water necessary to a dissolution of the methane liberated. At a later geologic period, under subterranean pressure, the cellulose became solid.

The same actions that caused the solidification process also caused the water to disappear, perhaps decomposing it into its elements, which were then absorbed in the reactions accompanying the process. The methane was thus again liberated. It still was left, however, in intimate contact with the molecules of hardened cellulose. When a substance separates under pressure from another in which it was dissolved it generally polymerizes.

Polymerization Depends on Pressure

Polymerism, as is well known, is a term generally applied to the phenomenon by which a chemical body having the same chemical composition as another chemical body has nevertheless fundamentally different physical properties. A substance that has thus been transformed physically by a change of either pressure or temperature or by both of these, will regain its original form and other properties as soon as a return is made to the original conditions of temperature and pressure. When this happens the substance is said to depolymerize.

For any substance polymerized under compression there is always a critical point. Let the pressure be reduced below a certain degree, and the substance will at once depolymerize and return to its former physical condition. According to Ruelle, methane separating under pressure from the water that was holding it in solution may have polymerized. It might take the form, perhaps, of microscopic crystals, perhaps of microscopic liquid vesicles, attaching themselves to the molecules of coal and becoming, so to speak, one with said molecules.

That being the case, only one action could separate the polymerized methane from the molecules of coal and that would be a reduction of pressure below the critical point. Morin's experiments have shown to what extent coal sometimes must be crushed before the last of its gas abandons it. Wholesale crushing of a coal area, causing it to spread into the mine workings, suddenly reduces the pressure below the critical point in the whole body of coal affected. Instantaneous depolymerization takes place through the coal and a blowout results, as has been explained already by the analogy between such a manifestation and a boiler explosion.

Importance of the Cement Industry As a Consumer of Coal

By J. S. Eaton.

AS THE fourth largest consumer of coal in the United States, the portland cement industry is a factor of growing importance in the demand for coal. Its position as a customer for bituminous directly follows the railroads, the iron and steel industry, and the public utilities. This rating so near the top may come as a surprise to many coal men who have not realized the large amount of fuel needed in making the country's cement.

Roughly speaking, one car of coal must be taken into a plant for every two of cement that are shipped out. Over half of this fuel is needed for burning the cement clinker, and the remainder is required in generating power for operating the heavy crushers, grinding mills, rotary kilns, conveyors and other equipment found in every mill.

The widespread activity in construction during 1922 sent cement production figures to new heights. According to data recently issued by the U. S. Geological Survey, the year's total was 113,870,000 barrels. In terms of the package almost universally used in shipping cement this means 455,480,000 sacks. Since crude oil is burned instead of coal in some parts of the country and natural gas also is employed to a small extent, the use of these fuels must be taken into account in estimating the coal consumed. With liberal allowances made for these substitutes, it appears that the coal consumption in the manufacture of cement was more than 8,500,000 tons in 1922.

The fuel requirements of the industry seem likely to become still greater, as the use of cement in all sorts of structures is increasing. In the two large fields of commercial building and roads this is especially marked. The manufacturers are already equipped to meet a considerably greater demand, for in 1920 the U. S. Geological Survey reported the producing capacity of the mills nearly 30 per cent above the record production of last year.

As building formerly was regarded strictly as a seasonal occupation, the demand for cement until recently has been largely concentrated in the six-months period May to October inclusive. The demand for new structures, however, has caused contractors to break through the prejudice against winter work, so that a large volume of construction is now carried on during cold weather. Much cement also is put in storage during this period against the peak demand. But the much greater summer activity normally results in a big demand for coal for cement manufacture throughout the warm months, when domestic and utility consumption drops off.

In all, as much as 200 lb. of coal or equivalent fuel is needed in making a single barrel of portland cement —that is, 50 lb. of coal to a 94-lb. sack. Expressed more vividly, for every sack of cement manufactured, nearly enough coal to fill that same sack must be bought.

Mining Seams Where Those Below Have Been Worked*

When Upper Seam Is About Twenty Feet Above Lower It Can Be Mined After Coal in Lower Bed Has Been Entirely Extracted —Do Not Work Upper Seam When Pillaring Seam Below It

By Howard N. Eavenson†
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IN MANY of the bituminous-coal districts of this country more than one seam of workable coal is found, and in most cases the lower seam is the more attractive, owing either to its greater thickness or its superior quality. Apprehension that the mining of a seam will destroy the availability of all overlying seams has hindered the development of many fields and has led to the unprofitable working of certain seams in order to save them from an expected total loss.

The United States Coal & Coke Co., Gary, W. Va., was the first operator in the Pocahontas field to mine the No. 4 seam extensively. This occurs about 80 ft. above No. 3, the seam which was worked first. No. 4 seam was worked at the Gary mines for the reason that over large areas that bed was the only one that was of a thickness which at that time could be mined at a profit. In two places both the seams were workable in the same area, the No. 4 being the thinner and containing more impurities than the No. 3 seam.

In mining these areas an attempt was made to keep the workings in the upper seam in advance of those in the lower one, and no pillar robbing was done in No. 3 seam until after pillars in that part of the upper seam directly over it had been mined. This resulted in an excessive development in the lower seam, with large areas of finished rooms and standing pillars. The top fell badly, and after a couple of years the falls became so heavy that pillar drawing was unduly expensive.

Made Investigatory Tour to Ascertain Facts

To overcome this obstacle and allow No. 3 seam to be worked in some territory where No. 4 was thick but too dirty for present use, a study was made of operating methods applied to superimposed seams in Pennsylvania and Maryland. I started this investigation more than seven years ago, and my data, supplemented by more recent information gathered by my associates and by two instances, the information regarding which is derived from recent foreign publications, form the basis of this paper.

In central Pennsylvania the lower coal measures contain several seams of nearly the same thickness but of varying quality, and as mining has been conducted here for many years, numerous instances can be found where an upper seam has been mined after a lower one. A general section of the measures in Cambria and Somerset counties is shown in Fig. 1. The coal seams vary from 3 to 5 ft. thick and occur at intervals of 40 to 80 ft.; the intervening rocks usually are shales, slates or sandstones. By correspondence with engineers, mine inspectors and operators it was learned that in many places an upper seam was being worked with no trouble after a lower seam had been mined. In four mines visited, a careful investigation in the upper mine failed to reveal any traces of damage caused by the removal of a 4-ft. seam 80 ft. below, and in one mine a heading over an area from which the pillars had been removed was of double-track width, without any posts and under good roof. In this mine it was reported that in driving the main heading in the upper seam, over a robbed area in the lower, a settlement of about 8 in. had been noticed, although the coal was in good condition. Rooms are driven 23 to 26 ft. wide with three rows of posts. It usually is necessary to drill holes to the lower seam to drain the water from the upper bed.

In another mine in this locality, recently examined, the *E* seam is being worked about 119 ft. above an area where the *C'* seam was removed some years ago. Above the *E* seam are 8 or 9 ft. of slates and shales under a 28-ft. layer of sandstone; the intervening strata are slates, shales, sandstones and the *D* seam, the latter being about 32 in. thick and lying 25 ft. above the *C'* seam. Mining was attempted in the *D* seam, but was abandoned on account of the damage done by mining the lower seam. In the *E* seam little settlement has occurred, but in certain places lying directly over robbed areas in the *C'* seam heavy falls occur, which frequently extend up to the sandstone. This does not happen where the *C'* seam has not been robbed. Cracks came up to this seam, draining the water off, but the overlying sandstone seems to be undamaged. Mining is considerably more expensive, due to the amount of dead work and timbering required, and the size of the coal produced is very fine.

One case was found where three seams in the same area were leased to three different operators, without any stipulation as to sequence of working, except that, if any settling was observed, protection should be left in the lower seams under the main headings driven in the seams above.

Two Thick Beds Worked Despite Small Interval

In southern Somerset County four mines are operating in the Redstone seam, immediately over the Pittsburgh coal. The latter seam averages about 8 ft. thick; the Redstone coal varies from 4 ft. to 4 ft. 10 in. and is overlaid by a fireclay 8 to 11 in. thick, bone and impure coal 14 to 20 in. thick, and a slate roof. Between the two seams the strata are mostly slate, which breaks readily into small pieces, but the actual bottom of the Redstone seam is a hard limestone from 2 to 6 in. thick. According to careful leveling, the distance from the top of the Pittsburgh to the bottom of the Redstone coal varies from 35 to 19 ft., the average being slightly over 26 ft. In general the headings in the upper seam are driven over those in the lower one, but sometimes this is not done; the headings are between 9 and 10 ft. wide. The fireclay over the coal is taken down and loaded out in both headings and rooms; the bone streak above this, wherever possible, is left up for a roof, and generally it stays up well. Where a heading or a room crosses a pillaring line in the lower seam, a break

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a few inches wide always is found in the seam and the top, the coal bending and dropping a maximum of 3 ft. vertically in a distance of 8 ft. horizontally. Fig. 2 shows this occurrence.

The experience in that district is that any two seams with this thickness of strata between them can be mined successfully if the lower seam has been entirely removed before mining the upper one; that the cost of mining the upper seam has not been increased perceptibly by the removal of the lower one; that the percentage of

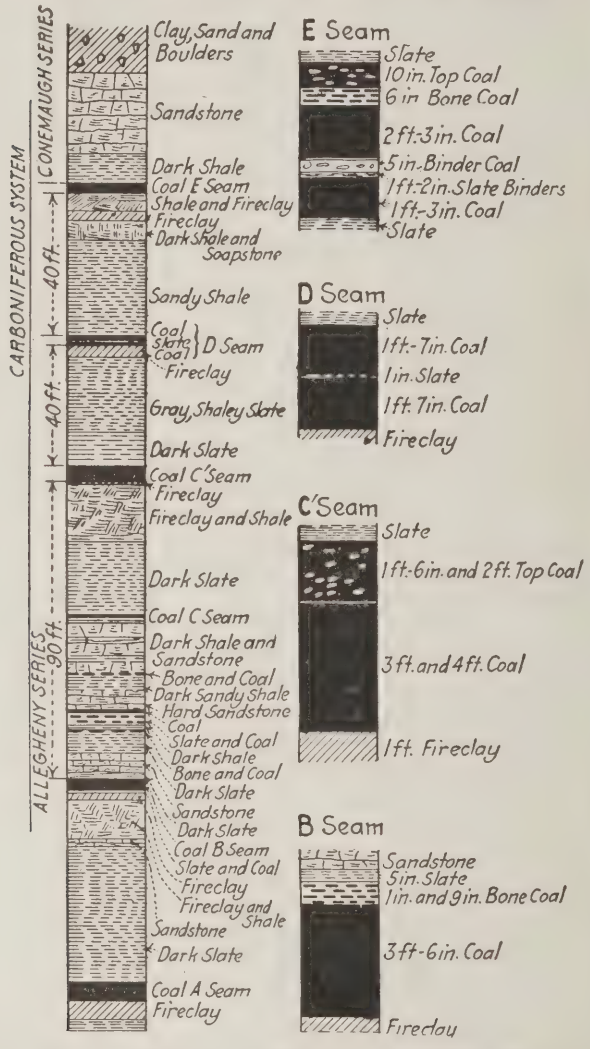


FIG. 1—SECTION OF STRATA AT PORTAGE, PA.

The *E* seam is being worked about 119 ft. above the area where the *C* was removed some years ago, the interval being 119 ft. Mining in the *D* seam, however, was tried and abandoned, owing to injury resulting from the removal of the *C* seam.

recovery has not been materially affected, nor has the element of danger been increased. It was the opinion that the upper seam could be worked three months after the lower one had been mined. It was generally necessary to drill holes to the lower seam to drain the water from the upper one.

At one mine the engineer for the lessor stated that 90 per cent of the coal was being recovered in the Redstone seam and that the cost of mining was not more than 4 to 6 per cent more than if the lower seam had not been mined. In view of the fact that the surface is often badly broken by the removal of pillars at depths of 200 ft. and more, the little damage done to the upper seam was almost unbelievable.

In the Georges Creek field in Maryland, and in the Connellsville region of Pennsylvania extensive mining is now being done in the Tyson or Sewickley seam in areas where the underlying Pittsburgh seam has been removed. In the Georges Creek field the Tyson seam varies from 28 to 36 in. thick; the top is a sandy slate or shale, which shoots well and stays up well. The Pittsburgh coal has a total thickness here of 14 to 16 ft., of which 12 to 14 ft. has been mined. The interval between the two seams is from 77 to 81 ft. and is composed of shales, slate and 16 ft. of sandstone. Very little attention has been paid to the location of the workings in the upper seam with regard to those below. In these mines the greatest damage found in the upper seam was in an area about 150 ft. wide. Here the roof was so badly broken to a height of 6 to 8 ft. above the coal that it would have been unsafe to drive rooms under it. This section was directly over a barrier pillar in the lower mine between one robbed section and another. The damage could not all have been due to the lower workings, as nowhere else could more than a few cracks be found, or a very infrequent break, similar to Fig. 2, but having a drop of only 18 in. The only other trouble experienced was where rooms or headings had been driven in the upper seam and robbing had been done afterward below them. The water from the upper seam usually drains through cracks to the lower one.

Surface Cracks Let in Disintegrating Water

In the Connellsville region, where the Sewickley seam is being worked, it has an average thickness of 5 ft., the Pittsburgh coal averaging 8 ft. The bottom of the Sewickley coal usually is a hard fireclay, although sometimes a thin slate occurs between the fireclay and the coal. The top is either limestone, sandstone or slate. The interval between the seams is 72 to 142 ft. of shales, sandstone, limestone and slate. Careful examination of thirteen mines in the upper seam showed the existence—over many robbed areas of the lower seam—of surface cracks in which percolating water and air had disintegrated the top rock, causing local falls sometimes as high as 4 ft. These conditions were not observed where robbing had not been done in the lower coal.

Gas was frequently noticed entering the upper seam from the mines below. Where sufficient time had elapsed after robbing the lower seam, nothing was found in the upper seam that indicated any material increase of cost or of danger, or a diminished recovery of coal. The surface over many of these mines had been broken by robbing in the Pittsburgh coal, but in spite of this numerous pools of water, in one case covering an area of several acres, accumulated in the upper seam and had to be removed by pumping. These pools were over areas which had been mined out by the H. C. Frick Coke Co.

In two cases where the upper seam had been developed first, when robbing was done in the lower seam, subsidence of 3 to 4½ ft., with heavy roof falls, occurred in the upper one.

During recent years in the Pocahontas field the coal in the No. 3 seam has been worked in several instances. In one case, No. 4 seam, with an average thickness of 4 ft., is being worked over an area where the lower seam, 5 ft. 5 in. thick, has been robbed. The roof of the upper seam is 5 ft. of slate under heavy sandstone; the bottom is 3 ft. of fireclay. The interval of 60 ft. is mainly sandstone, with some slate. Robbing in the lower seam produced no visible effects in the upper except possibly some roof falls, which, however, were not different from those usually expected with that kind

of roof. There is some question in this case as to whether the robbing in the lower seam had been thorough enough to cause serious falls.

In another mine, No. 6 seam, averaging 3 ft. 8 in. thick, with sandstone top and fireclay bottom, is being worked where No. 3 seam, 5 ft. 9 in. thick, has been mined beneath it; the interval of 150 ft. is almost entirely sandstone, except a few feet of slate over the lower seam. The only evidences of disturbance in the upper seam are in two places where subsidence and roof falls occurred, the robbing in the lower seam having been done after the workings in the upper were driven. In all other places conditions in the upper seam appear normal and water frequently collects over robbed areas.

In still another mine, a higher seam, about 340 ft. above No. 3, is being worked where the lower seam has been entirely removed. The only trouble here has been due to surface cracks which allow water to enter the mine, from which it does not drain well to the lower seam. In a mine in southwest Virginia, robbing in a seam 5 ft. 10 in. thick caused cracks in the surface 570 to 794 ft. above, along a line more than 1,000 ft. long. An upper seam occurs 445 ft. above the lower one, and some trial headings were driven in this to learn the extent of the expected damage done by the robbing. Except for some cracks, through which air came from the lower workings, absolutely nothing was found in the upper seam, either in levels or in the character of the coal, to indicate that the lower seam had been removed.

In a paper by William Taylor Heslop* the following experience at St. Georges colliery, Natal, is described. There are two seams here, the top one about 4 ft. thick; the bottom one, including 9 in. of carbonaceous shale, has a total thickness of 5½ ft. Between the two seams is a bed of laminated sandstone, varying from 3 to 5 ft. thick. The immediate roof of the upper seam is about 17 ft. of shale, the total cover being 250 to 350 ft. of interbedded sandstones and shales. The seams are approximately level. At first the top seam was totally extracted from about 8 acres, and the area was allowed to settle for two years before the bottom seam was started. Several trials of this scheme, with both room-and-pillar and longwall mining, showed that the weight of the gob on the intervening sandstone caused trouble and loss of coal when working the bottom seam. The plan finally adopted was to drive all workings in the bottom seam, connecting the haulageways by inclines to the top seam. The bottom seam was developed by blocking it into pillars 39x75 ft., the working places being 15 ft. wide. The top seam was then developed in the same way, the workings being exactly over those below. When robbing commenced, a lift 18 ft. wide was driven 39 ft. across the end of the top pillar; when this was completed and the fall had occurred, a corresponding lift was driven in the bottom seam, making the gob line in the top never more than 33 ft. (18 ft. lift plus 15 ft. working place) in advance of the bottom seam. The overhang of the solid roof protected the working lifts, and the sandstone between the two seams protected the lower lift from the gob above.

In a paper before the Mining Institute of Scotland, Dec. 9, 1922, the following experiences are described. Near Glasgow, the Main and the Jewell seams lie about 710 ft. below the surface. The Jewell seam, the lower one, is 22 in. thick and is separated from the Main seam, which is 24 in. thick, by 4 ft. of fireclay. In some places the upper seam was worked first, but in one place the bottom seam had been worked out for about three years before work started in the upper seam. The upper coal was found to be friable and produced much slack; although the roof was hard, it was broken, as a result of the first working, and the roads were difficult to keep open. The bottom, being soft, had a tendency to heave, and in some places it had dropped away from the coal. Care had to be taken when the mining machine was crossing an old road in the lower seam. By this method less timber was required and less dirt was produced than when the lower coal was worked after the upper coal had been taken out.

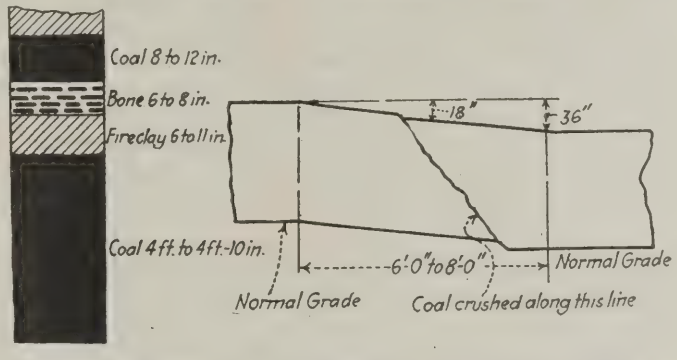


FIG. 2—BREAK IN UNDERMINED REDSTONE SEAM

How the coal breaks over the point where the work of removing pillars in the lower, or Pittsburgh, seam commenced. The interval between the seams is from 19 to 35 ft. and the Pittsburgh seam is 8 ft. thick, yet at one mine 90 per cent of the Redstone seam is recovered, and the cost of mining is not more than 4 to 6 per cent above that it would be if the lower seam had not been mined.

The table shows the comparative costs of mining in both seams and under both conditions, x representing the lowest cost. The shilling has been figured as equivalent to 24c.

The statement is made that when either seam is worked the other is more or less damaged, to an extent depending upon the nature of the strata. Where the top seam was worked first the damage consisted in hardening the coal, which was of no importance when machines were used. Where the bottom seam has been worked first, the damage consists in a large percentage of slack, which is not objectionable if the coal is for coking purposes. "Hence, one might say that the injury would be either real or apparent, according to condition."

Experience in all the above-mentioned localities seems to warrant the following conclusions: (1) Mining an upper seam after a lower one has been removed can almost always be successfully done when the thickness of intervening strata is 19 ft. or more. (2) The lower

Journal, Chemical, Metallurgical and Mining Society of South Africa, October, 1921.

Section	Output per Shift at Coal Face, Lb.	Miners' Wage Rate, Cents	Machine Cutting, per Ton, Cents	Brushing, per Ton, Cents	Repairs and Overhead, Cents	Total Cost, Cents	Timber Cost Cents
Main (top) coal, where bottom is mined out	3,277	x+ 19.8	x+ 5.0	x+ 6.4	x	x+ 27.2	x+ 1.2
Main (top) coal, solid	6,101	x	x	x	x+ 3.1	x	x
Jewell (bottom) coal, solid	2,975	x+ 63.2	pick places	x+ 3.1	x+ 8.7	x+ 47.2	x+ 0.6
Jewell (bottom) where top coal has been mined out	2,200	x+ 32.0	x+ 17.4	x+ 41.2	x+ 23.2	x+ $1.106	x+ 7.2

seam should be entirely removed from any area, and time should be allowed for settlement before working is started in the upper seam; the more complete the extraction, the less will be the likelihood of trouble in the upper seam. (3) Working in an upper seam should not be attempted while removing the pillars in a seam below it. (4) Percentage of recovery in an upper seam will not be materially reduced nor the cost or danger of mining be greatly increased because a lower seam has been removed.

Liquid-Oxygen Explosive Is Demonstrated At Martinsburg, W. Va.

AS FLAME is generated by the explosion of liquid oxygen it is hardly likely that the explosive will ever be recommended for use in blasting coal. It has been used for that purpose in Germany, but reports are that its employment is declining. However, enough shooting takes place at coal strippings, in tunnels and on mine railroad switches, surface tramroads and in general excavation work to make the possibilities of using liquid oxygen important to the industry and worthy of note.

The Germans are ardent advocates of using for this purpose carbon and oxygen of great purity. Frequently the oxygen they use runs 99 per cent pure, but that prepared for this purpose at the Real del Monte y Pachuca Co.'s mine at Pachuca, Mex., is slightly more than 95 per cent pure. The company mentioned is a subsidiary of the United States Smelting, Refining & Mining Co. The lampblack by which the liquid oxygen is absorbed is made by the combustion of *chapopote*, a residual gum of petroleum found in the crude state in the Mexican oil fields. This being an impure product absorbs in a ratio of 4:1 as compared to 4½:1 ratio attained with purer forms of carbon used by the Germans. They use burned cork for their carbon cartridges.

The oxygen at the Pachuca mine is prepared by an ordinary Mexican laborer and boy, so simple is the method of manufacture. The maximum pressure used in the process is 2,800 lb. The air is compressed until liquefied and then the pressure being lowered, the nitrogen, which is more volatile than oxygen, boils off, leaving a steel-blue liquid oxygen about 95 per cent pure. The Pachuca plant uses a 100-hp. motor for the liquefaction of the air and produces thirty-six cans of liquid oxygen per eight-hour shift, each containing 12 kg., or 26.45 lb., of oxygen. This is almost 1,000 lb. The gases formed are not visible. They consist of carbon dioxide. It is stated that no carbon monoxide is formed where the cartridges are properly saturated.

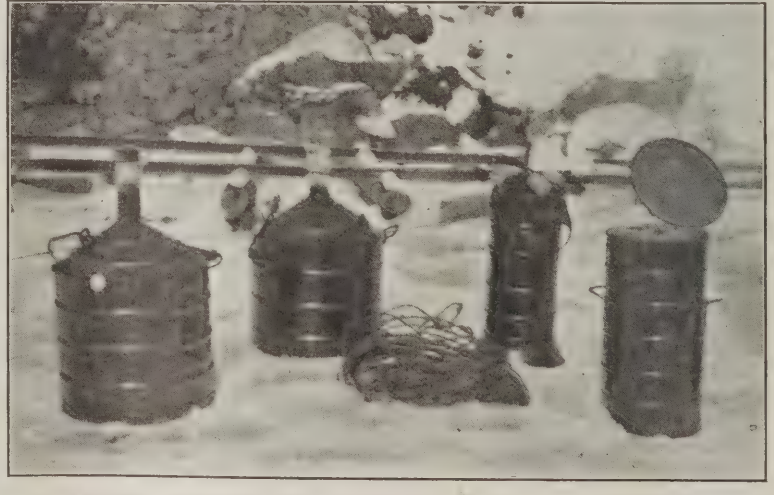
The first public demonstration in this country of blasting with this explosive took place Feb. 7 at the quarry of the Kelley Island Lime & Stone Co., about two miles west of Martinsburg, in the Panhandle of West Virginia. The tests, which were arranged by the U. S. Bureau of Mines were conducted by Adolph Messer, head of the German firm of Messer & Co., who has been in this country on business. This explosive in general is made by soaking sticks of carbon in liquid oxygen on the spot where the blasting is to be done. The holes are then loaded with the saturated cartridges as quickly as possible, and blasting follows with the minimum loss of time, either electric exploders or the ordinary cap and fuse being employed. Blasting must follow quickly after the cartridges are removed from the soaking receptacle, because the evaporation of the oxygen soon renders them inert.

The liquid oxygen used was made at the plant of the Southern Oxygen Co., Washington, D. C., from which it was taken between 1 and 5 p.m., Monday, Feb. 5, and conveyed to the quarry at Martinsburg in double-wall vacuum-bottle containers most of which held about 35 lb. of the liquid. The flasks are not corked but have a hinged perforated metal cap. Oxygen is steadily lost from the containers by evaporation. By 7:30 a.m. Tuesday, Feb. 6, the average loss, according to the representative of the oxygen company, was 1½ lb. per 35-lb. container. The loss, it was stated, averages less than 0.5 per cent per hour; this despite the fact that the container is open to the air. Corking or closing of the container will result in its breakage.

Some of the "Lampblack" Mixed With Cork

Carbon cartridges of two kinds were used in the tests. One (D2) consisted of pure acetylene lampblack, and the other (A2) was composed of the same material mixed with 25 per cent unburned ground cork. The former, according to Mr. Messer, is considered equivalent, when impregnated, to 80 per cent dynamite, and the latter to 60 per cent dynamite. The lampblack was loosely wrapped in blotting paper so as to form roughly cylindrical sticks, 300 mm. (about 12 in.) long, and 35 or 40 mm. (1⅜ to 1½ in.) in diameter. These sticks before soaking in oxygen can be compressed easily with the fingers. After soaking they are frozen and brittle. Most of the cartridges used in the test were 40 x 300 mm. (1½ x 12 in.), each containing 75 gm. (2¾ oz.) of pure lampblack. Immediately after soaking they weighed about ¾ lb. each, indicating a ratio of absorption of about 3½:1.

No. 8 electric exploders were used in the principal tests, one to each hole or charge. The cap was inserted in a hole bored through a wood cylinder or plug about 4 in. long and somewhat less in diameter than the drill-hole. Cap and plug were then lowered into the hole by the leads until they rested on the charge. Firing was



BLASTING EQUIPMENT ASSEMBLED AT COLLARS OF HOLES
On the left are the double-wall liquid-oxygen containers, each holding 15 liters. On the right are the soaking cans filled with carbon cartridges. Electric exploders and wood plugs rest on top of the unopened soaking can.

done with a No. 4 blasting machine of the Aetna Explosives Co.

The program included the blasting of one round of two holes, one of three holes, one "block shot," and two "pasters" or "mud caps." The two holes shot first were about 2 in. in diameter at the bottom and 20 ft. deep, drilled almost vertically and 10 ft. back of the quarry face. They reached practically to the level of the quarry floor, and at that level were approximately as far in from the face as at the top. The cartridges were prepared close to the collar of the hole. The equipment assembled for this purpose is shown in Fig. 1. Carbon sticks were placed upright in the double-walled soaking containers, which held from twelve to eighteen sticks, according to size. Liquid oxygen was then poured in from the oxygen container, flowing in a small steel-blue stream from the orifice. Rapid evaporation accompanied the pouring. The soaking cans were then closed and the sticks allowed to soak for about fifteen minutes. At least six minutes is required for proper soaking, according to the representative of the oxygen company and oversoaking is better than undersoaking.

Oxygen Rapidly Evaporates in Borehole

The cartridges were then removed one by one, as frozen sticks, from the can and dropped into the hole. If properly soaked, the entire cartridge should be saturated, though the bottom will be supersaturated. Immediately there was a rapid evolution of vapor from the hole, demonstrating the rapidity with which oxygen was being lost. Eighteen D2 cartridges were used in each hole. The charge was then carefully packed down with a long wooden tamping rod. The electric exploder and wood cylinder described above were lowered into each hole, a half powder box of fine sand poured in by way of tamping, the wires tested, and the blast fired. Loading consumed four minutes and the blast was fired within seven minutes after the first cartridge was dropped. Three men were employed in loading the two holes.

As a result of the blast, the ground was badly shattered over an area extending 15 ft. back of the face and 50 ft. along it. A moderate tonnage was thrown into the quarry pit. The general impression created, however, was favorable.

In the second test, three holes, respectively 20 ft., 16 ft., and 20 ft. deep, drilled almost straight down and 7 ft. apart in a line parallel with the quarry face and 8 ft. back of it, were loaded as before. The cartridges were soaked nineteen minutes, and two men loaded the three holes in six minutes. Sixteen ¾-lb. sticks were placed in each 20-ft. hole and 12 sticks in the 16-ft. hole. The blast failed, however, though all three of the detonators exploded. This was explained by the theory that the evolution of gas from the charge lifted the wood cylinders by which the detonators were held, thus permitting the sand tamping to get between the exploders and the charge. Some even say that the detonators were thrown out of the holes.

After an hour had elapsed the inert carbon charges were easily blown out of the holes with compressed air. The 16-ft. hole and one of the 20-ft. holes were then reloaded. Soaking took fifteen minutes and loading three minutes, two men loading the 20-ft. hole and one man the 16-ft. hole. The third hole was abandoned because of insufficient oxygen. The manner of loading was changed in this test. Twelve cartridges were put in each hole before the electric detonator. Most of them



QUARRY OF KELLEY ISLAND LIME & STONE CO.
The tests with liquid oxygen were made in this quarry under the direction of the U. S. Bureau of Mines. One round of two holes, one of four holes and two "pasters," or "mud caps," were fired.

were of the A2 variety, containing 25 per cent ground cork and 75 per cent acetylene lampblack. On top of each exploder were then placed three D2 cartridges, followed by two A2 cartridges. Sand tamping was again used.

Before loading was finished, difficulty was experienced by the action of the escaping gas in blowing the sand and some of the topmost cartridges from the holes. These were finally wedged in and the charge was blasted. One hole broke well. The other was again a failure, giving a pyrotechnic display as flame from it spurted into the air. The opinion was expressed by Mr. Messer that the use of sand was evidently a mistake, though the first time it gave no trouble.

A "paster" or "bud-cap" shot gave remarkable results in shattering a huge block of stone in the quarry pit. Ten sticks of D2 explosive were fired with 8X cap and fuse. Two other minor tests gave good results.

During the tests the oxygen and cartridges used were not weighed, so that the total quantity of explosive used could only be gaged approximately in terms of "cartridges."

Preparation of Electrical Mine-Safety Codes.—The Electrical Section of the U. S. Bureau of Mines has done considerable work in connection with the preparation and the compilation of data relating to safety rules and regulations for the installation of electrical equipment in mines. The following publications relate to this question:

- Technical Paper 133, "Suggested Safety Rules for Installing and Using Electrical Equipment in Bituminous-Coal Mines."
- Technical Paper 271, "State Mining Laws on the Use of Electricity in and About Coal Mines."
- Serial 2224, "State Regulations on Accident Prevention Covering Electric Circuits in Coal Mines."
- Serial 2258, "State Safety Regulations Governing Mine Telephones."
- Serial 2405, "State and Federal Electrical Shotfiring Regulations."
- Serial 2419, "Regulations Safeguarding Coal-Cutting Machines."

In addition to the above, tentative codes for the installation of electrical equipment in both coal and metal mines have been prepared. Copies of these codes can be obtained by any commission having the revision of state mine regulations under consideration.



Problems of Operating Men

Edited by James T. Beard



Warning Against Mine Explosions

Frequency of Mine Explosions Increased Since the Strike—Mine Workers Cautioned to Avoid All Unsafe Practices in the Mine

THAT mine explosions have been on the increase, both in this country and abroad, during the past six or eight months, is not to be denied. In this country, it is natural to claim that the strike of the miners is, at least, one of the contributory causes for this condition, although there may be and probably are other causes for the increased frequency of these dread disasters.

I have read with interest the warning given out by the Chief of the Bureau of Mines, drawing attention to this matter. Certainly the appeal to awaken the slumbering regard of mine workers to this danger cannot be made too strongly. At the present time, there is little that is of greater importance than to arouse the interest of every mining man, from the official in the office to the miner at the coal face, and solicit their co-operation in efforts to make the mine safer.

While the six explosions mentioned in the warning to which I have referred resulted in the killing of 185 men, this sad accounting does not include the several smaller explosions that are taking place in our mines each week and killing from one to five men apiece.

Local Explosions Cost Many Lives

If the whole story could be written, it would appear that there are occurring daily, in the mines many local explosions that, by the merest chance, do not extend further than a short distance from the place of their origin. That such is the case cannot be said to be due to good management. It is what most men call "luck" and a few a "merciful providence."

To the practical miner, the causes of these happenings are not mysterious. He knows that the following of a bad practice will sooner or later bring disaster. At the same time, almost without exception, the miner chooses to follow the easy way, instead of using the precaution that he would recommend to others and which he knows are essential to safety.

In other words, the average miner takes the chance in innumerable instances. He follows the line of least resistance that, while it may get results today, makes no promise for the morrow. Such, I regret to say, is the attitude of mind of the major portion of our miners toward their work, today.

The Foreman Knows But Trusts to Luck

Every mine boss knows whether the working places in the mine of which he has charge are being adequately ventilated. Most of these bosses know, also, the condition of the gob. They may feign some surprise when told of a dangerous condition existing in a portion of their mine. But, if the truth was known, the information afforded is nothing new to them. They have known of the condition for some time, but are trusting to luck, ignoring the danger while devoting themselves wholly to getting out the coal.

A miner's working place should be the safest place in the mine and any half-hearted, indifferent attitude on his part should not be tolerated. Again, failure on the part of the foreman to provide sufficient supplies and preserve a healthful and safe working condition must likewise not be tolerated. But who, let me ask, is to be held responsible for enforcing these conditions?

While it is not my disposition to throw responsibility that should rest on one party, onto the shoulders of another, it is my belief that there is no agency better able to enforce discipline in our mines than the State Department of Mines. The law gives them the power and their authority is widely respected. Let me close by stating that when the state realizes its responsibility for maintaining discipline in the mine, the occurrence of accidents and disasters will be less frequent.

Pikeville, Ky. George Edwards.

Conditions That Invite Mine Explosions

Circulation not sufficient to dilute and sweep away gases generated—Air current not made to sweep the working faces—Large abandoned areas standing open.

MANY mine disasters occurring recently cause us to ask ourselves, again, what are the causes that lead to these occurrences? Though it is a well worn subject, a brief reference to some of the general causes or conditions that invite explosions in mines will not be out of place at this time.

All must agree that one of the principal causes of explosions of gas or dust, in mines, is an insufficiency of ventilation. The volume of air in circulation may be sufficient to comply with the requirements of the mining law and yet not enough to dilute and sweep away the gases generated in the workings of a mine.

Locked Safety Lamps No Excuse for Inadequate Ventilation

No practical mining man will deny that such a condition invites disaster. The fact that a mine is being worked with locked safety lamps of an approved type is no excuse for inadequate ventilation and any attempt to operate such a mine when poorly ventilated is but taking a gambler's chance.

Another chief cause of the ignition of gas and dust present in the workings of a mine is the failure to properly conduct and distribute the air current throughout the mine. The fact that the *volume* of air entering a mine is all that is required to make the workings safe does not prove that the mine is properly ventilated.

Efficient ventilation means that the air entering the mine is distributed to the several ventilation districts in proportion to the need of each district. Not only that, but the air current must be made to sweep the

working face with sufficient velocity to dislodge and carry away what gases would otherwise accumulate there.

This will often require the erection of brattices, in rooms and working places, so as to conduct the air forward from the last breakthrough. In some cases, it may be necessary to erect a special brattice to deflect the air into some cavity of the roof or other void place.

A third and very important condition that invites disaster is permitting large abandoned areas to stand open, or attempting to ventilate them by passing the air current through such places and then permitting it to enter other places where men are at work.

Danger When Air Passes Over Falls

Safety requires that when a room, or a number of rooms forming a section of the mine, have been worked out and the pillars drawn such places should not be left to stand open without being properly ventilated. If they are ventilated the current passing through them should be conducted at once into the main return airway where it will pass out of the mine without reaching other working places.

Not long ago, I had taken charge of a mine where the ventilating current passed over many falls in the worked out section, before it reached the rooms where men were at work. In that mine, when the coal was taken out and the roof caved much gas would be given off.

The mine was worked with open lights and, while I took every precaution to keep the dust wet and the roadways clean, in my opinion, the place was not safe. I therefore requested the superintendent of the mine to allow me to change the circulation so as to ventilate the live workings with fresh air and conduct the air sweeping the falls directly out of the mine. This being refused I resigned my position and left the mine.

In closing, let me say that attention given to these and other points of equal significance will greatly reduce and perhaps wholly eliminate the disasters that are now so frequent in coal mining. C. W. Atkins.

Parnassus, Pa.

Overcoming Bumps and Outbursts of Gas Occurring in Mines

Suggestion of storing waste by flushing not effective—Outbursts occur in advance workings—Not known in worked-out sections.

KINDLY permit me to refer to the letter signed "M. E." and entitled "Gas Menace in Mines," which appeared in *Coal Age*, Dec. 21, p. 1001. In the latter part of the letter the writer refers to the occurrence of bumps and outbursts of gas in mines.

In his closing paragraph, the writer makes a suggestion that is worthy of comment, because of its evident inapplicability as a means of preventing these occurrences. It would seem, that, in making the suggestion, the writer did not stop to give the matter a second thought, or he would not have asked if the proposition was feasible.

After speaking of the danger of such occurrences, he states as follows: "In the same connection let me suggest the practicability of the stowing of waste in the worked-out portions of mines, by the hydraulic process, which some may style 'flushing.' Such a stowing of waste might prove an effective means of eliminating both bumps and outbursts of gas."

There are few mining men who have not heard of the use of flushing as a means of aiding in the recovery of pillars, under conditions that made it impossible to extract them in any other way. However, this is the first time that I have read of flushing being recommended for the elimination of bumps and blowouts in mines.

No Knowledge of Outbursts of Gas Having Occurred in Old Workings

Though I have read of many outbursts of gas in mines in various localities and have investigated a number of them, in no single instance have these occurred in the worked-out portion of a mine. On the contrary, they have always occurred in the advance workings with which they are or seem to be associated.

Taking these facts into consideration, it is difficult to understand the ground on which this suggestion is based; or was it merely a passing thought that escaped the writer before he had given it special attention?

Previously, in his letter, the writer remarked, "While bumps in mines are dangerous, they are far less so than many outbursts of gas that have occurred. In some instances, the outburst has thrown down tons of coal and filled the mine passageways with gas and suffocating dust."

From this statement, it would appear that the writer recognized the fact that these occurrences took place, at least commonly, in the live workings of a mine. It would be interesting to know if our friend has any knowledge of such occurrences ever having taken place in worked-out sections. Assuming that he gave the matter any serious thought, it seems possible that he may have experienced occurrences of this nature in sections where the stowing of waste would have prevented their occurrence.

Before closing, allow me to ask the writer to whom I have referred, if he considers that flushing would have any material value in certain European mines, where outbursts have occurred in the advance workings, both in the bord and pillar and longwall systems of mining. Again, does he seriously think that flushing could have been applied with advantage in the mines of British Columbia, where large outbursts have occurred at Morrisey and elsewhere? R. W. H.

Victoria, B. C.

Solution by Equivalent Orifice

Ventilation of shaft mine increased by adding another airway—Cube of the quantity of air passing varies as the square of the equivalent orifice.

REFERRING to the solution given to a difficult examination question, asking what increase of air in a shaft mine would result from the addition of another airway of the same size and length as the one already in use, *Coal Age*, Dec. 21, p. 1002, permit me to offer the following solution obtained by the use of the equivalent-orifice method.

The *Coal Age* journal is much appreciated here and read from A to Z; and it seemed to me that the following solution would be of interest to many students of ventilation. I will endeavor to give it as simply and briefly as possible, omitting unnecessary explanations.

The question referred to assumes a circulation of 10,000 cu.ft. of air per minute, passing in a single split in a shaft mine, and makes the resistance of the two shafts equal to that of the original airway. Then, assuming a constant power on the air, it is desired to

ascertain how much the circulation in the mine would be increased by the addition of a second airway of the same size and length as the first.

Applying the equivalent-orifice method, let A represent the equivalent orifice of the combined shafts and the original airway, when the air is passing in a single split; and let a and a_1 represent the respective orifices of the two shafts and the original airway. Then it can be shown that

$$\frac{1}{A^2} = \frac{1}{a^2} + \frac{1}{a_1^2} = \frac{2}{a^2} \qquad (1)$$

remembering that a is equal to a_1, since the resistance of the two shafts is equal to that of the original airway.

Again, let A_1 represent the equivalent orifice of the combined shafts and the two airways, after a second airway has been added of the same proportions as the first. In this case we have

$$\frac{1}{A_1^2} = \frac{1}{a^2} + \frac{1}{(2a_1)^2} = \frac{5}{4a^2} \qquad (2)$$

Now dividing equation 1 by equation 2, we have for the ratio of the squares of the equivalent orifice of the mine, before and after the change is made.

$$\frac{A_1^2}{A^2} = \frac{2}{a^2} \times \frac{4a^2}{5} = 1.6$$

But, for the same power on the air, it can be shown that the cube of the quantity of air in circulation varies as the square of the equivalent orifice of the mine. In other words, the cube of the quantity ratio is equal to the square of the orifice ratio. Hence, the original circulation being 10,000 cu.ft. per min. and letting Q represent the increased circulation after the second airway is added, we have

$$\left(\frac{Q}{10{,}000}\right)^3 = \left(\frac{A_1}{A}\right)^2 = 1.6$$

and $Q = 10{,}000\ \sqrt[3]{1.6}$

$= 10{,}000 \times 1.1696 = 11{,}696$ *cu.ft. per min.*

ROBERT I. CURRIE, Head of Mining Dept.,
South Wales & Monmouthshire School of Mines.
Crumlin, Mon., S.W.

Inquiries Of General Interest

Retimbering an Old Slope When Opening a Longwall Mine

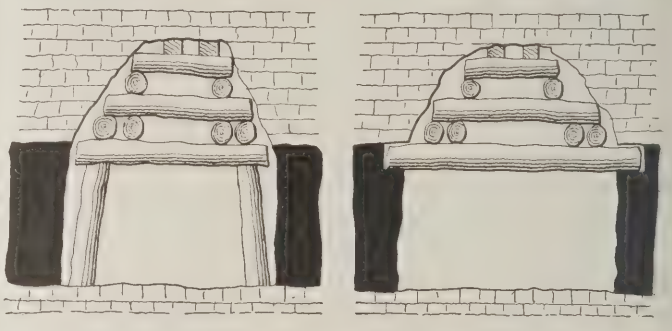
Slope 8 Ft. Wide, 500 Ft. Long, Dipping 20 Deg. Needs Retimbering—Should Crossbars be Set in Hitches or Supported on Legs?

A PROPOSITION that has given me some little concern, recently, is the retimbering of a 500-ft. slope, at one of our mines. The slope is driven 8-ft. wide and dips 20 deg. Including the slate in the coal, the height of the seam is about 4 ft. The coal is overlaid with a soft roof. When the slope was driven, the roof was not brushed, but was timbered in the usual way with double timbering, the collar beams being supported on two legs. At the present time, the weight is breaking the timbers and the frail soapstone roof is falling to a considerable height above the road.

When this slope has been retimbered and is in shape to be used it is the intention to open out a longwall face at the foot of the incline. The roads or gateways will be driven across the pitch, so as to provide a suitable grade for handling the cars, which will then be hoisted up the slope.

The work of retimbering was started at the foot of the slope and had proceeded but a short distance when it occurred to me that we were making a mistake in choosing the wrong method of supporting the crossbars. The plan we had selected is illustrated on the left of the accompanying figure.

As there shown, the crossbars are supported on two legs. The timber frames are set about 3 ft. apart and heavy stringers or poles were used as lagging to span the space between. As shown, other cross-timbers were



TWO WAYS OF SUPPORTING ROOF TIMBERS

then laid above the lagging and this system was continued up to the solid formation above.

In this work, the old timbers are being used to fill the space previously occupied by the fallen material. The work looked good and we had imagined that the job was fairly well executed as far as it had gone. Pondering on the matter, however, has caused a doubt in my mind as to whether we have chosen the right method of supporting the crossbars.

It seems to me now that these should rest in hitches cut in the solid coal, as shown on the right of the figure, instead of employing double timber and resting the collars on the legs. What appeals to me is that, not only would we have saved the timber used for the legs, but all the timbers would settle more uniformly with the strata and excessive strains would be avoided had we chosen this second method of supporting the crossbars.

The question that puzzles me is to know whether my reasoning is correct. It seems to me that when the coal is taken out and the overburden settles on the gob, we can expect nothing but that the legs of the timber frames will be broken and the topping above the collars fall into the road.

To my mind, such a result is what is liable to occur in the adoption of the first method mentioned. Since it is most important to maintain a good roof over the main slope, we are anxious to have the views of *Coal Age* and its practical readers, as to the safest method of proceeding. The problem may be a simple one, but it appears to me as being worthy of discussion.

River Herbert West, N. S. MAC.

Although the correspondent has mentioned his intention of opening a longwall face at the foot of the slope it is possible that he has in mind extending the longwall work above that level, on either side of the slope, and fears what effect the later extraction of the coal will

have on the slope itself. In that case, we think that his second suggestion of resting the crossbars in hitches cut in the rib is far better than resting them on legs, after the manner of double timbering.

The question of supporting the crossbars in hitches in the rib, in any case, depends primarily on the hardness of the coal. If the coal is soft and friable, it will not furnish the needed support to the crossbars and such a method of timbering would then be impracticable. It is also of interest to know the nature of the floor underlying the seam. The question is a practical one and we gladly submit it to the readers of *Coal Age*, in the hope of receiving many good suggestions.

Finding Percentage of Grade Expressed in Degrees and Minutes

No formula for calculating percentage of grade from degree of inclination—Use must be made of table of sines and cosines.

KINDLY explain how a person would go about the work of obtaining a formula that would provide a simple means of calculating the percentage of grade of a slope when its inclination is given in degrees and minutes. I have been unable to find any help from textbooks on this subject. STUDENT.

Patton, Pa.

It is not possible to develop a formula for converting degrees of a circle into a co-ordinate system that would express the corresponding percentage of grade, either in terms of the horizontal distance or measurement taken on the incline. Referring to a table of natural functions, the tangent of the angle of inclination will give the percentage of grade, expressed decimally in terms of the horizontal distance. Likewise, the sine of the angle of inclination will give the percentage of grade, expressed decimally, in terms of measurement on the incline.

For example, a slope having an inclination of 30 deg. has a percentage of grade of 0.577, or 57.7 per cent referred to the horizontal distance. The percentage of the same slope referred to distance measured on the incline is 0.5, or 50 per cent.

Examination Questions Answered

Miscellaneous Examination Questions

(Answered by Request)

QUESTION—*If the airway in a mine is 8 ft. high, 10 ft. wide and 3,600 ft. long, how much will the pressure have to be increased to pass the same quantity of air when the length of the airway has been increased to 7,200 ft.?*

ANSWER—Other conditions remaining unchanged, the pressure will vary with the length of the airway. In this case, the length of the airway being doubled, the pressure must be increased in the same ratio. Therefore, to pass the same quantity of air through an airway of twice the length will require twice the original pressure.

QUESTION—*(a) What are the principal causes of mine fires? (b) What precautions should be taken to avoid them? (c) Explain the method of approaching and fighting mine fires?*

ANSWER—(a) The principal causes of mine fires are the careless use of naked lights, in mines generating gas, or in proximity to combustible material, such as hay, oily waste, or oil-soaked timbers. Fires may result from the ignition of gas feeders, in blasting coal; or the ignition of gas or dust, by the flame of a blowout shot, the sparking of wires or blowing out of a fuse. Again, fire may result from spontaneous combustion taking place in oily waste, or by reason of the heating of fine coal and slack stored in the gob.

(b) Strict rules and regulations must be observed regarding the use of open lights in mines; the blasting of coal and handling of explosives; the storage of waste and other combustible material when not in use in the mine. All electrical installations must be properly made by a competent mine electrician and every precaution taken to prevent the accidental short-circuiting.

(c) In fighting a mine fire, it must be approached only from the intake side. Experienced men must be employed for that purpose and they should be equipped with approved safety lamps. Men working in the mine must be notified and withdrawn at the first indication of danger.

QUESTION—*What is the rubbing surface of an airway 8x12 ft., in section, its length being 6,550 ft.? (b) if the velocity of the air is 350 ft. per min. what is the volume of air in circulation?*

ANSWER—(a) The perimeter of the airway being $2(8 + 12) = 40$ ft. and its length 6,550 ft., the rubbing surface is $6,550 \times 40 = 262,000$ cu.ft. per min.

(b) The velocity of the air current is then $262,000 \div 330 =$ say 794 ft. per min.

QUESTION—*Find the water gage that should be produced by a fan in circulating 105,000 cu.ft. of air per minute in an airway 8x12 ft. in section and 5,000 ft. long, including the return.*

ANSWER—The rubbing surface s and sectional area a of this airway are: $s = 2\ (8 + 12)\ 5,000 = 200,000$ sq.ft and $a = 8 \times 12 = 96$ sq.ft. Then, using the Atkinson coefficient $k = 0.00000002$, we have for the required water gage,

$$w.g. = \frac{k\,s\,q^2}{5.2\,a^3} = \frac{0.00000002 \times 200,000 \times 105,000^2}{5.2 \times 96^3} = 9.6\ in.$$

This is an unusually high gage due to circulating the air a distance of nearly a mile at a velocity of $105,000 \div 96 =$ say 1,090 ft. per min. In practice this circulation would be divided so as to reduce the gage. Ignoring shaft and main airway resistances, if this air was made to travel in two equal splits the gage would be one-eighth of the previous amount, or 1.2 in.

CORRECTION

Attention has been kindly drawn to a typographical error that occurred in the reply to the second question on page 261, of the issue for Feb. 8, where the efficiency in steam-boiler practice is given as "varying from 3 to 7 per cent," instead of 50 to 70 per cent. The fair average evaporation due to burning the 5 lb. of coal, in that question should then be, say $0.60 \times 72 = 43.2$ lb. It may be more or less, depending on numerous factors, but chiefly on the heating value of the coal, type of boiler, manner of firing, etc.

Fear of Future Shortage Causes Hysteria In Northeast, Says I. C. C. Chairman

Personal attention to the fuel situation in northern New York and New England by President Harding, based on daily reports of the Interstate Commerce Commission; application by the Attorney General of New York State for authorization to seize coal on sidetracks on the ground that such cars have lost their interstate status; seizure of two cars of coal by the municipal authorities in Saratoga, N. Y., and advocacy by Mayor John F. Hylan of New York of seizure and control of the mines by the government were some of the developments in the coal situation last week.

Due to several days of low temperature New York City passed through the "worst combination of circumstances" it had seen in thirty years. While heavy ice floes made worse by the cold wave and a northwest gale prevented coal barges being brought across New York Bay and the rivers in anything like normal numbers, there was no real distress reported. Emergency complaints to the State Fuel Administrator's office multiplied rapidly. Several barges containing more than 10,000 tons of domestic sizes were sunk by the heavy ice, and at one time it was asserted by railroad officials that there were 75,000 tons of coal on the New Jersey terminals which could not be moved.

Efforts made to force the administration at Washington to embargo shipments to Canada apparently having failed, the municipal authorities at Saratoga, N. Y., on Feb. 19 seized nine cars of coal on the Delaware & Hudson R.R., releasing seven of the cars later on. The seizure was on the following day characterized as "ill-considered and unwarranted" by General George W. Goethals, State Fuel Administrator, who also said the seizure was made against the advice of Clarence B. Kilmer, district administrator for Saratoga, and representatives of the Federal Fuel Distributor and the Interstate Commerce Commission.

Chairman B. H. Meyer, of the Interstate Commerce Commission, discussed the fuel situation in New York State and New England with President Harding. Mr. Meyer informed the President that after the request of Federal Fuel Distributor Wadleigh for priority orders for coal shipments to districts in New York and New England the Interstate Commerce Commission sent agents into this region who submitted reports that in virtually every instance the shortage had been relieved. Mr. Meyer told the President that in his opinion it was fear of a future shortage if cold weather continued and not a present lack of coal that had created a condition of hysteria and that much of the complaint was due to the unwillingness of consumers in these sections to dilute their anthracite with bituminous coal.

The New York State Legislature passed a resolution by Senator Ferris requesting the State Fuel Administrator to exercise the power conferred upon him by law to take immediate steps to furnish fuel to the people of the state who are at present suffering and in great peril. This action was taken in view of the fact that General Goethals had shown some hesitancy in seizing coal and had sought to obtain co-operation with the federal authorities rather than proceed under the provisions of the New York State statute.

On Feb. 21 Mr. Ferris, in the Senate, and Mr. Bartholomew, in the Assembly, introduced a bill amending the public service commission law by inserting therein a new section prohibiting common carriers without consent of the Public Service Commission from establishing embargoes on shipments of coal or other necessaries of life or refusing to accept shipments of such for transportation.

Carl Sherman, Attorney General of New York State, warned all communities that seizures of coal are "wholly unlawful" except when made under the direction of the State Fuel Administrator. When seizures are so made the price will be fixed by the Fuel Administrator and steps will be taken to replace any coal seized.

Deputy Attorneys General Edward G. Griffin and Francis W. Cullen appeared before the Interstate Commerce Commission in Washington and made application for authorization to seize coal on sidetracks, taking the position that such cars lost their interstate status when blocked in transit. This view was also indorsed by Attorney General Sherman as well as by General Goethals.

Later in the week two cars of anthracite in the Mechanicsville yard of the D. & H. R.R. were diverted to relieve the shortage in that city by direction of District Fuel Administrator Kilmer. Earlier in the day residents of the city threatened to seize the coal passing on cars.

President Harding is being kept informed on the efforts made to relieve the situation in New York and New England by daily reports from the Interstate Commerce Commission. The commission is doing all in its power to meet the situation and stands ready to issue priority or other orders if the facts justify such action.

The New England coast was ice blocked for several days, the ice in some ports being from 15 in. to 2 ft. thick. Coastguard cutters were employed to break the ice and let the coal barges through with their cargoes.

In Connecticut the State Police Department issued a request to the public to use substitutes.

A resolution said to have been offered in behalf of 20,000 miners of the Hudson Coal Co. was sent to Mayor John F. Hylan of New York City asking President Harding to intervene against "the rule-or-ruin tactics of the coal-carrying roads of the country." The Hudson Coal Co., it was charged in the resolution, had not operated its twenty-two collieries more than half time since last September. This was attributed to inability of the D. & H. R.R. to furnish requisite cars as a result of the shopmen's strike.

Mayor Hylan of New York, in a letter written at Palm Beach to Murray Hulbert, acting mayor, and made public Feb. 23, advocated immediate government seizure and operation of all mines.

Keeney Freed; Witnesses Tampered With

The trial of C. Frank Keeney, president of the West Virginia United Mine Workers, charged with being an accessory to murder in the Logan County miners' armed march in the summer of 1921, came to an abrupt end at Berkeley Springs, W. Va., Feb. 23, when Judge Woods dismissed the indictment on motion of the prosecution.

At the opening of court H. D. Allen, prosecuting attorney, asserted that four important witnesses for the state had mysteriously disappeared and he would not attempt to continue the case without them.

Judge Woods indicated that in the circumstances nothing remained for him to do but to grant the motion. T. C. Townsend, of counsel for Keeney, objected, stating that the witnesses in question also were witnesses for the defense and that three of them had come to him a day or two ago asking protection from deputy sheriffs from a "foreign county." They told him, he said, they had been compelled to make statements which were untrue.

Judge Woods ordered the witnesses brought into court. When they entered they were taken to the prosecutor's table and after a brief conference Mr. Allen told the court the men would not discuss the case with him and that it would be useless for him to proceed without them. Judge Woods agreed with him and Keeney was freed. The court ordered that the three witnesses be held for further investigation and that warrants be issued for any persons believed to have intimidated witnesses.

Sentence 47 of Cliftonville Mine Mob

Forty-seven men who were in the mob which burned the tipple at the Cliftonville mine, in West Virginia, near the Pennsylvania state line, last July were convicted or entered pleas of guilty to the indictments brought against them at Wellsburg, W. Va., Feb. 23. Sheriff Duvall and six of the attacking party were killed in the fighting.

Forty-three of the indicted men pleaded guilty to conspiracy and each was sentenced to serve three years in the Moundsville Penitentiary. The Grand Jury indicted 220 men, but only those in custody were caught. Seventy-eight were charged with murder. Four of these went to trial and were found guilty. Each was sentenced to ten years in the penitentiary. Indictments against those who have not been apprehended will stand.

Miners' Union Urges Detailed Probe of Anthracite; Union Disregards Facts, Says Warriner

In response to the recent request of the U. S. Coal Commission for suggestions and recommendations from the miners as to matters and subjects which the commission should investigate, the United Mine Workers of America filed with the commission Feb. 20 the first statement in behalf of the miners in the anthracite industry, the subject covered being "Mining." Additional statements to be filed later will deal with various other subjects connected with the anthracite industry. The first statement is signed by Thomas Kennedy, C. J. Golden and W. J. Brennan, presidents of the three anthracite districts of the miners' union, and Ellis Searles and John Moore, of the committee representing the union before the commission. The statement is as follows:

"We hereby accept your invitation to offer suggestions as to the range of facts that should be known about the anthracite industry and the ways by which they should be found out and made public. We realize that it will take time to get the essential facts, but that without them any pronouncements that might be made about the industry by strangers to it would be quite worthless.

"To show you from our more intimate knowledge of the industry the complicated problems of fact finding that Congress has set you, we present certain tables and estimates as close to the truth as is permitted by the very limited information made public. From these we conclude that the present monopoly organization of anthracite, through overcharges in each branch of the business, adds at least $3.61 per ton, which is immediately discoverable, to the present price the consumer pays, and much more which cannot be exactly estimated.

(1) In mining, an average overcharge, per ton, of	$1.26
(2) In land-owning, an overcharge which we will not attempt to estimate, but which may become the most disturbing factor in the industry in the immediate future.	
(3) In transportation, an average overcharge, per ton of	1.00
(4) In distribution, an average overcharge, per ton, of	1.35
	$3.61

"This sum ranges from $4 and $5 on domestic sizes down to approximately $1 on smaller sizes to produce the average given. It is an overcharge which amounts to a total of $252,700,000 on an annual commercial production of 70,000,000 gross tons. With similar prices, it would amount to $270,750,000 on an annual commercial production of 75,000,000 tons, which is occasionally reached.

"With such estimates before us to establish and confirm our beliefs, we ask the obvious question: 'Are these overcharges inevitable?' Is the business of mining, transporting and distributing anthracite doomed always to be so organized that a few high-cost land lessors or real-estate speculators, a few high-cost collieries, a few railroads which choose to spend their incomes on vindictive labor war, and a few high-cost distributors scattered over the country can always create a situation in which the great bulk of low-cost operators, landowners, transporters and distributors will always be tempted to advance their profits at the expense of everybody else interested in the industry?

"We do not believe it is inevitable or in any way necessary. To get to the bottom of this situation, we are asking you to find the facts which will answer certain fundamental questions implied, but not directly stated, in your suggested topics. We should like you to inform us whether or not your investigation into facts will or will not finally include these questions.

"To connect your nineteen scattered topics with our questions, we have followed the natural division of the industry into: (1) Mining; (2) land-owning; (3) transportation; (4) distribution; (5) the future of the industry.

"*Mining.*—At December, 1922, prices, the mine operators appear to be receiving a net income of approximately $1.48 for every ton of anthracite sold, including steam sizes. If these prices continue throughout 1923 until the expiration of the present agreement, they will make approximately $103,600,000, which is over 30.8 per cent on their capital stock or 41 per cent on what we believe to be the actual cash invested in capital stock. We believe that 22c. per ton will give a 6 per cent return upon the actual investment, and that everything above that is excess profit, taken and insisted upon not only at the expense of the consumer but at the risk of periodically disorganizing the industry.

"To determine the significance of your profit data, we ask you to determine the actual investment in the anthracite mines. This is the only figure which will give a basis for judgment as to excessive returns. We believe that this valuation should be done on the basis of original cost plus added expenditure. This is the only way to determine the amount allowable for deductions for depreciation and depletion. We stand ready to submit argument in favor of this basis of valuation of the coal mines.

"Six companies (the Lehigh Coal & Navigation Co., the Lehigh & Wilkes-Barre Coal Co., the Lehigh Valley Coal Co., the Philadelphia & Reading Coal & Iron Co., the Delaware & Hudson Co., and the Delaware, Lackawanna & Western Coal Co.) reported:

Net Income (All Six)		Surplus (First Four)	
1912	$8,800,000	1912	$10,000,000
1920	$32,000,000	1920	$74,000,000
(An increase of 363 per cent)		(An increase of 739 per cent)	

"If all the coal companies earned the same rate of return and increased their surpluses in the same proportion, the anthracite industry would show:

Total Net Income (Estimated)		Total Surplus (Estimated)	
1912	$13,300,000	1912	$24,000,100
1920	$51,000,000	1920	$192,400,000

"The information on these other companies has never been made public.

"In the face of such figures the miners are tired of the operators' common cry that coal strikes are caused by the lack of ability to pay better wages. There has just been a five months' suspension because of this disagreement over the question of whether the industry could or could not afford better wages and more satisfactory conditions of work. The miners drew on their credit, established laboriously over many years of constant and dangerous work, to support themselves during idleness. We agree with modern industrial engineers that the companies should do the same. There is no justification for the present high prices on the ground that the companies are paying for the expense they went to in their attempt to lower wages. If the companies are to protect themselves against such industrial losses by charging the public high prices, it would be equally just that the miners receive compensation of some sort from the companies for each day of every strike or lockout, and the miners have never asked for that.

"It is very important for the public to know the facts about profits and costs in detail. We know that the amount given as representing the value of the capital stock does not mean that anything like that figure was actually invested in the industry. We know that there are bookkeeping ways of increasing apparent costs and making the industry seem unprofitable. We therefore ask you not only to determine the present value but to establish and insist for all time upon a uniform accounting system similar to the one advocated by the Federal Trade Commission. Unless a satisfactory accounting system is adopted and enforced, the public and the miners will continue to disbelieve the statements of costs and profits which are now given so much publicity. We shall instead remember the report of the Engineers Committee of the U. S. Fuel Administration (1919) which said of the coal industry as a whole: 'depreciation was often put in as a guess. In some cases it was frankly stated that this seemed a good time to charge off improvements, and such were charged to the limit and beyond.' The same report spoke of depletion, which is another way of retiring the capital invested. It said: 'Depletion of lands was also an item which appeared greatly to trouble some of the accountants. While generally under-

stood, many very wild guesses, even up to the market price of the product, were found; also many instances of depletion charges for land operated on royalty or lease and not property of the operator.'

"These findings agree with our own beliefs that there are double charges made upon the industry in every branch, which are ultimately dangerous to its stability. We believe that much is charged to maintenance and repairs which should be charged to capital account. We, therefore, ask you to examine such charges on the industry with a view to eliminating everything which is unnecessary and unwarranted. Until that is done the anthracite-coal industry will not be able to give the efficient public service we believe it should give. We know it is natural under the present system of long-distance ownership that there should be such double charges, a keen desire for great profits, and a resulting indifference to the welfare of the men who are investing their lives in the industry.

"You will find out that this is because the majority of the coal mined is controlled by the railroad companies, which in turn are controlled by large financial interests in New York and Philadelphia, by men who have never seen the inside of a mine, but who attempt to regulate the meals, living and opportunities for schooling of the miners' families by their decisions on wages. It is known that the bankers played a leading part in the 1922 suspension. We ask you to convince yourselves of these facts as we are convinced, by tracing out the ownership of coal from the ground through the processes of mining, transportating and distributing—processes often controlled entirely by one interest which then takes four different profits on every ton.

No Guarantee of Regular Employment and Output

"You will find that neither the present ownership nor the present management has yet been able to guarantee regularity of production and employment to the industry. In spite of the relatively steady work (256 to 272 days out of a possible 308) during the past few years, anthracite is not immune to irregularity. It is known that the coming of the 1922 suspension concealed the fact that there were to have been at least 60 idle days during the summer of 1922. You will find that this is due locally and occasionally to car shortage. The U. S. Department of Labor reported for November, 1922: 'Wilkes-Barre—Inadequate transportation has retarded employment in the mining industry.'

"We believe the possible irregularity of production is due to the apparently limited market for the average amount of anthracite produced. The market might have been widened: (1) If exorbitant freight rates were not charged on anthracite, which discriminated against it in favor of soft coal; (2) if middlemen did not take such a large share of the value of each ton; (3) if the operators and land lessees did not insist upon such large profits.

"We ask you to inform us of any ways by which the market for anthracite can be increased.

"You will find that there has been wastage of coal. There is less of this now than there was formerly, but where managements change, as they still do in the smaller mines, and each new management seeks to cream off what it can, the result is often that much coal may be lost. In certain mines the operators went right after the coal that was closest to the mouth drift, shaft bottom or slope bottom, and removed it without regard to the mining of coal further off. This desire for immediate production with apparently low costs resulted over a period of time in an increased cost of production because of the increased requirements for more timber props, etc. This condition could have been avoided if the mine had been worked with the purpose of getting out all the coal available instead of with the desire to get everything while the getting was good and to sell out as soon as the results of this policy became apparent.

"If it were possible for men to engage in the business of mining coal in order to produce fuel for the country instead of producing profits for a few investors, the amount of waste might be eliminated.

"We therefore urge that, if you limit your attention to the mere facts about the cost of living, wages paid in similar industries, and the superficial showings of the balance sheets, your work will leave the industry quite where you found it. If your work is to be of any use at all in settling the coal question, you must take account of the whole range of claims upon the industry in the form of the various items of costs, wastes and the claims by capital holders—with the purpose of eliminating all exorbitant, unnecessary and consequently disturbing charges. Lack of a complete detailed statement year by year of costs, profits and investment in each branch of the industry has created a situation where the mining, land-owning, transporting and distributing departments of the industry shift the burden of proof for high prices from one to the other in an apparently high-minded desire to show that their hands are clean, their hearts are pure and their earnings low. Lack of itemized knowledge of the costs that enter into each branch is a difficulty we expect you to remove. This ignorance was the fact that led the consumers of anthracite (represented by the legal departments of Massachusetts, New York, etc.) to fear that the small increase (approximately 10c.) caused by the recent anthracite tonnage tax would result in an entirely disproportionate rise in the final price.

"We therefore ask you to discard the division of costs into labor, supplies and other expenses, and to make public in detail how much of the cost of a ton of coal is devoted to: (1) labor, (2) supplies, (3) power, (4) compensation insurance, (5) administration, (6) depletion and depreciation, (7) county and state taxes, (8) royalty.

"We ask that you make public the information you collect so that it may be stated in the following form: (1) Cost per commercial ton (itemized); (2) profit per commercial ton before federal tax; (3) profit per commercial ton after federal tax; (4) proportion of profit to actual investment.

"We recall your promise to give the miners representation in examining the cost figures of the various collieries and companies and again state our belief that this is essential.

"We have no confidence in the figures supplied in the past by the operators to the Department of the Interior or to the Federal Trade Commission, although the latter body made a more critical study of them. Any figures you may now ask for and receive will not differ in our estimation from previous compilations unless we are given the opportunity to know in detail what the figures are, and are given the opportunity to study, analyze and criticize the varying accounting systems used in their preparation."

Warriner Attacks Union Statement

S. D. Warriner, chairman of the General Policies Committee of Anthracite Operators, on Feb. 21 issued a public statement pointing out the weaknesses in the assumptions made by the union representatives as follows:

"The purpose of the published statement of the miners' organization is inexplicable, unless it is to divert attention from the real cause of the coal shortage from which the public is suffering. The present shortage of anthracite is due exclusively to strikes, and strikes in the anthracite industry are at all times unjustifiable, because for over twenty years that industry has been distinguished by a labor board which provides for the adjustment of all disputes by conciliation, with final resort to an umpire. Notwithstanding this, and even since the settlement of the strike in the anthracite field in September, hundreds of thousands of tons of production have been lost by outlaw strikes in violation of agreements.

"The statement that the anthracite producers are overcharging the public $3.61 a ton must, as the miners say, be based on 'very limited information.' It shows a reckless disregard of the facts for the miners' organization, with little or no information in its possession, to pretend to fix such a figure as $3.61 as overcharge.

"The United States Coal Commission is making an elaborate investigation of the cost of production, transportation and distribution of anthracite, and the operators are co-operating with it in furnishing the necessary information as to the costs and profits. Until this information has been compiled and the commission has made its findings, it is absurd for any of the parties in interest to attempt to prejudge the case and mislead the public by any such statement as was published in the morning papers."

L. & N. Ry. Adopts Commission Plan of Car Allotment to Mines

The Louisville & Nashville Ry. has committed itself to the commission plan of car allotment to the mines on its system. This was agreed to at a meeting held in Louisville, Feb. 23, and will become operative March 1.

The acceptance of the commission plan was the result of months of work on the part of the various coal associations in the districts along the system, which held numerous meetings at their own headquarters, Louisville, Cincinnati and Washington. Special committees were drafted from those representing operators in southeastern Kentucky, northeastern Tennessee, the Birmingham district, eastern Kentucky, southern Indiana, western Kentucky and even the small group in the western part of Virginia had its voice in the matter.

A meeting of representatives of the special committees was held in the morning and elected Attorney Van Norman, who represents various coal interests but who had no particular ax to grind, chairman. J. H. Amos, of the Jewett, Bigelow & Brooks interests, Cincinnati, was made secretary. After threshing out the various plans that were proposed it finally was agreed that the commission system that is in use by the Norfolk & Western Ry. comes close to being the most workable if applied to the L. & N. The point whether it should be a three- or a five-man commission was left open.

Through various conferences held by coal shippers and representatives of the large coal-carrying roads operating in southern West Virginia during the latter part of February a uniform system of car allotment and car distribution was worked out, effective March 1, and under the agreement reached in all cases allotment commissions have been established whose members will visit personally the various coal mines and allot each mine the number to which it is entitled under the rules and regulations adopted. The meeting of shippers and officials of the Chesapeake & Ohio was held at Huntington and rules and regulations worked out at a conference there. Similar rules and regulations were worked out at a meeting between about 45 shippers on the Virginian Ry. and officials of that road at a meeting held at Huntington. The conference between Norfolk & Western shippers and officials of that road was held in Washington. J. W. Davin, of Huntington, is chairman of the Chesapeake & Ohio allotment commission of five; W. F. League, of the Virginian commission of three, and the understanding is that John Stewart will retain his position as chairman of the Norfolk & Western allotment commission and that the present commission of two will be enlarged.

Kanawha Operators to Consider Proposals Of Union Scale Committee

Operators from the Kanawha district in West Virginia, meeting at the Chamber of Commerce in Cincinnati on Friday, Feb. 23, elected to meet the United Mine Workers scale committee of that district for the purpose of hearing what proposals they have to make regarding the agreement which must be continued after March 31. To this end they appointed E. O. Dana, of Cincinnati (chairman); O. F. Harris, Cannelton, W. Va.; John Snure, Wheeling; John McKeever, Longacre; W. C. Michel, Plymouth; A. W. Pollock, Ramage; A. W. Fugel, Blakeley, and A. Michire, of Charleston, as their scale committee.

As the Kanawha district stands at present about 65 per cent of the tonnage is being produced on an open-shop basis and 35 per cent under agreement with the miners' union. Of the latter the mines on the Kanawha & Michigan R.R. are organized 100 per cent and about 20 per cent of the production on the Chesapeake & Ohio side of the river is put on wheels by closed-shop miners.

The open-shop production is fathered principally by the Kanawha Operators' Association and these are firm in their resolve to continue the policy. It developed through the meeting that some nine mines would find it impossible to continue production under the scale agreed to at the New York meeting and that they might be forced to stay out if an agreement is entered into with the union. This would cut the C. & O. tonnage to 12 per cent instead of 20. Many angles of the conditions that have to be faced were gone over and the drafting of the scale committee would indicate that further negotiations are in sight—even though Frank Keeney, as the spokesman for the unionists, issued a bombastic statement on Saturday regarding the basis of settlement that the miners intended insisting upon.

Colonel E. O. Dana, who was the chairman of the Cincinnati meeting, said: "It was the consensus of those present that we should meet with the miners at a later day and closer to the time when the existing agreement expires. There will also be further meetings of the operators between now and that time."

Walsh Asks Data on Anthracite Impurities

Under the terms of a resolution introduced by Senator Walsh of Massachusetts Feb. 26 and adopted by the Senate with only brief discussion, the U. S. Bureau of Mines is directed to report to the Senate the results of its studies of anthracite coal in purchases for government use in Washington. Specific reference in the report is asked regarding the extent to which impurities and misgrading have been found in domestic sizes of anthracite; what information the bureau may have as to the extent of impure or misgraded anthracite generally marketed to the public, and whether it is the opinion of the bureau that legislation should be adopted seeking to establish market grades in size and quality of anthracite shipped in interstate commerce.

The preamble recites that there is "general complaint of the marketing to the public of anthracite coal of misgraded sizes and containing a large proportion of impurities."

Senator Walsh's bill to establish standards of anthracite coal in interstate commerce, which he introduced several weeks ago and which had been on the table, was referred to the Committee on Mines and Mining last Friday when reached on the calendar. Senator Walsh attempted to obtain immediate consideration, but Senator Poindexter, declaring that the bill required study and probably would need "considerable amendment," insisted upon a motion that it be referred to the committee, this motion prevailing.

I.C.C. Revokes Service Order 38

Washington, Feb. 27.—In vacating its Service Order 38, the Interstate Commerce Commission practically admits its mistake in having issued this order over the protest of Federal Fuel Distributor Wadleigh. This service order gave a large preferential car supply to the Mountevallo mine in Alabama without charging the cars against the distributive share of the mine. After the order was issued Mr. Wadleigh again objected and requested reconsideration of the order and its annulment. Another indication that Mr. Wadleigh is right in his analysis of the situation was the fact that the mine was unable to load a considerable proportion of the cars which it received during the time the service order was in effect.

Asks Hammond to Combat State Coal Laws

A public utterance by John Hays Hammond as to the inadvisability of coal legislation by the several states has been asked by J. C. Brydon, chairman of the bituminous operators' special committee. The request was made because it is feared that state legislation may change conditions so that the commission's report will be made to Congress on facts obtained before the situation was changed by state legislation.

The bituminous operators' special committee will meet March 8 in the law offices of Henry L. Stimson, 32 Liberty Street, New York City.

Lewis to Study British Coal Situation

John L. Lewis, president of the United Mine Workers of America, was a passenger on board the White Star liner Celtic, which sailed from New York City Feb. 24 for Liverpool. He is going to make a six weeks' survey of the coal situation in England. Mr. Lewis said that he would visit the heads of the mine workers all over the United Kingdom and study production and labor conditions.

Coal Commission Now Likely to Get Funds

Washington, Feb. 27.—Chairman Madden formally announced today on the floor of the House of Representatives that the Appropriations Committee of the House is in full accord with the President's Coal Commission. "We would like very much to have recommended an appropriation of $400,000," he said, "but we realize that there is no law that authorizes us to do it. I believe the facts that may be found by the commission, judging from the work it has done already, would justify the expenditure of a very large sum of money."

The significance of this statement from the chairman of the Committee on Appropriations is that a Senate amendment will be accepted by the conferees on the deficiency bill, which practically assures the ultimate voting of the money.

Decision Rendered in Ohio & Kentucky Ry. vs. Louisville & Nashville R.R.

The Interstate Commerce Commission on Feb. 19, 1923, handed down a decision and order on Docket No. 13602, the Ohio & Kentucky Ry. Co. vs. Louisville & Nashville Railroad Co., involving the division of rates on northbound coal.

The line of the Ohio & Kentucky is wholly within the State of Kentucky and extends from O. & K. Junction to Licking River, 38.43 miles. That portion of the line from Cannel City to Licking River, 12.8 miles, is operated under lease from the Caney Valley R.R. Ohio & Kentucky passenger trains are operated from O. & K. Junction to Jackson, 1.37 miles, under trackage rights with the Louisville & Nashville R.R., hereinafter referred to as defendant. All freight is interchanged with defendant at O. & K. Junction.

The important action taken by the commission in this case is to apply the principle established in the P. & W. V. case, that reasonable divisions established prior to the various general increases in rates made during the past few years, should be increased proportionately as the joint rates were increased in order to take care of the growing burden of operating expense.

In this case (Ohio & Kentucky) the division first established on May 1, 1919, is used as the base, because prior to that time no joint through rates were in effect, the coal originating on the Ohio & Kentucky moving out over the L. & N. through O. & K. Junction on combination rates based upon a proportional rate published by the O. & K. Ry. to O. & K. Junction plus the rate published by the L. & N. from that point to destination.

On May 1, 1919, joint rates were published from O. & K. mines on the basis of 20c. over the rate from O. & K. Junction on the rates from O. & K. Junction on the L. & N. The situation since May 1, 1919, on divisions, as disclosed by the report is as follows:

TO ALL DESTINATIONS NORTH OF THE OHIO RIVER, WEST OF THE BUFFALO-PITTSBURGH LINE AND POINTS IN WESTERN TRUNK LINE TERRITORY

		From O & N Jct. to Three Mile Inclusive			From North of Three Mile to Wilburst			North of Wilburst		
		1	2	3	1	2	3	1	2	3
May	1, 1919	25	...	...	25	...	...	27½	...	...
Aug.	26, 1920 *a*	33⅓	33⅓	...	33⅓	33⅓	...	36⅔	36⅔	...
March	3, 1921 *b*	...	35	...	...	35	...	...	38	...
May	25, 1921 *c*	...	34½	...	...	34½	...	...	37½	...
Oct.	6, 1921 *d*	27	...	...	27	...	...	30⅔	...	...
June	16, 1922 *e*	15	32½	28	27	34⅔	34⅔	30⅔	37½	37½
July	1, 1922 *f*	13½	29½	25	26½	31½	31½	29½	34	34

(*a*) General advance of 33⅓ per cent. (*b*) Advance of 4 per cent. (*c*) Reduction of 1⅓ per cent. (*d*) Reduction of 9 per cent. (*e*) Joint rates on the district basis were established by order of I. C. C. from stations O & K Jct. to Three Mile, inclusive, which meant a reduction of 20c. a ton. Rates from stations north of Three Mile not changed. (*f*) General reduction of 10 per cent.

In column No. 1 above are shown the divisions actually in effect between the O. & K. and L. & N.

In column No. 2 above are shown the divisions that would have been in effect if they had been changed in accordance with the increases and reductions in the joint rates.

In column No. 3 are shown the divisions fixed by the I. C. C. in this case, Docket No. 13602.

The division of 37½c. to Cincinnati is not involved in the case. The divisions to stations on pages 98 and 99 of the effective tariff and to Jeffersonville and New Albany, Ind., are ordered by the I. C. C. to be adjusted on a pro-rata basis to the divisions prescribed above.

It will be noted that the I. C. C. fixed divisions for points north of Three Mile in the same amount as those shown in column 2, but from O. & K. Junction to Three Mile, inclusive, they fixed a lower division than shown in column No. 2. This latter was done because the carriers had partly sustained the burden of proof that they should be lower, most probably because of the establishment of joint rates from the latter stations on the district basis, effective June 16, 1922, which meant a reduction of 20c. per ton on the rate.

The I. C. C. also suggests that passenger fares on the O. & K. should be increased and that the O. & K. should arrange for a reduction in the rental of $500 per month paid to the Caney Valley property. This latter means a return of 3.29 per cent on the value of the Caney Valley as indicated in the report of the Bureau of Valuation of the I. C. C., which that road could not earn as an operating carrier.

Marked Increase in Production in January

Most of the figures thus far received regarding January business conditions, according to the Survey of Current Business prepared in the Bureau of the Census and printed in *Commercial Reports*, show a very large productive activity, with new high records in many cases. "Cotton goods, pig iron, steel ingots, locomotives, zinc, bituminous coal and flooring are among the basic commodities whose January production figures show the largest output since the boom period of 1920. Sales and unfilled orders show the same upward trend, especially in metals and building materials. The large car loadings and seasonally high retail sales, as well as the general depletion of manufacturers' stocks, indicate that the goods produced are quickly passing into consumption."

Arc from Broken Feeder Line Caused Dawson Explosion, Says Coroner's Jury

A derailed car on an outbound trip knocked down haulageway timbers, dropping a feeder power line onto the steel car, striking an arc which ignited coal dust. This is the direct cause assigned by a coroner's jury for the Feb. 8 explosion in No. 1 mine of the Phelps Dodge Corporation at Dawson, N. M. The jury, impaneled by T. L. McKinney, justice of the peace, reached this decision after long hearings following the explosion. The mine, in which 122 men lost their lives and much property damage was done, is now cleared, but extensive repairs underground and at the mouth of the slope must be made.

High Court Reverses Central Coal Verdict

In a brief decision, Feb. 26, the U. S. Supreme Court in effect nullified the Arkansas State law permitting suit in any county of the state by a citizen of the state against a foreign corporation which engages in business within the boundaries of Arkansas. The case at issue was an appeal by the Central Coal & Coke Co., a Missouri corporation with mines in Sebastian County, Ark., from a decision of the Arkansas Supreme Court sustaining a lower state court in a judgment rendered Jacob Ocepek, formerly an employee of the Central company, for personal injuries.

Monongahela Operators and Miners Sign Up

The Monongahela Coal Association and the district officers of the United Mine Workers signed an agreement at Pittsburgh, Pa., Feb. 20, on wages and working conditions for the year beginning April 1 next. The agreement covers about 45 mines in the Morgantown (W. Va.) district, in which about 10,000 miners are employed.

In explaining the wage agreement, John H. Jones, president of the Bertha Coal Co., said that the scale to be in force would be the same as that which at present prevails in the Morgantown field.

U. S. Coal Commission Will Suspend Work March 4 Unless Congress Grants Additional Funds

By Paul Wooton
Washington Correspondent of *Coal Age*

Since there have been too many inconclusive investigations of the coal industry, the President's Coal Commission is prepared to suspend its work on March 4 if Congress does not provide it with the necessary funds to continue its program on the scale outlined. It was announced on Feb. 24 by Chairman Hammond and Commissioner Smith that the commission is unanimous in its conclusion that it would be undesirable to attempt to continue its work even until the funds at its disposal are exhausted. On March 4 the commission will have $85,000 of its appropriation still on hand. This will not carry its investigations to a conclusion.

It is not a foregone conclusion that Congress will not furnish additional funds for the commission's use. No appropriation is carried in the deficiency bill as reported out of the Appropriations Committee of the House on Feb. 22. It is possible to attach the appropriation to that bill on the floor of the House or it may be carried in a Senate amendment. There is every reason to believe that the leadership in Congress is entirely willing that the commission should have its $400,000. It was excluded from the deficiency bill because it would have been subject to a point of order since the legislative authority for the appropriation had not been voted. Chief blame is laid at the door of Chairman Winslow, of the Committee on Interstate and Foreign Commerce, who has insisted on subordinating the legislation desired by the commission to the Cape Cod Canal proposition, alien property legislation and other controverted matters which have prevented consideration of coal legislation, which probably would not have led to protracted discussion. Dr. Smith states that the commission has no evidence whatever of any concerted effort either inside or outside of Congress in opposition to the legislation.

Hammond and Smith Speak Frankly

Both Chairman Hammond and Dr. Smith were entirely frank in expressing their views to the Committee on Appropriations. This is shown by the following verbatim extract from those hearings:

Chairman Madden—What would happen to the investigation if you are confined to your present appropriation?

Dr. Smith—I think the chairman of the commission will bear me out in saying that it is not worth while to continue it, if we do not get this additional appropriation.

Mr. Hammond—It would be a sheer waste of money. It would be like starting to build a dam and only completing one-half of it. It would be foolish. It would be much more economical for us to return the unexpended money to the government. As a matter of fact, we cannot undertake to continue the investigation unless we get the appropriation for which we are asking. We pared it down from $540,000 to the irreducible minimum of $400,000. We do not see how we can cut it down more and have a report worth presenting to Congress.

Chairman Madden—Is the commission unanimous in its request for this appropriation?

Dr. Smith—Yes sir; and also unanimous in the belief that it would not be worth while to continue this investigation after March 4 unless this additional appropriation is allowed, and that we should stop the investigation then and save what we can of the appropriation already made.

Chairman Madden—Is the commission unanimous in the belief that the investigation will result in something worth while, if the additional money is appropriated?

Mr. Hammond—We will guarantee it.

Dr. Smith—I would like to add the fact that the commission believes it had a great deal to do with settling the labor difficulties so that we were assured a month ago that there would be no strike on April 1. As a result, the soft-coal market has been softened very much. In four weeks the average price for bituminous coal has gone down 84c.

Chairman Madden—Do you think the commission contributed to that reduction?

Dr. Smith—We have been blamed for it by some of the coal operators.

Mr. Hammond—I think the operators admit it. Of course, we are abused by some of them because we despoiled them of their profits.

Dr. Smith—Ordinarily that labor situation is not settled until the eve of April 1, if it is settled at all.

An indication that the commission fully expects to obtain its appropriation is had in the announcement of plans for visits to various coal-mining regions. Dr. Devine and Mr. Neill expect to make a first-hand survey of the situation in Oklahoma and Texas mining districts. Chairman Hammond, Governor Marshall and Commissioner Howell already have made their railroad reservations preparatory to a trip to the Alabama fields early in March. Dr. Smith expects to visit a number of the fields nearer to Washington.

Like the Cloaca Maxima, the principal sewer of ancient Rome, the commission is being made a dumping place for all sorts of theories and panaceas. Several of the interests closely concerned with the investigation have addressed communications to the commission which were in fact propaganda. The United Mine Workers have issued two such statements within a week. On the other hand, the commission is a recipient of a great mass of helpful data. Among other things, its attention has been called to a widely held belief that coal operators have not made sufficient use of engineering skill. The record is said to be clear that expenditures for engineering talent and advice represent an insignificant portion of the expense of coal-mine development—very much in contrast with the amount expended for engineers in metal mining. Some engineering methods in the coal industry are held to be entirely inexcusable. Most metal mines, it was pointed out, operate on a 24-hour basis. Most coal mines work only one shift. As a result the great investment in plant and equipment is not being utilized throughout twenty-four hours. Were the mines to be operated for even two shifts, many believe it would have the effect of eliminating more of the high-cost mines and would make for a better labor situation.

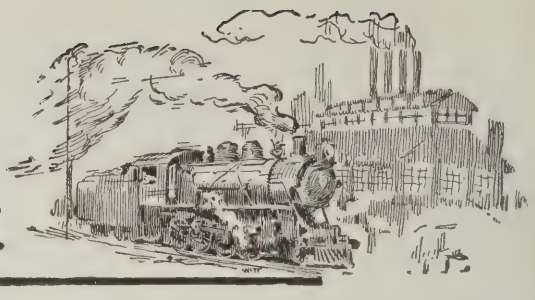
Another point being emphasized is that insufficient attention is being given return "cargo" for cars, in direct contrast with the careful consideration being given to return cargo for ships. While the car is a smaller unit and the haul is shorter, which makes the matter of empty transportation relatively less important than in the case of ocean carriers, yet it is held to be a matter of great importance which should concern coal operators, dealers and consumers, as well as the transportation companies. In that connection it also is pointed out that the railroads have been material contributors to overdevelopment in regions containing coal deposits. In their eagerness to obtain tonnage they have frequently disregarded the general economic effect of making possible the opening of new mines when there are too many already.

As this is written it seems certain that the amendments to the Coal Commission Act are lost. While it is possible to put through the appropriation on a Senate amendment, it is not practicable to attempt the handling of other Coal Commission legislation on that basis. The feeling is expressed, however, that penalties are not necessary to assure correct returns on the commission's questionnaires.

Under a bill recently introduced, the State of Utah could take over and operate all Utah coal mines "in time of emergency," selling the coal to the people at cost, thus creating a fund from which mine owners would be reimbursed for all coal removed from their mines at the average price for the preceding year.



Production and the Market



Weekly Review

There is a feeling of easiness in the bituminous coal market. Here and there a better demand exists for various grades and in some instances there have been slight advances in prices, offset, however, by declines at other points. *Coal Age* Index is unchanged from last week, at 288. The corresponding spot price is $3.49.

The severe cold weather general in all sections of the country last week slowed down transportation and sharpened demand. This combination of circumstances also held the market even.

Production of soft coal has dropped to a new level, being now around 10,500,000 net tons per week. Every prospect is for lower tonnages during March.

Price changes were more general in the high-volatile coals than in the low-volatile grades.

There are faint indications of foreign demand for smokeless coals because of the Ruhr situation and the steady advance in Welsh coal prices. These, however, are hardly to be relied upon to support any ambitious program of coal exports. Two vessels, one for Genoa and the other for Rotterdam, have been chartered for early March cargo loading.

While inquiries are being received here regarding shipments of coal to foreign countries, British coal to the amount of more than 32,000 tons was received in New York harbor during the week ended Feb. 24.

Operators Quote Contract Figures

Operators are freely quoting contract figures and some contracts have been closed at figures ranging from $3.25@$4, with the majority of the tonnage covered at $3.50@$3.60. Consumers are not overanxious to close contracts for their next year's fuel supply and are doing so only when they feel comfortably sure that the spot market is not going lower than their contract figures.

In the Midwest steam coals are sluggish and hard to move while domestic demand was hardly sufficient to take care of the southern Illinois lump and stove sizes. The bottom was kept from dropping out of the domestic situation by the transportation situation.

A peculiar situation existed in the Northwest during the past week. While bituminous coal at the Head-of-the-Lakes was going down in price from 50 to 75c. there was a scarcity of coal around Milwaukee along with snowstorms which hindered rail movement. Duluth dock men, having considerable coal on hand, begun shading prices to avoid an expensive carry-over, excepting lake shipments to bring in coal at a lower figure than the cost of the coal on hand.

At the request of Fuel Distributor Wadleigh, the Navy and the Army has sent tugs to Boston and other New England ports to act as ice breakers to permit the entry of coal barges. Telegraphic advices to Mr. Wadleigh on Feb. 27 indicated that coal barges now can move freely to New England destinations.

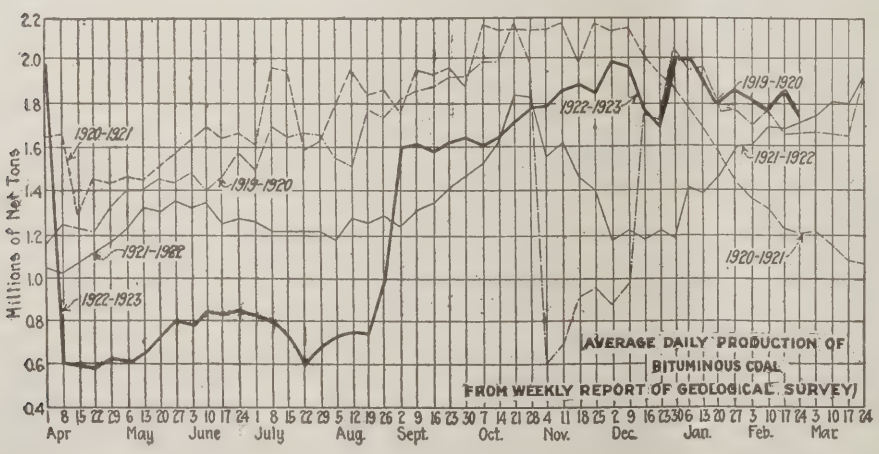
Brisk Demand at Birmingham

One of the bright spots in the country is at Birmingham, Ala., where there is a brisk demand for domestic coal due to cold weather. Yards have been entirely cleared of stocks although production is on a basis of around 385,000 net tons per week and car supply ranges from 50 to 60 per cent of requirements.

An ample supply of smokeless coals at the Virginia terminals resulted in a softened market. There was an improvement in coastwise shipments and in the bunker trade. Dumpings, however, were 98,352 net tons less in the week ended Feb. 22 than in the previous week.

The coldest weather of this winter had no appreciable effect on soft coal in the East. Supplies remained sufficient to meet requirements. Heavy ice hampered transportation along the eastern coast from New York to New England and for several days only the larger vessels were able to make deliveries.

The anthracite market is active and domestic sizes moved easily. The smaller operators who a few weeks



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Feb. 3	9,714,000	10,686,000
Feb. 10 (*b*)	10,309,000	10,725,000
Feb. 17 (*a*)	10,285,000	10,549,000
Daily average	1,714,000	1,758,000
Coal year to date	369,949,000	356,664,000
Daily average coal year	1,365,000	1,314,000
ANTHRACITE		
Feb. 3	1,811,000	2,056,000
Feb. 10	1,822,000	2,023,000
Feb. 17	1,703,000	1,828,000
Coal year to date	78,122,000	44,582,000
COKE		
Feb. 10 (*b*)	128,000	359,000
Feb. 17 (*a*)	135,000	382,000
Calendar year	840,000	2,392,000

(*a*) Subject to revision. (*b*) Revised from last report.

ago reduced their prices from around $13@$14.50 because of the cancellation of orders due to mild weather have gone back to their former prices.

Stocks of anthracite at the Head-of-the-Lakes are now down to 15,000 tons, with the supply going to dealers in small shipments. There were 2,825 cars of bituminous coal and 3,632 cars of anthracite forwarded to New England through the principal gateways over the Hudson River and through Rouses Point during the week ended Feb. 17, as reported by the American Railway Association. This was 4 cars less of anthracite and 636 cars less of bituminous coal than the previous week.

The spot furnace coke market has stiffened. There was a fair volume of buying by consumers while one producing interest has been in the market for coke to apply on its delivery obligations.

"The total soft coal raised during the week ended Feb. 17 is estimated at 10,549,000 net tons, a decline of 239,000 tons from the revised estimates of 10,788,000 for the week preceding," says the U. S. Geological Survey. "Early returns on car loadings in the present week show 39,280 cars loaded on Monday, 30,177 on Tuesday, and 31,392 on Wednesday, thus indicating a rate of production lower than in the week before and a probable total output of from 10,200,000 to 10,400,000 tons."

Midwest Steam Trade Drags

Field and railroad conditions during the past week in the Chicago region were such that steam coals from any territory were sluggish and difficult to move. Domestic demand was barely enough to absorb the best-known and most widely advertised lump and stove sizes from southern Illinois throughout the Chicago and Northwest market region, leaving the others to hunt for buyers. Around St. Louis the cheaper grades of domestic coals from the Standard district were the ones that moved most easily, though the usual steady call for high-grade Mt. Olive lump continued fairly evenly. This movement of domestic sizes brought so much fine coal into transit that screenings everywhere softened. Even Franklin County screenings required pushing at $2.25, the lowest listed price. Association operators held to that minimum as closely as possible, but it was a hard struggle

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

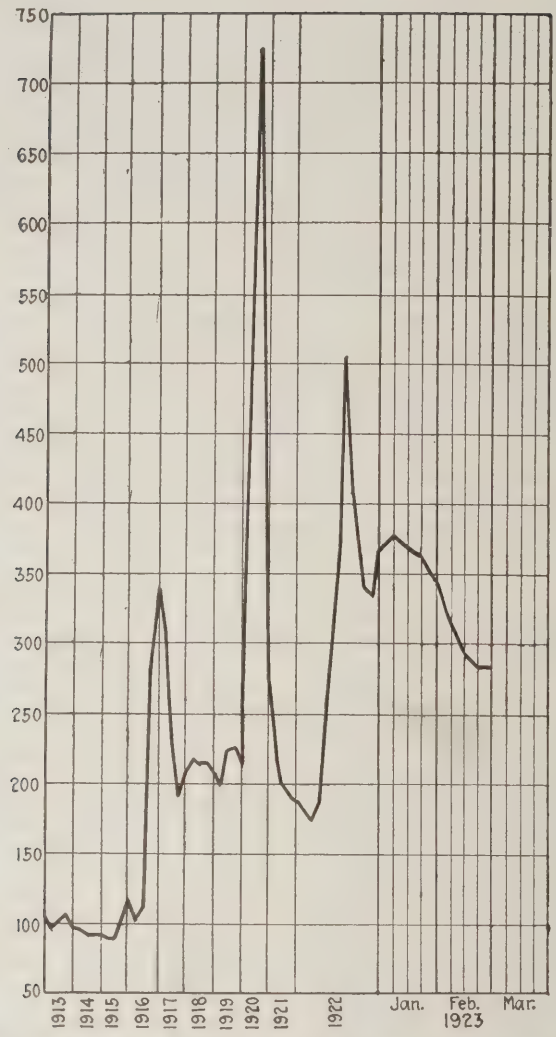
	Market Quoted	Feb. 27 1922	Feb. 12 1923	Feb. 19 1923	Feb. 26 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.25	$7.00	$7.00	$6.50@$7.50
Smokeless mine run	Columbus	2.15	4.75	4.35	*4.25@ 4.75*
Smokeless screenings	Columbus	1.40	4.75	4.35	**4.25@ 4.65**
Smokeless lump	Chicago	3.15	7.00	7.00	6.75@ 7.25
Smokeless mine run	Chicago	2.15	4.75	4.75	*4.00@ 5.00*
Smokeless lump	Cincinnati	3.15	7.10	7.25	**7.00@ 8.00**
Smokeless mine run	Cincinnati	1.75	4.75	4.75	4.50@ 5.00
Smokeless screenings	Cincinnati	1.15	4.50	5.00	*4.00@ 4.25*
*Smokeless mine run	Boston	4.60	7.15	6.70	*6.10@ 6.35*
Clearfield mine run	Boston	1.95	3.85	3.85	*3.50@ 4.00*
Cambria mine run	Boston	2.45	4.50	4.50	*4.00@ 4.75*
Somerset mine run	Boston	1.90	4.10	4.10	*3.75@ 4.25*
Pool 1 (Navy Standard)	New York	3.00	5.25	4.80	*4.50@ 5.00*
Pool 1 (Navy Standard)	Philadelphia	3.05	5.10	4.80	*4.55@ 4.90*
Pool 1 (Navy Standard)	Baltimore	2.70	4.60	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.40	4.60	4.00	*3.50@ 4.25*
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	4.60	4.35	*4.10@ 4.40*
Pool 9 (Super. Low Vol.)	Baltimore	2.40	4.35	3.60	*3.50*
Pool 10 (H.Gr.Low Vol.)	New York	2.00	4.10	3.70	*3.25@ 3.75*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	4.10	3.70	*3.50@ 3.75*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.10	4.00	3.25	3.25
Pool 11 (Low Vol.)	New York	1.75	3.35	2.90	2.70@ 3.15
Pool 11 (Low Vol.)	Philadelphia	1.75	3.10	3.15	*2.90@ 3.25*
Pool 11 (Low Vol.)	Baltimore	1.85	3.00	2.65	*2.60*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	2.95	2.60	*2.10@ 2.40*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	2.95	2.75	*2.35@ 2.60*
Pool 54-64 (Gas and St.)	Baltimore	1.40	2.85	2.45	**2.65**
Pittsburgh sc'd gas	Pittsburgh	2.65	4.10	4.10	4.00@ 4.25
Pittsburgh mine run (St.)	Pittsburgh	2.15	2.75	2.75	2.75
Pittsburgh slack (Gas)	Pittsburgh	1.65	3.25	2.85	*2.75@ 2.85*
Kanawha lump	Columbus	2.55	4.50	4.30	**4.00@ 5.00**
Kanawha mine run	Columbus	1.60	2.60	2.60	**2.75@ 3.00**
Kanawha screenings	Columbus	1.40	2.35	2.35	**2.35@ 2.60**
W. Va. lump	Cincinnati	2.25	4.25	4.25	**4.50@ 5.00**
W. Va. Gas mine run	Cincinnati	1.85	2.60	3.35	*2.75*
W. Va. Steam mine run	Cincinnati	1.40	2.60	3.35	*2.50*
W. Va. screenings	Cincinnati	1.30	2.25	2.35	2.25@ 2.50
Hocking lump	Columbus	2.55	4.50	4.25	*3.85@ 4.75*
Hocking mine run	Columbus	1.90	2.50	2.50	*2.50@ 2.75*
Hocking screenings	Columbus	1.50	2.10	2.10	1.90@ 2.35
Pitts. No. 8 lump	Cleveland	3.10	4.20	4.25	**4.00@ 4.75**
Pitts. No. 8 mine run	Cleveland	$2.00	$3.15	$3.20	**$3.75@$4.00**
Pitts. No. 8 screenings	Cleveland	1.80	3.10	3.10	*2.85@ 3.00*
Midwest					
Franklin, Ill. lump	Chicago	3.25	5.35	4.60	4.50@ 4.75
Franklin, Ill. mine run	Chicago	2.50	3.85	3.35	3.25@ 3.50
Franklin, Ill. screenings	Chicago	2.00	2.55	2.55	*2.25@ 2.50*
Central, Ill. lump	Chicago	3.00	3.60	3.35	3.25@ 3.50
Central, Ill. mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.80	1.60	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.25	4.35	4.35	4.25@ 4.50
Ind. 4th Vein mine run	Chicago	2.50	3.10	3.10	3.00@ 3.25
Ind. 4th Vein screenings	Chicago	2.00	2.30	2.10	2.00@ 2.25
Ind. 5th Vein lump	Chicago	2.90	3.60	3.60	3.50@ 3.75
Ind. 5th Vein mine run	Chicago	2.25	2.60	2.60	2.50@ 2.75
Ind. 5th Vein screenings	Chicago	1.75	1.80	1.80	1.75@ 1.85
Standard lump	St. Louis	2.60	3.10	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.95	2.25	2.25	2.25
Standard screenings	St. Louis	1.10	1.45	1.45	1.40@ 1.50
West Ky. lump	Louisville	2.65	3.85	3.35	3.25@ 3.50
West Ky. mine run	Louisville	1.85	2.35	2.05	**2.00@ 2.40**
West Ky. screenings	Louisville	1.80	2.10	1.85	1.75@ 2.00
West Ky. lump	Chicago	.....	3.85	3.60	3.50@ 3.75
West Ky. mine run	Chicago	.....	2.00	1.95	1.90@ 2.00
South and Southwest					
Big Seam lump	Birmingham	2.60	3.95	.....	.....
Big Seam mine run	Birmingham	1.85	2.35	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	4.85	4.60	4.50@ 4.75
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.55	5.25	4.75	**4.50@ 5.50**
S. E. Ky. mine run	Louisville	1.55	2.60	2.60	2.25@ 3.00
S. E. Ky. screenings	Louisville	1.35	2.35	2.35	*2.00@ 2.40*
S. E. Ky. lump	Cincinnati	2.35	4.25	4.00	**4.50@ 5.00**
S. E. Ky. mine run	Cincinnati	1.75	2.35	2.60	*2.25@ 2.50*
S. E. Ky. screenings	Cincinnati	1.15	2.10	2.35	*2.00@ 2.25*
Kansas lump	Kansas City	5.00	5.00	5.00	5.00
Kansas mine run	Kansas City	4.00	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.50	2.50	2.50

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Latest Pre-Strike Company	Feb. 19, 1923 Independent	Feb. 19, 1923 Company	Feb. 26, 1923† Independent	Feb. 26, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35 @8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.50@ 5.50	4.00@ 4.10	*4.50@ 5.25*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	5.00@ 5.50	4.00	4.00@ 5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 3.00	2.75@ 3.00	2.25@ 3.00	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50@ 2.00	2.00	1.40@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 288, Week of Feb. 26, 1923. Average spot price for same period, $3.49. This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

in the face of Williamson and Saline County competition at $2.

The only thing that kept the bottom from dropping out of even the domestic market was the transportation situation. Congestion at the Toledo, Louisville and Cincinnati gateways held back a good deal of Eastern coal that eventually will reach the Chicago district, thus throwing the market open to Illinois mines. Car supply there permitted not to exceed three days' running time in most southern Illinois mines and only four days in central Illinois. Standard district and Mt. Olive mines east and northeast of St. Louis were lucky to get as much as 2½ days.

Louisville Feels Blockade Effects

The railroad congestion around Louisville, which is making itself felt throughout the whole Middle West, is laid largely to the Kentucky & Indiana Terminal R.R. The inability of that carrier to clear its connections with both Northern and Eastern lines piled up loads back along the routes to the mines and prevented empties from returning to the fields so that the Louisville & Nashville embargoed Louisville early in the week. A good deal of this confusion was clearing along toward the end of the week, but it is expected that several days will elapse before coal can get into good flow again.

Demand general throughout Kentucky is poor. The cold weather of a week ago has softened and with it prices have grown limber again on practically every kind of coal, in spite of the rail congestion. Domestic demand was keen for a short while but nothing could be sold that had not left the mines. Dealers took enough to save transit domestic coal from distress and steam consumers bought steadily if sparingly.

Some of the blame for the slowness of movement off the docks is laid to Illinois and Indiana competition. Southern Illinois coal can be laid down in southern Minnesota and the eastern end of the Dakotas for $8.75@$9. It costs $11.15 at present freight rates, dock men say, to deliver Eastern coal from the docks to the same markets. Hence the strong efforts of the dock interests just now to push their case before the Interstate Commerce Commission for an equalization of rates inland from the Lakes.

Kansas Steam in Some Demand

The fact that dealers in Kansas City and the surrounding territory are still overstocked with coal has shortened the market for domestic sizes, further reduced the production at mines and thus cut down steam coal supply to a point where the standard level of $2.50 shows signs of rising to $2.75. The rise in fuel oil prices is making a railroad or two begin to eye coal with respect once more, coal salesmanagers say. Inquiries are coming in from that source.

Mines in Utah are working a little more than half time and operators are easily marketing all the lump production. Small sizes, however, are sluggish and price cutting has begun. Though domestic sizes move out readily, operators are carefully watching the credit of dealers and consumers in farming communities where financial conditions are not good. Car supply is adequate. There is no labor trouble in the state worthy of the name.

In Colorado car supply is sufficient to keep work time at the mines so high that the market is steadily flooded again with both bituminous and lignite fuels. Two days a week running time more than fills the requirements. Canon City and Walsenburg lump sells for $6 and nut for $5.50. Trinidad lump is quoted at $5.50; nut, $5, and mine-run, $4.50 Lignite lump moves slowly at $3@$3.50.

Ohio Retailers Seek Larger Shipments

With cold weather and car supply poorer Ohio retail dealers are in the market for larger shipments and steam-coal consumers are buying better. On the whole the tendency is upward. Retail stocks around Columbus are exhausted in many instances. Shipments ordered a month or so back have not yet arrived and dealers are not anxious to buy more coal, fearing the shipments will arrive at about the same time. Public institutions, schools and hospitals are in the market for additional stocks and utilities and railroads are buying heavily.

The Cincinnati market has been stabilized by embargoes to the North and bad car supply. The Louisville & Nashville embargo against deliveries to the lines North still holds good. The Grand Rapids & Indiana at Richmond, Ind., is still tight and the Big Four is in bad shape. The jam on the B. & O. is due to the congestion that does not seem breakable at Toledo. The Chesapeake & Ohio is in bad shape because of the lowered supply of empties to the mines.

Output of eastern Ohio mines during the week ended Feb. 17 was 309,000 tons, an increase of 21,000 tons over the preceding week. The mines are unable to work more than 35 to 40 per cent of capacity because of car shortage.

Retail dealers in Cleveland are in the market for lump sizes. They have considerable difficulty in procuring smokeless fuel from West Virginia and eastern Kentucky and anthracite is particularly scarce. The delivered prices for Pocahontas is about $14, and for anthracite from $18 to $19.

Receipts of bituminous coal at Cleveland during the week ended Feb. 17 were 2,733 cars, an increase of 88 cars over the preceding week. Of this tonnage 2,103 cars were consigned to industries and 630 cars to retail yards. Average weekly receipts during the first quarter of 1923 up to Feb. 17 were 2,861 cars per week, as compared with 2,345 cars per week during the last quarter of 1922.

In West Virginia as a whole the car supply is not over 30 per cent. In some sections railroad fuel mines are

obtaining the bulk of the supply. Though not so many cars are being ordered since market conditions and lower prices have eliminated many small mines from the market, companies still loading and shipping are not able to obtain enough cars to take care of orders.

Cars Scarce in Central Pennsylvania

In the Pittsburgh and central Pennsylvania districts car shortage is being seriously felt. In the Pittsburgh region there is little demand in the open market and the cold weather seems to have had little effect upon demand for lump coal. The operators in central Pennsylvania also are suffering because of poor car supply, which is about 20 per cent on both the Pennsylvania and New York Central railroads.

Operators along the New York Central are able to get on an average 25c. per ton more for their coal than those on other roads because of their ability to make shipments into New England.

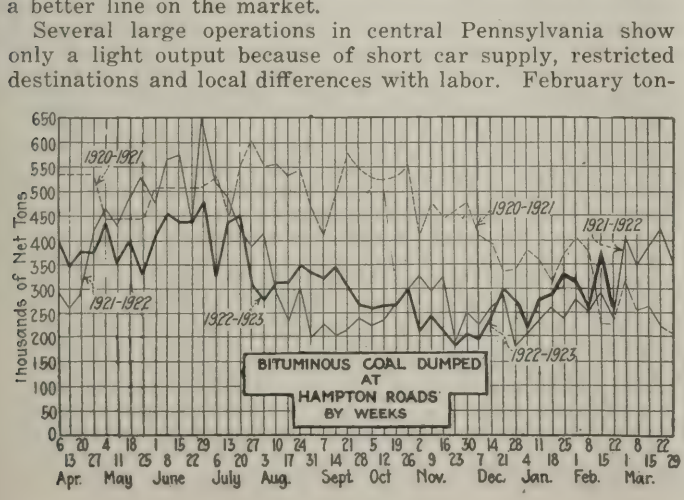
Steam Receipts Light at Boston

Receipts of bituminous steam grades in Boston have continued extremely light. Embargoes have continued in effect against the Hudson River gateways, especially from connecting lines, and by the water route also transportation has been seriously delayed. A long period of steady cold has caused ice to form in many of the small harbors and particularly on the shoals back of Cape Cod. Barges and certain of the steamers have been held up for days at a time, and even the approaches to the Cape Cod Canal have been so blocked with ice that few boats have come through during the past week. In consequence there has been a mild shortage of bituminous coal to meet current requirements. There has been more or less borrowing on that account, and at the rehandling wharves for inland delivery there has been a sufficient shortage of cars to advance spot prices to the high mark of several weeks ago. At the same time certain of the large factors have based their quotations on the market at Hampton Roads and in such cases the price level has not been above $9.50 per gross ton on cars.

There have been instances where Navy acceptable Pocahontas and New River have been sold quietly at close to $6 per gross ton f.o.b. vessel, but the average probably would be around $6.25. This nets better than $3.50 per gross ton at the mines, and the trade is much interested to see whether during March spot quotations will go lower.

Meanwhile this territory is being diligently canvassed for next season's business. So far we have heard no prices beyond those quoted by one or two operators for April coal but it is quite likely there will be developments in this direction during the next fortnight. Large consumers here are by no means eager to make contracts; there have even been buyers who have cancelled purchases made in December, for the reason that they have comfortable reserves for the present and are looking for lower prices when next they enter the market. Oil has made such inroads with some of the mills that together with water power, which soon must be reckoned with, buyers of this kind feel they can afford to wait developments on coal until they can get a better line on the market.

Several large operations in central Pennsylvania show only a light output because of short car supply, restricted destinations and local differences with labor. February tonnage was very light with most producers, and in spite of the shortage of anthracite, which has perhaps been more acute in New England than at any time thus far, there has been no urgent demand for bituminous coal even by routes that are open.



Anthracite

Demand for the anthracite domestic coals continues strong. The New York market was seriously affected by heavy ice in New York Bay and adjacent rivers and more than 10,000 tons of coal was lost through barges being sunk.

Weather conditions at Baltimore affected the anthracite business. Demand increased and the receipts were picked up as quickly as they arrived.

"The production of anthracite in the week ended Feb. 17 declined to 1,828,000 net tons, including mine fuel, local sales and dredge and washery output," says the Geological Survey. "Save for the holiday weeks (Thanksgiving, Christmas and New Year's); this is the first time since mid-November that the weekly production has fallen below 2,000,000 tons. Labor troubles and transportation disability on account of bad weather were causes of the decline and make it impossible to forecast the present week's output."

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to April 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Feb. 10, 1923 Inclusive	Week Ended Feb. 10, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.5	(a)
Somerset County	74.9	36.3	30.7	(a)
Panhandle, W. Va.	51.3	57.3	55.3	56.5
Westmoreland	58.8	65.8	57.4	51.2
Virginia	59.9	55.7	53.2	52.8
Harlan	54.8	22.1	22.4	24.6
Hazard	58.4	16.4	20.2	18.5
Pocahontas	60.0	36.6	37.4	37.9
Tug River	63.7	28.8	33.5	35.4
Logan	61.1	26.2	31.2	32.8
Cumberland-Piedmont	50.6	31.7	45.0	(a)
Winding Gulf	64.3	30.4	33.0	30.6
Kenova-Thacker	54.3	42.4	38.7	34.0
N. E. Kentucky	47.7	28.4	27.9	(a)
New River	37.9	31.6	34.9	34.8
Oklahoma	59.6	59.1	40.8	53.2
Iowa	78.4	75.9	78.9	77.0
Ohio, Eastern	46.6	40.8	33.8	33.5
Missouri	66.8	76.3	76.4	75.3
Illinois	54.5	49.9	52.9	49.1
Kansas	54.9	55.9	52.0	48.2
Indiana	53.8	37.7	54.6	54.4
Pittsburgh†	39.8	41.2	32.7	25.3
Central Pennsylvania	50.2	53.4	42.8	45.5
Fairmont	44.0	35.5	37.6	34.5
Western Kentucky	37.7	32.4	34.2	31.6
Pittsburgh*	31.9	56.1	65.0	55.6
Kanawha	13.0	15.6	21.5	23.4
Ohio, Southern	24.3	38.1	36.9	31.9

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended Feb. 10, 1923	853,289	190,860
Previous week	865,675	189,773
Same week in 1922	777,791	192,789

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
Feb. 7, 1923	28,628	7,790	70,269	37,626
Jan. 31, 1923	26,588	7,208	73,269	38,477
Same date in 1922	296,659	81,592	.....	.....

Foreign Market And Export News

Demand for British Coal for Export Strong; Production Slightly Lower

Production of British coal for the week ended Feb. 10 was 5,567,000 tons, says a cable to *Coal Age*. This was 34,000 tons below the previous week's production and the smallest output for any week this year.

There is a strong demand in the South Wales market which has resulted in stronger prices for some coals.

Inquiries for coal for export are heavy. Germany is looking for all classes of fuel, especially cooking coals and coke. Italy, France and Belgium are reported as heavy buyers.

The German pressure on the Newcastle and Hull markets is excessive, and in response to urgent inquiries and offers to pay in sterling very large sales have been effected alike for prompt and forward shipment. While these sales cover every class of coal, they consist mostly of Durham coking unscreened and steam smalls. In some cases the German industrialists are sending their own boats across the North Sea.

The greatly increased export demand for foundry and furnace cokes sent these brands well up, and it was accompanied by a great improvement, from home sources due to the better outlook in the iron trade. France and Belgium are in need of prompt supplies, and have sent numerous inquiries into the market for industrial fuels, including coke. Italy and the Continental railway and gas works are coming forward with their requirements. The output is large, but is not large enough to meet the demand.

The Ruhr crisis is responsible for increased exports to France and Italy. Exports to Italy are on a higher level than for some time. From forty to fifty steamers are waiting for loadings at the various ports. Within the last month 85,000 tons of coal has been sold to Germany. There is an appreciable quantity of Welsh coal going to India and Egypt.

Stinnes has been soliciting Welsh coal, but has declined offers because of the high prices asked. The north of England market is firm.

French Mines Production Increasing

Production is rapidly increasing in the mines of the Nord and Pas de Calais as is shown by the following tabulation in metric tons:

	Coal	Coke	Briquets
In 1913	29,618,997	2,445,050	1,802,286
In 1921	13,554,028	387,245	1,042,928
In 1922	15,379,566	539,889	1,406,940

That the work of reconstruction is going on rapidly in the devastated collieries is indicated by the following comparative figures showing production in January and December of last year:

PRODUCTION IN DEVASTATED MINES OF THE DEPARTMENT OF PAS DE CALAIS

(In Metric Tons)

	Jan., 1922	Dec., 1922
Coal	227.578	354.584
Coke	0	3.035
Briquets	29.940	25.162

PRODUCTION IN DEVASTATED MINES OF THE DEPARTMENT OF DU NORD

(In Metric Tons)

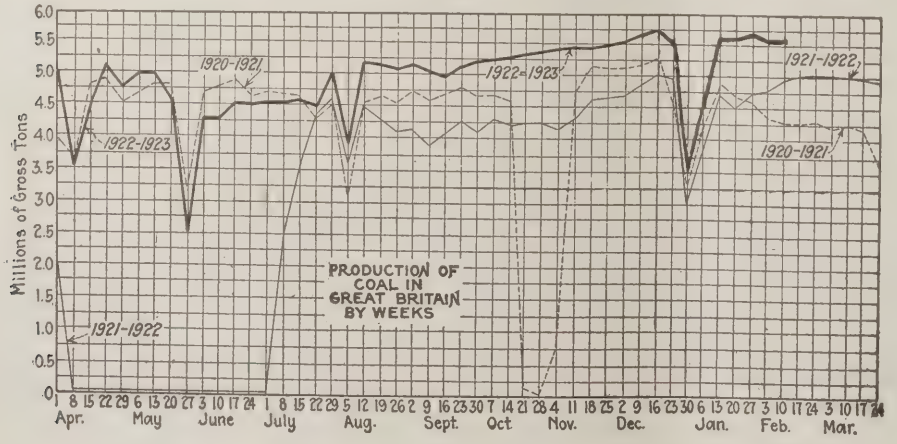
	Jan., 1922	Dec., 1922
Coal	353.148	379.652
Coke	5.988	27.449
Briquets	84.871	92.825

Hampton Roads Movement Brisk

Movement at Hampton Roads has been brisk, the holiday intervening, however, to cut down the volume. Coastwise shipments have shown a decided improvement and the bunker trade also has taken the upgrade.

The tone of the market grew firmer, with prices apparently halted in their downward trend. Shippers look forward to an early entry into the export field if conditions continue to improve.

Movement of coal to port increased, some improvement in the car situation being noted. The effect of the recent storm in delaying shipping and holding back movement was being eliminated and piers were making up the time lost in this manner. The outlook was brighter than for several weeks.



American Gas Coal for Germany

Firms in Hamburg, Germany, are reported to have purchased several cargoes of American gas coal and inquiries concerning further deliveries from the United States are said to have increased as a result of advancing prices for British coal.

It was also said that English coal firms are negotiating for the lease of dock space at Hamburg in order to lay in large stocks of bunker coal.

Official German statistics made public show that German reparations coal amounting to 1,587,026 tons have been exported from France and Belgium in fifty-nine specific instances during the last two years. It is stated that at least twenty-three offers of this coal were made in neutral countries, and even in Germany. In fifteen of these offers some 200,000 tons, besides 1,042 carloads, were tendered. In at least one instance, according to the statement, the coal was advertised through the newspapers in a neutral country.

Export Clearances, Week Ended Feb. 17. From Hampton Roads

FROM HAMPTON ROADS

	Tons
For Cuba:	
Br. S.S. Darnholme, for Havana	5,654
Br. SS. Berwindvale, for Havana	7,715
Dan. SS. Aabenraa, for Havana	3,160
For Italy:	
Ital. SS. Anna Dminak, for Genoa	9,353

FROM PHILADELPHIA

For Cuba:	
Dan. SS. Jan, for Havana	...
Nor. SS. H. C. Flood, for Havana	...
For Porto Rico:	
Br. SS. Carib, for San Juan	...

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	Feb. 15	Feb. 22
Cars on hand	1,013	1,287
Tons on hand	64,679	88,242
Tons dumped for week	98,848	88,096
Tonnage waiting	3,575	35,400
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,420	1,542
Tons on hand	83,670	89,370
Tons dumped for week	119,021	63,021
Tonnage waiting	13,251	9,226
C. & O. piers, Newport News		
Cars on hand	1,509	1,323
Tons on hand	79,790	72,835
Tons dumped for week	105,269	84,207
Tonnage waiting	24,311	6,110

Pier and Bunker Prices, Gross Tons

PIERS

	Feb. 17	Feb. 24†
Pool 9, New York	$7.25@$7.50	$7.25@$7.50
Pool 10, New York	6.50@ 7.00	6.50@ 6.75
Pool 11, New York	5.75@ 6.25	*5.50@ 6.00*
Pool, 9, Philadelphia	7.00@ 7.25	*6.95@ 7.15*
Pool 10, Philadelphia	6.50@ 6.75	*6.35@ 6.65*
Pool 11, Philadelphia	5.65@ 6.15	*5.55@ 6.00*
Pool 1, Hamp. Roads	6.25@ 6.50	6.25@ 6.50
Pools 5-6-7 Hamp. Rds.	6.40	*6.25*
Pool 2, Hamp. Rds.	6.25@ 6.50	6.25@ 6.50

BUNKERS

Pool 9, New York	$7.65@$7.90	$7.50@$7.90
Pool 10, New York	6.90@ 7.40	*6.80@ 7.25*
Pool 11, New York	6.15@ 6.65	*5.80@ 6.50*
Pool 9, Philadelphia	7.30@ 7.60	*7.15@ 7.50*
Pool 10, Philadelphia	6.85@ 7.10	*6.70@ 6.95*
Pool 11, Philadelphia	6.00@ 6.40	*5.90@ 6.35*
Pool 1, Hamp. Rds.	6.50	6.50
Pool 2, Hamp. Rds.	6.50	6.50

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Feb 17	Feb. 24†
Admiralty, large	29s.@29s.6d.	29s.@29s.6d.
Steam, smalls	19s.@21s.	**22s.6d.**
Newcastle:		
Best steams	28s.	**28s.6d.@30s.**
Best gas	27s.@28s.	**29s.@30s.**
Best bunkers	25s.6d.	**28s.@32s.6d.**

† Advances over previous week shown in **heavy type**; declines in *italics*.

News Items From Field and Trade

ALABAMA

The Scott & Jones Cahaba Red Ash Coal Co. has been incorporated in Birmingham with a capital stock of $5,000. W. A. Scott, B. F. Jones and D. H. Jones are incorporators of the new company.

ILLINOIS

Illinois coal operators on Feb. 20 conferred in Chicago with Henry L. Stimson and Goldthwaite Dorr, attorneys for the bituminous operators before the United State Coal Commission. They reviewed the situation as it effects operators through the Commission. Mr. Stimson and Mr. Dorr had met the operators of Ohio the previous day. From Chicago they made a short trip into Midwestern coal fields with George B. Harrington, intending to return to Washington by the 24th.

James G. Monohan, of Chicago, has been appointed manager of the Peabody Coal Co. interests in Springfield. He succeeds the late Alfred G. Halle. Mr. Monohan formerly managed the Peabody interests at Buffalo and for several years was attached to the Chicago office.

A new effort is on foot in the Illinois Legislature **to enact a bill taxing coal production** at the rate of 8c. a ton. At two previous sessions of the Legislature similar tonnage tax bills have been defeated, both operators and miners uniting against them on the ground that they are discriminatory, since they covered only one industry. The bill filed this year was introduced by Representative G. J. Johnson, of Ford County, a region which produces no coal.

A new mine is being located near old Lake Creek, three miles southeast of Johnston City, by the **St. Louis Chemical Co.** A switch is being laid to the site of the new mine. This is the first of three new mines which will be located east of Johnston City.

The Byproducts Coke Corporation, of Chicago, reports net earnings of $255,152 for 1922, against a net operating loss of $1,295,235 in 1921.

Gunplay and murder were described as **daily occurrences in the coal field towns of southern Illinois** by Representative Myers of Franklin County in a speech to a committee of the Illinois Legislature Feb. 21. Mr. Myers was speaking for his bill to regulate the sale and carrying of one-hand guns. "Down where I come from," he told the committee, "murders are so frequent that the local papers pay no more attention to them than they do to weddings."

The fate of the state police bill is doubtful on the floor of the Illinois House. The bill has been reported out of the Military Affairs Committee but is encountering stiff labor resistance.

E. P. Stewart has joined the engineering staff of Allen & Garcia of Chicago and will specialize in the design and construction of coal washeries for that company. Mr. Stewart has been with Roberts & Schaefer, of Chicago.

Forty-nine mines in southern Illinois on five railroads serving that district **have worked on an average two days a week since the miners' strike,** according to figures issued by the Coal Operators' Association of the Fifth and Ninth Districts of Illinois. The statement is made that the loss in working time is due mainly to failure of railroads to supply cars. From Sept. 4 to Jan. 27 twenty-one mines on the Illinois Central worked 38.55 per cent of the time, lost 51.09 per cent of the time on account of no cars and 10.36 per cent due to other causes. Mines on the Louisville & Nashville, Baltimore & Ohio, Mobile & Ohio and Southern railroads showed about the same general averages.

Because of the congested traffic conditions in coal movements through the Duquoin yards, the **Illinois Central R.R.** is making preparations **to construct a cut-off** which will connect the Eldorado branch with the main line and the St. Louis line direct, eliminating the hauling of coal from Franklin County through the Duquoin yards. Company engineers have already surveyed the proposed cut-off and it is expected that work will be started on the job soon.

Indications are that **large coke ovens may be installed** at Zeigler soon under the ownership of the newly formed **Zeigler Coal & Coke Co.** of that town. At the time the new concern incorporated it was announced that only a new mine was to be opened by the company, but later reports are that 1,600 acres of additional land has been obtained by the company for the purpose of erecting large coke ovens. The stockholders of the new company, E. A. Bronson, Frank M. Wakefield and William J. Warr, are all closely connected with Joseph Leiter, now of Chicago, whose Zeigler properties are operated under a long lease by Bell & Zoller.

Damage which amounted to more than $4,000 was done recently to the tipple and shaker screens of the **Western United Gas Coal Co.** mine at Murphysboro. A Missouri Pacific switch engine was switching the mine when **cars broke loose from the engine and crashed into the tipple,** making extensive repairs necessary. The work of repairing the broken and damaged parts of the tipple has been started by the railroad but will require several weeks to complete. The mine was formerly known as the "Gus Blair" mine.

Practically the entire jury has been chosen for the second trial at Marion, Ill., of men indicted for playing leading parts in the **Herrin massacre** of June 22. The majority of the men already seated are farmers, but at least one is a member of the United Mine Workers of America and has been paying into the union defense fund. However, this man declares he can pass impartial judgment upon the case and sees no reason why he cannot go back to work as a union miner in case the jury were to vote unanimously for conviction. No date has yet been set for the opening arguments, but they are expected to start within a few days.

INDIANA

Fire of unknown origin recently did $20,000 damage to the mine tipple of the old Freeman mine at Bicknell, now known as the Howe-Coulter Mine No. 2. Thirteen men who were at the bottom of the mine at the time of the fire escaped uninjured. The plant employs about 300 miners. Firemen from Bicknell saved the engine house and equipment. The principal stockholders in the company are William Howe, John Coulter and Robert McCleavy, all of Chicago, and the corporation was recently reorganized. The mine was formerly operated by the Tecumseh Coal Co. and produces Fifth Vein coal.

Articles of incorporation have been filed with the Secretary of State for the **Burr Coal Mining Co.,** an organization composed of Sullivan capitalists. The company is incorporated for $50,000 and has purchased the Black Comet Mine, in Sullivan County. Heber Stevens, Frank Bolt, Harry C. Boothe and others are interested in the company. The officers of the company will be located in Sullivan. The Black Comet property is east of the city and always has been regarded as one of the best of the small mines in that field. Many improvements have been planned and the mine will be enlarged and modernized.

The H. & K. Coal Sales Co. has been organized at Elkhart, with a capital stock of $15,000 for the purpose of doing a wholesale and retail coal business. The organizers are Robert R. Haggerty, Harry F. Kitchell and Ethel F. Arnold.

The **washhouse at the Dixie Bee mine,** near Pimento, was **destroyed by fire** recently, the miners losing practically all the clothing they had worn to the mine that day. It is believed a thief robbed the washhouse and set fire to it to escape detection of the theft.

KENTUCKY

W. F. Bradshaw, coal operator, banker, insurance man, and president of the Tobacco pool of western Kentucky, may be a candidate for Governor of the state, according to press reports.

P. Wooldridge, of Pewee Valley; C. F. Wooldridge, of Louisville, and others have incorporated the **Falls Branch Coal Co.,** at Louisville, Ky., with a capital of $70,000.

The Ajax Coal Co., of Bulan, Ky., is planning the construction of a coal bin at a cost of $10,000, which is to be modern in every respect.

The mines of the **Consolidation Coal Co.** at Jenkins were able to resume shipment of coal during the latter part of February after being **out of commission for several days owing to a landslide** which buried the tracks of the Sandy Valley & Elkhorn R.R. to a depth of 30 ft. for about 800 ft.

Activities of the Good Roads Committee of the Northeast Kentucky Association have resulted in assurances by the State Highway Commission of Kentucky that a **hard-surface highway will be constructed through the northeastern Kentucky region** and that work will be started without delay. This will provide increased transportation facilities and afford a short-route highway linking the entire South with the territory north of the Ohio River.

With a capital of $15,000, the **Kentucky Coal Sales Co.,** Williamsburg, has been chartered by B. F. Sheely, T. J. Roberts and A. M. Ellison.

The Kentucky Block Coal Co., of Paducah, capital $100,000, **has been chartered by W. F. Bradshaw, H. L. Richardson and C. F. Richardson.** The interests recently took over the two mines of the Coil Coal Co., Madisonville. The Richardsons are active in the management of the big West Kentucky Coal Co., one of the largest in western Kentucky, which operates a fleet of river boats and eleven tipple mines. Bradshaw is a capitalist, tobacco and insurance man.

The Kentucky Co-operative Coal Co., Lexington, has been chartered with a capital of $30,000, by C. C. Perry, of Quicksand, and C. R. Taylor and E. C. Brown, of Lexington.

Utility consumption of coal at Louisville may be reduced materially if plans now under development are completed for **a big hydro power plant at the Ohio Falls, Louisville,** this plant to be supplemented during low-water periods with current from the plant of the Louisville Gas & Electric Co., a Byllesby organization. The city and the company have been fighting to obtain first rights to the water power, the city intervening when it discovered that the company had plans of utilizing the river, no one else having ever before considered the plan as feasible.

Articles of incorporation have been filed at Lexington for the **Ace Coal Co.,** capital $25,000, T. F. McConnell, R. J. Raymond, Lexington, and A. B. Ewen, Whitesburg. The company plans mine operation in Letcher County.

Operators of the state met in Louisville on Feb. 9 with officials of the Louisville & Nashville R.R. in connection with a **new plan for rerating coal mine capacities,** so that some mines will not be getting a larger percentage of cars than they are entitled to. Not much was accomplished at this meeting, due to the fact that the Harlan and Hazard operators were not ready, and didn't have necessary figures available. Western Kentucky operators and those of the Southern Appalachian and Alabama districts fed by the L. & N. were represented. Another meeting was to be held late in February, at which figures were to be compiled and placed in shape for presentation before the Interstate Commerce Commission.

MINNESOTA

An incorrect report from Washington suggests that the hearing before the Interstate Commerce Commission on the complaint of the dock interests will bring a claim on behalf of the dock trade for increasing the rate on competing all-rail coal which comes into the Twin Cities. The complaint sets forth that the commission has established a tariff of $1.82 for the 150-mile haul from the docks to the Twin Cities, which the railroads must charge, and that the roads have voluntarily made a rate of $3.42 for all-rail coal hauled a distance of 642 miles. The complaint sets forth that the difference in the two sets of rates is discriminatory to the dock business and asks to have the discrimination removed. It leaves the method of correction with the commission, and does not suggest anything.

A conference of coal dealers was held in Minneapolis Feb. 13 to consider **the bill for licensing coal dealers** proposed by Fuel Commissioner Ivan Bowen. Mr. Bowen outlined his proposition and there was considerable discussion upon it. Resolutions were passed that there should be no regulation of the coal business undertaken until such time as it is shown to be necessary by the state; that it is not possible for the state to regulate the coal business; and that no regulation should be attempted until the federal coal commission has reported, so that the state proposition may be in harmony therewith.

MISSOURI

T. T. Brewster, president of the St. Louis & O'Fallon Coal Co., St. Louis, attended the sessions of the New York section of the American Institute of Mining and Metallurgical Engineers held in New York City last week.

Fire at the mine of the Blackfoot Coal Co., near Columbia, did considerable damage, the building containing the fan and the motor being destroyed. It made it necessary to stop operations and threw a large number of miners out of work. The plant was working at capacity at the time of the fire because of the sudden cold spell that had come up in Missouri just at the time.

Charles H. Swift, of Lafayette County, formerly surveyor for the Western Coal & Mining Co. and formerly with the engineering department of the City of Colorado Springs, Colo., has been appointed county highway engineer for Saline County, with headquarters in Marshall.

Articles of incorporation have been filed in the office of Secretary of State Charles U. Becker by the **D-H Coal Co.**, Kansas City; capital, $250,000 and 2,500 shares no par value. Incorporators, J. W. Alder, H. A. Fowler, J. E. Yount, T. N. Kingsley, L. S. Harper and F. C. D. Dobson.

Everton and Ash Grove capitalists have formed an organization for the development of the coal resources in that section of Dade County. The development will be a resumption of operations that were carried on some years ago when the Frisco R.R. was built from Springfield to Ft. Scott. At that time a good grade of coal was mined through shallow mining on the right of way just east of Everton.

Contests under the auspices of the Missouri Mine Safety Association will be held at Jacksonville, Huntsville, Higbee and Moberly in keeping with a resumption of the program of rescue work by this association, after a year of inactivity. Suspension of the work was due to the cessation of mining operations all over the country. Notices that these educational meetings are to be held all over Missouri are being sent out by President H. J. Pierce and Secretary George Hepple. Representatives of the Bureau of Mines are now in Missouri and plans for an itinerary have been made out. The co-operation of operators and miners is asked in the campaign in Missouri and all mines are urged to send teams to the cities in which the contests will be held.

NEW YORK

Sixty families in Sidney without coal called a mass meeting Feb. 21 and **seized a carload of coal passing over the Delaware & Hudson R.R.** destined for Lawrence, Mass. When informed of the acuteness of the situation, officials of the road diverted two cars to Sidney, one consigned to Albany and one to Bloomingdale. These and another car were placed in Sidney yards before nightfall. At the meeting a resolution was passed empowering the Village Board and Board of Health to seize coal cars passing through Sidney, if additional cars were not placed without delay.

Railroads would be prohibited from establishing embargoes on shipments of coal or other necessities of life or from refusing to receive such shipments for transportation by the provisions of a bill introduced in the Legislature Feb. 21 by Senator Ferris of Ticonderoga. The measure provides a new section for the Public Service Commission law. Senator Ferris has been active for the last few weeks in endeavoring to provide relief for counties without coal throughout the northern part of the state.

Charles S. Allen, formerly secretary of the Wholesale Coal Trade Association of New York City and more recently acting as secretary of the Tonnage Debtors' and Creditors' Committee of the new Tidewater Coal Exchange, has joined the sales force of **Cory Mann George Corporation.** In addition to the duties of the new connection Mr. Allen will continue to handle the settlements of the Debtors' and Creditors' Committee until that matter is closed.

During January the **New York Central Lines** had **66,021 cars loaded with bituminous coal on the lines of its system**, exceeding the loading of that month one year ago by 53 per cent, the excess of January, 1923, over 1922 being 23,048 carloads. There were 49,607 cars loaded with that class of coal in January, 1922. January coal loadings were greater than the loadings for any January since loading records have been kept. The figures as to coal do not include cars of coal received from connecting carriers, which would bring total coal business to a much higher figure.

The Girtanner Engineering Corporation, now a subsidiary of the American Brake Shoe & Foundry Co., will enlarge its activities of manufacturing and installing standardized steam ash and soot removal systems and other boiler house equipment. Offices have been removed to 30 Church Street, New York City, and agencies are to be established in all of the leading cities.

J. D. Monie, vice-president in charge of operations of the Titan Fuel Co., with office at Johnstown, Pa., **will be located at the New York office of the company**, No. 42 Broadway, for a couple of months beginning March 1.

F. R. Walters, formerly with the Alden Coal Co., has joined the forces of the **Majestic Coal Co.**, of 120 Broadway, New York City. He will look after the trade on Long Island and Staten Island. The Majestic Coal Co. has opened an office at Somerset, Pa., with E. J. Frauenheim, Jr., in charge.

NORTH DAKOTA

Representatives of the **Canadian government have been conducting tests of lignite** at Grand Forks with a representative of the United States Government. The Canadian lignite is being tested to determine whether it may be used with the same result as the North Dakota lignite.

OHIO

The American Export & Inland Coal Co., Cincinnati, has been chartered with an authorized capital of $100,000 to mine and sell coal. The incorporators are E. F. Heasley, Stuart R. Ducker, M. Wellman, R. Johnson and Arthur W. Gordon.

The Merrimac Fuel Co., Cincinnati, has been chartered by H. E. Joseph, W. J. Quinn, Ray E. Manley, Mary Barrett and Fanny Sachs, with a capital of $50,000 to deal in coal and coal lands.

The Slater Coal & Supply Co., Lorain, has been chartered by George L. Slater, F. J. McFadden, D. A. Cook, S. S. McFadden and Mayme J. Ambrozio, with a capital of $50,000 to deal in coal.

The Burns Coal Co., of Columbus, recently chartered with an authorized capital of $100,000, will take over three additional retail yards in Columbus about April 1, making a chain of four yards. All of the yards will be equipped with modern machinery for loading and unloading. Edward C. Sharfnaker is president and general manager.

Lee Hall, who has been president of the Ohio division of the United Mine Workers of America, was re-elected to that position during the annual convention held in Columbus. The convention also went on record as favoring an old age pension law. **William Roy** was re-elected vice-president and **G. W. Savage**, secretary-treasurer.

The American Export & Inland Coal Co. has been incorporated under the Ohio laws with $100,000 capitalization in the place of the American Export & Inland Corporation, a West Virginia company. Ernest Heasley continues as president, with H. H. Randolph, of Williamson, W. Va., as treasurer, and L. N. Birk, of East Bernstadt, Ky., as secretary. The former company is the one that figured largely in the Ford deal that caused so much comment in September. The new company will represent some seventeen mines in the Big Sandy district as their direct mine representatives. Most of them were involved in subsequent happenings that tied up some of the payments for the coal that was shipped.

PENNSYLVANIA

The Lehigh Coal & Navigation Co. reports for the year ended Dec. 31, 1922, a **decrease in both gross and net earnings**, as compared with the year previous. The statement showed revenues of $18,786,431, against $22,801,906 in 1921, and net revenue after depreciation and depletion of $3,788,207, against $5,394,224. After allowing for other deductions there was a net income of $1,587,024, equal to $2.71 a share on the $29,243,400 capital stock of $50 par value. This compares with a net of $3,033,764, or $5.20 a share, in 1921.

Representative Thomas F. O'Boyle, of Lackawanna, it is announced, is having a bill prepared for introduction into the State Legislature **to compel coal companies to sell coal to the general public in the municipality in which the mining is being done.**

The United Mine Workers of America will try to have the present anthracite miners' **certificate law extended to the bituminous mining fields.** This action was decided on at a recent meeting of the anthracite tri-district board held in Wilkes-Barre. The board also decided to fight for the repeal of the anthracite tax law recently upheld by the U. S. Supreme Court.

On Feb. 1 American railroads were **awaiting delivery of new rolling stock estimated to cost about $325,000,000**, according to reports filed by the carriers with the American Railway Association at Washington, Feb. 21. On Feb. 1 unfilled orders totaled 91,354 cars and 1,507 locomotives, of which 23,022 cars and 62 locomotives were ordered during January. The equipment under order was classified as follows: Coal cars, 37,476; box cars, 43,211; refrigerator cars, 6,402; freight locomotives, 1,022; passenger locomotives, 362, and switching engines, 123.

The fifth anthracite district in 1922 produced 866,450 tons, while in 1921 output was 2,056,299 tons, a decrease of 1,189,849 tons, says the report of S. J. Phillips, mine inspector. This was due to the strike. There are 12 collieries and 30 mines in the district, while the mines in operation, the report says, number 24. Of the tonnage produced 827,662 tons were shipped to market, the balance being sold to the local trade and used for steam and heat at the mines. Electrical machines produced 40,810 tons.

Edgar C. Weichel, of Scranton, who for the past twenty years has been a traveling inspector for the Pennsylvania Coal Co., has become an assistant mining engineer for the Hudson Coal Co.

A report on strikes in Pennsylvania during 1922 just made by William J. Tracy, chief of the Bureau of Mediation and Arbitration of the State Department of Labor and Industry, to acting Commissioner Walker of that department shows that the coal strikes in the anthracite and the bituminous districts of the state last year involved 322,806 men. The anthracite mines were idle for 132⅔ days and the bituminous mines for 106 days. Tracy estimated the number of days lost to the strikers in both fields at 38,000,000 days and the wages lost at $190,000,000. He based the financial loss to the workers on an average daily wage of $5. Involved in the strikes were 1,263 mines.

Shipments of anthracite in January, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,671,822 gross tons, as compared with 4,848,053 gross tons during the corresponding month last year, an increase of 1,823,769 tons, or 37.6 per cent. January of this year also showed an increase of 216,946 tons over the preceding month of December, when 6,454,876 tons were shipped to market. Shipments by originating carriers were as follows, in gross tons:

	January 1923	December 1922
Phila. & Rdg.	1,381,359	1,259,927
Lehigh Valley	1,093,052	1,107,745
Jersey Central	588,093	564,071
Lackawanna	1,038,719	938,530
Delaware & Hudson	741,739	832,893
Pennsylvania	596,989	561,603
Erie	750,277	738,073
N. Y., O. & W.	178,072	159,829
L. & N. E.	303,522	292,205
Totals	6,671,822	6,454,876

For the purpose of bringing all the mining men of the Centre-Clearfield region together to discuss the problems before them, a meeting was held Feb. 3 in Philipsburg, at which time an organization to be known as the **Moshannon Coal Mining Institute was formed.** There were present forty-eight mining men representing twenty-six coal companies from the towns of Clearfield, Curwensville, Woodland, Morrisdale, Munson, Winburne, Grassflat, Philipsburg, Osceola Mills, Houtzdale, McCartney, Sandy Ridge, Tyrone and Johnstown, as well as representatives from several mine supplies companies. After organization, it was decided to make a further effort to have all the interested men in the region present at the next meeting, the time and place, as well as the nature of which to be decided upon by the executive committee. C. B. Maxwell was elected president; Thos. A. Mather, first vice-president; James L. Lewis, second vice-president; George H. Brighton, third vice-president; Thomas F. Morgan, secretary-treasurer; James W. George, assistant secretary-treasurer, and the executive committee as follows: Joseph Knapper, D. L. Boyle, H. S. Shillingford, William George, Fred Pepper.

The assessed valuation of the coal beneath the surface within the city limits of Wilkes-Barre for the year 1922 was $21,633,079, from which will be deducted $317,254, abatements for coal mined during the year, leaving the **valuation for 1923, $21,315,824**, on which the city hopes to receive as taxes $213,158.24.

S. M. Casterline, who for many years has represented the Fairmont Mining Machinery Co. has been made sales manager of the American Mine Equipment Co., Pittsburgh.

Under the provisions of a bill introduced in the House by John E. Stavitski, of Luzerne County, the owner of a mine or an operator who neglects or refuses to furnish a sufficient supply of pure drinking water for the use of employees in the mines is liable to a penalty of $50 for each day of such neglect.

Local Union No. 5256, United Mine Workers of America at Jerome, Somerset County, at a recent meeting **decided in favor of continuing the strike**, thus indorsing the action of the district board and officers of District No. 2 in ordering a referendum vote.

A committee of the Central Pennsylvania Coal Producers' Association held a conference in Altoona recently **to formulate car-distribution and mine-rating rules.** This meeting was held in response to a request from the Interstate Commerce Commission, which asked the operators and the Pennsylvania R.R. to agree on rules. The conference was attended by President B. M. Clark, of Indiana; Vice-President G. Webb Shillingford, Secretary Charles O'Neill and Commissioners John C. Forsythe, J. William Wetter, Leslie Wallace, Mr. McDougall, A. H. Wilson and E. W. Derringer. This committee will meet with a committee of the railroad company later. The rating which a mine receives depends upon its capacity per day and the car distribution must be determined when the car supply is less than 100 per cent. There has been much complaint on the part of the operators relative to the distribution of cars, the claim being made that it is inequitable. Production in the district is far below the standard.

UTAH

John Crawford, state mining inspector, has issued a warning to coal mining superintendents and foremen in which he says none but authorized shotfirers must fire blasts. Mr. Crawford called attention to the recent deaths from this cause and says prosecution will follow if the rule of the Industrial Commission in this respect is not adhered to.

A bill to amend Section 3932 of the compiled laws of Utah, 1917, **relating to check weighmen in coal mines** has been introduced in the Legislature. It would compel operators to deduct pro rata from the pay of miners and pay the check weighman at the same time the miners are paid.

The MacLean Coal Co. has been incorporated for $500,000 The new company owns 2,000 acres of coal lands in Spring Canyon, Carbon County, known as the Mac Lean mine. Incorporators are: W. D. MacLean, W. M. MacLean, L. B. McCornick, J. J. Welch and G. S. Payne. W. D. MacLean is general sales agent for the Standard Coal Co., Kearns Building, Salt Lake City.

VIRGINIA

A coaling station for barges and small vessels, costing in the neighborhood of half a million dollars, is being promoted to be established on the waterfront in Berkley, on the south side of Norfolk. Capital in Philadelphia and Norfolk is to be employed in the project, according to the best information obtainable.

D. A. Butler, Norfolk manager for the Fort Dearborn Coal Co., has resigned that position to return to the accounting business, in which he was formerly engaged. He will open an office in Norfolk.

The Virginia Coaling Corporation, at Norfolk, has increased its capital to $25,000.

The Eastern Coal & Export Corp., of which L. S. Evans is president, and which is located at Richmond, has increased its capital stock from $500,000 to $750,000.

WEST VIRGINIA

A special meeting of directors of the **Pond Creek Coal Co.**, has been called for March 1 in New York **to discuss dissolution and liquidation of the company**. The property was recently sold to Henry Ford. It is reported that the directors will declare a final liquidation dividend of $10 a share. This dividend, when declared, will bring the total payment to $45 a share. Ford paid $8,500,000 for the entire property and equipment of the company, which, with current assets, was equal to $45 a share on 212,920 outstanding shares of stock after payment of taxes and all liquidation expenses. A first dividend of $35 a share was declared Feb. 15.

The Pound Mountain Coal Co. has been incorporated at Huntington with a capital of $100,000; John R. Evans, C. W. Campbell and E. D. Campbell are the incorporators.

G. D. Miller, Frank Enslow and R. H. Cunningham have organized the **Basic Coal Co.** at Huntington.

Charleston capitalists are said to be largely interested in the **Flynn Coal & Coke Co.**, recently organized with a capital of $50,000 to develop Fayette County coal properties. Among those interested are Daniel K. Flynn, of Elmo; H. B. Beury, James Flynn, A. S. Guthrie and J. A. Flynn, all of Charleston.

A new corporation has been formed by the interests back of the Pond Creek Coal Co., which recently disposed of its coal properties in Kentucky to Henry Ford. It will be known as the **Pond Creek Pocahontas Co.** and will operate in the Pocahontas field in West Virginia. The company has acquired mines with an annual tonnage of about 750,000, or about 150,000 tons less than the current tonnage rate of the Pond Creek Coal Co. The capitalization of the new company consists of 125,000 shares of no par value common stock. F. B. Davis, president of the Pond Creek and Island Creek companies, is president of the new corporation. The directors are Ben P. Bole, J. A. Downs, I. D. Francis, Frederick H. Goff, Charles G. Rice, Galen L. Stone and Mr. Davis.

The County Court of Monongalia County, W. Va., has instituted action **to set aside the sale of bonds of the Wheeling & Morgantown Ry. to Samuel Pursglove** of Cleveland, receiver of the road, the sale having been authorized by the county court last year. Since then the personnel of the court has been changed. In taking such action the new county court instructed the prosecuting attorney of Monongalia County to unite with counsel for the plaintiff in the case of R. H. Jarvis et al. against Samuel Pursglove. The bonds of the railroad, owned by the county, were sold for the sum of $162,500, the face value of the bonds being $325,000, plus accrued interest.

Henry Ford may extend the Detroit, Toledo & Ironton R.R. into the coal fields of West Virginia, according to assertions made by him Feb. 17 at Williamson, W. Va. His road now runs within 80 miles of Williamson. "We could haul coal to Detroit, make the product into coke, and sell it at a reasonable figure," he said. "If plans for the extension go through, the entire line would be electrified," he said. "We would develop the Ohio River just as we plan to develop Muscle Shoals," said Mr. Ford, "using hydroelectric power to move our trains and for other industries." He declared that he is now selling coke at $8 a ton in Detroit, and making a profit.

The E. E. White Coal Co. is planning to initiate work on the **new steel tipple** at its Glen White plant about April 1 with a view to having the tipple ready for operation by Sept. 1. The tipple will differ from the ordinary tipple in that only run-of-mine will be loaded over it and yet the degree of preparation and cleaning will be such as to meet the requirements of the most exacting market, it is stated. Other improvements are contemplated for the Glen White plant, all with a view to keeping the plant up to its degree of efficiency.

New coal companies organized in West Virginia during January had an aggregate capitalization of $6,850,000, there being 27 coal concerns in all formed during the period mentioned, two of which were non-resident. As two of the coal companies organized have capital stock without par value, the combined capitalization actually is in excess of the figures given. The largest among the coal companies organized was the **Mountain State Coal & Gas Syndicate** with a capital stock of $2,000,000. Other companies organized were as follows: **The Katona Coal Co.**, 1,000 shares without par value; **Bar-Jay Coal Co.**, of Philippi, $150,000; **Edna Gas Coal Co.**, of Fairmont, $1,500fi000; **Faith Smokeless Coal Co.**, of Beckley, $200,000; **Fairview Coal Co.**, of Webster Springs, $50,000; **Norwood Coal Co.**, of Omar, $1,000,000; **Pond Mountain Coal Co.**, Huntington, $100,000; **Profets Coal Co.**, Fairmont, $10,000; **Basic Coal Co.**, Huntington, 7,400 shares without par value; **Glenbar Coal Co.**, Clarksburg, $100,000; **Rich Mountain Sewell Coal Co.**, of Elkins, **$75,000; Shady Fuel Co.**, of Oxley, $25,000; **McKone Coal Co.**, of Tunnelton, $200,000 **Morganette Coal Co.**, of Beckley, $400,000; **Number One Coal Co.**, of Grafton, $5,000; **Hutton-Beale Coal Co.**, of Fairmont, $50,000; **Black Ash Coal Co.**, of Beckley, $15,000; **Riverside Coal Co.**, of Morgantown, $150,000; **Ideal Coal Co.**, of Charleston, $150,000; **Jackson Run Coal Co.**, of Clarksburg, $60,000; **Erwin Black Coal Co.**, of Charleston, $150,000; **Fire Creek Pocahontas Fuel Co.**, of Huntington, $150,000; **Flynn Coal & Coke Co.**, of Sunny Side, $50,000; **Coe Pocahontas Coal Co.**, of Covel, $200,000; **Brownsdale Coal Co.**, of East Liverpool, Ohio, $50,000; **Sanders Run Coal Co.**, of Pittsburgh, Pa., $10,000.

The following West Virginia coal companies have **increased their capital stock** in the amounts given: **Coal River Collieries Co.**, of Huntington, from $200,000 to $250,000; **Gulf Smokeless Coal Co.**, from $200,000 to $3,000,000; **Logan Fuel Co.**, from $25,000 to $100,000; **Independent Coal Co.**, from $50,000 to $100,000; **National Coal Mining Co.**, from $50,000 to $150,000.

Despite conflicting reports it is stated in reliable quarters that there has been a **settlement of the claim of the Willis Branch Coal Co.** against the United Mine Workers and that the sum paid over to the coal company was $400,000. John L. Lewis, International president of the United Mine Workers, has denied any such settlement.

Roy H. Cunningham and others prominent in the coal trade of southern West Virginia have organized the **Piedmont Coal Co.**, the capital stock of which consists of 20,000 shares without par value. Associated with Mr. Cunningham in the new venture are C. W. Strickland, G. C. Garred, James E. Hart and E. E. Winters, Jr., all of Huntington, where the general offices of the company are to be located.

Five men were injured, one seriously, in an **explosion Feb. 19 at No. 7 mine of the Island Creek Coal Co.**, Holden. Mine-rescue crews were reported searching Feb. 20 for two miners that were missing. According to mine officials, the explosion resulted when a car was derailed, filling the shaft with dust.

The new dry-process coal cleaning plant at the Crane Creek mine of the **American Coal Co.**, near McComas, was completed late in February and was scheduled to have its test run at once.

A news item in *Coal Age* Dec 28, 1922, stating that a fire due to spontaneous combustion threatened the destruction of a 35,000-ton storage pile of coal belonging to the Amherst Coal Co., at Amherstdale, W. Va., was a mistake. The Amherst company states that while it maintains "large stores of coal, this storage has never even been threatened with spontaneous combustion, even though one of the piles remained intact from December, 1920, to July, 1922, a period of eighteen months."

CANADA

In the year ended Jan. 31 **the United States sent to Canada 2,676,036 tons of anthracite**, duty free, valued at $23,364,988, and **10,327,450 tons of bituminous coal**, valued at $37,578,581, on which duty of $4,680,116 was paid, Secretary of State Copp announced Feb. 21 in the House of Commons at Ottawa.

During the week after the explosion of Feb. 8 which killed 33 men at the Canadian Collieries No. 4 mine, at Cumberland, Vancouver Island, a mass meeting of miners was held when the following resolutions were passed: **"That the exclusion of Orientals from all mines be demanded.** (2) That the longwall system of operating mines be eliminated. (3) That the meeting condemns Mr. Menzies, member of the Provincial Legislature for the district, for the statement alleged to have been made by him during the last session of the Legislature, to the effect that the miners and the company were satisfied with the result of the investigation into the cause of the previous explosion and with conditions at the mine." Trade unions in Vancouver threaten to boycott dealers that sell coal produced at mines where Oriental labor is employed. The Provincial Government has donated $5,000 toward the relief of the sufferers from the explosion and public subscriptions have been started in the cities of Vancouver and Victoria.

WASHINGTON

The War Department has called for bids for 2,000 tons of run-of-mine coal for delivery at Chanute Field, Ill., 824 tons of lump for use at Fort Omaha, Neb., and 100 tons of lump for use at Scott Field, Ill. Bids were scheduled to have been opened Feb. 27 at the Chicago Depot of the War Department.

Traffic News

F. R. Wadleigh, Federal Fuel Distributor, has asked the Interstate Commerce Commission to withdraw Service Order 38, under which the Montevallo Mining Co. of Aldrich, Ala., receives during the present coal car shortage priority rights to the use of 300 coal cars over its regular allotment.

The I. C. C. has authorized rail and barge rates and joint rates on coal from Alabama coal fields to Mobile and New Orleans for export.

The New York Central R.R. coal traffic department on Feb. 23 issued Supplement No. 10 to Summary of informal embargo notices No. 4, as follows: On account of accumulation **embargo 298 is placed by the New York Central R.R.** against **all freight** for delivery to the Fonda, Johnstown & Gloversville R.R. except perishable freight and anthracite coal, also bituminous coal when covered by permit issued by J. N. Snider, coal traffic manager, New York City.

To prevent congestion **embargo 303** was placed Feb. 21 by the **New York, Ontario & Western Ry.**, effective at once, against all shipments of coal from connecting lines (by rail or flat) at Weehawken, N. J., also New York and Brooklyn stations, piers or terminals; no exceptions.

The embargo placed by the Erie R.R. against all shipments of coal for the Passaic Worsted & Spinning Co., Dundee, N. J., **has been entirely cancelled.**

To prevent accumulation the **New York Central R.R.** on Feb. 22 **issued embargo 305** against all carload and less than carload freight destined to points on or via the New York, New Haven & Hartford R.R. and Central New England Ry., except livestock, perishable freight, anthracite coal, railroad fuel, freight consigned to officers of the United States Government. Shipments covered by permits issued by C. J. Brister, assistant vice president, Chicago, or G. C. Woodruff, general freight agent, New York City.

On account of accumulation the **New York Central R.R.** issued Feb. 22 **embargo 230-A** (superseding embargo 230), all carload and less than carload freight destined to points on or via the Boston & Maine R.R., except livestock, perishable freight, anthracite coal, railroad fuel and freight consigned to officers of the United States Government. Shipments covered by permits issued by C. J. Brister, assistant vice president, Chicago, or G. C. Woodruff, general freight agent, New York City.

At a conference of railroad officials representing the Virginian Ry. and coal operators shipping over that railway held in Charleston, W. Va., on Feb. 20, **regulations governing the shipping of coal were presented** by the railroad officials and agreed to by the operators, under the terms of which **shippers are to receive an equitable rating to be determined by the loading capacity of the mines.** Approximately 75 operators along the line of the Virginian are affected by the new rules and regulations, which become effective on March 1. The introductory period will be supervised by the allotment commission of the railroad and it is thought that with the new rules in effect there will be improved car distribution. Members of the allotment commission will visit the mines and under certain regulations will assist in arriving at a proper car apportionment basis. W. F. League will be chairman of the new commission, which is to have its headquarters at Princeton, W. Va.

A hearing will be held by the Coal and Coke Committee, Trunk Line Territory, in Room 401, 143 Liberty St., New York City, 2.30 p.m., Thursday, March 8, on a shippers' proposal for the **establishment of rates on bituminous coal** from the New River District of the Chesapeake & Ohio Ry. to Baltimore, Md., **on the basis of $3.65 per gross ton.**

The preliminary income statement of the **Delaware, Lackawanna & Western Railroad Co.** indicates that the coal strike resulted in a falling off of $11,355,000 in gross business for the year of 1922, as compared with the previous year. **Net income amounted to $10,475,928**, against $19,158,403 the year before.

Owing to the inability to get its cars back from other railroads, **coal loadings of the Pittsburgh & West Virginia Ry. are now only 40 per cent of car requirements,** Henry L. Farrell president of the company, says: "January net operating income will be favorable and will compare well with that of December," Mr. Farrell added.

Hearing on the joint petition of the Van Sweringen roads seeking permission to consolidate the New York, Chicago & St. Louis, the Chicago & State Line, the Lake Erie & Western, the Fort Wayne, Cincinnati & Louisville and the Toledo, St. Louis & Western roads into one system to be known as the New York, Chicago & St. Louis R.R. will take place at Buffalo on March 5. In New York only the "Nickel Plate" is involved, but similar applications are pending in other states and before the Interstate Commerce Commission. If ratified the new company also seeks to issue $32,720,000 in new preferred stock and $46,247,900 common stock. In the petition it is pointed out that the roads have been under common control for some time and that the consolidation would result in substantial economies and in improved service.

George S. Brackett, executive vice-president of the Northern West Virginia Coal Operators' Association, and several coal operators of northern West Virginia held a conference late in February in Pittsburgh with representatives of the Pennsylvania R.R. for the purpose of **discussing mine ratings.** A similar conference was held with representatives of the Baltimore & Ohio at the time the wage conference was held with officials of the United Mine Workers earlier in the month.

Another attempt is being made by the **Federal Valley R.R.**, which is owned and operated by the same interests that conduct the Black Diamond coal mine at Lathrop, Ohio, **to obtain relief from the Interstate Commerce Commission.** The railroad, which is 16 miles in length, was purchased by the Black Diamond Co. for the sole purpose of transporting the output of its mine. Other shippers along the line of the railway filed a complaint with the Public Utilities Commission of Ohio and obtained an order making the line a common carrier of freight. This added greatly to the burden of operating the line, as all freight is hauled at a loss due to disadvantageous divisions with connecting lines. It is contended that under present conditions the confiscation of the property ultimately will result. Such divisions of joint rates are asked as will permit this short-line railroad to pay its operating expenses, taxes and a fair return on the value of the property.

Preferences in the handling of privately-owned coal cars are condemned vigorously by S. C. Higgins, traffic manager for the New River Coal Operators' Association in a written argument filed with the Interstate Commerce Commission, in connection with the assigned-car case. "It is not in the public interest," Mr. Higgins says, "to give preference in the handling of private cars during the stress of car shortage, thus depriving shippers customarily dependent on system coal cars from distributing generally the products of the mines and using the limited facilities of the carrier in the movement of private coal cars, thereby disposing of the product in a restricted area." Mr. Higgins pointed out in his argument that during the car shortage on the Chesapeake & Ohio private cars are being placed at private-car mines greatly in excess of the distributive share placed at system mines. He further contends that both empty and loaded private cars receive preferential movement. Nelson W. Proctor, attorney for the Louisville & Nashville Ry., in taking exception to the contentions of the Commercial Coal Co. in the matter of rates on coal from eastern Kentucky mines to Northern and Western cities, declares that the mine operators have not shown these rates to be unreasonable. He says the present differences between the rates from L. & N. group 4 stations and group 3 stations are justified by the differences in distance and by comparison with the differentials obtaining between other coal groups. He declares that the grouping of mines in eastern Kentucky represents the best judgment of the traffic officers of the company and he states that the mine operators have not established that they are subjected to any unreasonable disadvantage as compared with the operators in group No. 3, who are nearer the markets.

Obituary

William Massie Warwick, superintendent of the operations of the Slab Fork Coal Co. in Raleigh County, W. Va., and for more than a quarter of a century prominent in the coal industry of southern West Virginia, died at his home at Slab Fork, on Feb. 8, of pneumonia. Mr. Warwick was 70 years of age.

Ora Darnall, 58, for many years connected with the Bolen-Darnall Coal Co. of Kansas City, Mo., died Feb. 10, in Battle Creek, Mich. Mr. Darnall in 1901 became general manager of the Bolen Coal Co. and not long afterward was made a partner in the concern. He moved from Kansas City to Wyoming twelve years ago.

James Mooney, widely known as an organizer for the United Mine Workers of America, who dropped dead recently in Kansas City, was buried in Novinger, Mo. Mooney had been a resident of Novinger and Connellsville for more than twenty years and had a wide acquaintance among miners not only in Missouri but throughout the United States and Canada, and he had been an organizer for this organization in both those countries for a number of years. He was attending a mine conference at the time of his death.

George Z. Hosack, treasurer of the Berger-Aiken Coal Co., of Carnegie, Pa., died on Feb. 9, after an illness of more than a month. He was a former treasurer of Allegheny County, and during his time had been associated with many coal companies.

George R. Stagg, superintendent of the Lehigh Valley Coal Sales Co. pockets at Irvington, N. J., died on Feb. 14 from pneumonia and influenza. He lived in Irvington.

James Omer Cole, 94 years old, the surviving original member of the lumber and coal firm of Cole & Crane, of Cincinnati, Ohio, died at his home in Peru, Ind., on Feb. 3. Mr. Cole owned considerable virgin timber land underlaid with coal in West Virginia.

Judge Martin A. Knapp, of the Commerce Court, formerly chairman of the Interstate Commerce Commission and long prominently identified with transportation matters, died Feb. 10.

Association Activities

Pittsburgh Vein Operators' Association of Ohio

The annual meeting of the Pittsburgh Vein Operators' Association of Ohio, comprising operators in the eastern Ohio No. 8 field, was held in Cleveland, Ohio, on Monday, Feb. 19, at Hotel Cleveland. The following officers and members of the executive committee were elected for the ensuing year: President, Michael Gallagher (re-elected); vice-president, Ezra Van Horn; treasurer, H. R. Sullivan (re-elected); secretary, D. F. Hurd (re-elected). S. H. Robbins, president of the Youghiogheny & Ohio Coal Co., was chosen chairman of the meeting in the absence of President Gallagher, who was unable to attend on account of the death of his mother. Colonel Henry L. Stimson and G. H. Dorr, of counsel for the bituminous operators' special committee, Washington, D. C., addressed the morning session, which had been especially arranged for the purpose of acquainting eastern Ohio operators with the progress being made by the national committee in preparing and presenting material facts concerning the industry before the U. S. Coal Commission. Non-member operators in the District were present as guests of the association at the morning session and also at the luncheon which followed.

Coming Meetings

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

Northwestern Pennsylvania Coal Operators' Association will hold its annual meeting March 6 at the William Penn Hotel, Pittsburgh, Pa. Secretary, T. F. Diefenderfer, Butler, Pa.

Canadian Institute of Mining and Metallurgy's annual meeting will be held March 7, 8 and 9 at the Mount Royal Hotel, Montreal, Quebec, Canada. Secretary, George C. Mackenzie, Montreal, Quebec, Canada.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

Indiana Bituminous Coal Operators' Association will hold its annual meeting March 14 at Terre Haute, Ind. Secretary, P. H. Penna, Terre Haute, Ind.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The executive board of the **Coal Mining Institute of America** will meet in Pittsburgh, Pa., Saturday, March 3.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Harry Harkness Stoek

IN THE death of H. H. Stoek the coal industry has lost a man of broad vision and progressiveness and yet withal one who made haste slowly. He was always careful and self-repressive in statement, a patient accumulator of information and one who never by overzeal supported a wrong cause. When acting as editor of the *Colliery Engineer* and *Mines and Minerals*—it bore both names—he made that paper one of the leaders in the technical journalism of its day.

He had great diplomatic ability, and this had much value at the time when largely by his efforts one of the most drastic of all mine laws was passed by the Illinois Legislature. In face of this fact Mr. Stoek always had the hearty support of the coal operators of Illinois. They in fact strongly approved the safety laws of their state though they always felt aggrieved with the fact that other mining states with which they had to compete did not have so severe a law to hamper their operations.

Professor Stoek labored hard to increase the percentage of extraction in Illinois; he brought together what information is available about subsidence; he carefully watched and recorded what developed in the matter of coal storage. As an organizer he was a man of much talent, a .d the work he did at the University of Illinois as head of the Department of Mining Engineering and the co-operation he attained in his educational work have made that establishment the leader in bituminous-coal mining of all scholastic institutions.

The Ins and Outs of Howat

THE Alex Howat case in Kansas certainly has its farcical aspect. It is humorous to picture the former president of District 14, United Mine Workers of America, popped out of this jail and that by the efforts of the new Governor of the state only to be popped in again by the efforts of the state Attorney General. But it is not so humorous to witness a Governor of a great state scorning the labor legislation on the statute books of his commonwealth and openly conniving with those elements of the citizenry within the state that would violate a law simply because it is distasteful and disobey a court because it is unpopular with them, as Alex Howat disobeyed the Industrial Court of Kansas.

Governor Jonathan Davis should prove the unconstitutionality which he charges against the Industrial Court Act and get that act repealed by due legislative course before he takes the doubtful case of Alex Howat in his own plow-calloused hands and attempts to settle it by freeing a prisoner of the state. He is setting an exceedingly bad precedent. The only relieving touch in the Howat episode is the ludicrous bungling of the Governor. He freely lavishes pardons and paroles upon the labor leader long ago discredited by his own national organization, but they do not mean anything. Some law enforcer always outwits the farmer Governor. And then Howat doesn't want his freedom anyway. When he is free he has to go to work. Periodical trips to jail, he seems to think, serve to keep alive the martyr worship he prizes so highly.

Coal Commission Able to Finish Its Work

CONGRESS in the end met every request of the United States Coal Commission, even to permission for Judge Alschuler to serve. An increase of 200 per cent in the appropriation, raising the total from $200,000 to $600,000, and some teeth in the law, making compulsory the answering of questionnaires, are the really important things, however, of which the added money is the more important. It is hoped that from now on there will be smooth sailing for the commission. Halting to get out the Jan. 15 report and several weeks of hesitation and uncertainty while the matter of added appropriation was being settled have slowed up to an appreciable extent the work in progress, and added to the doubts in the minds of the coal operators and the trade generally as to whether the whole thing might not blow up.

There is no reason now why anyone should delay sending to Washington data called for by the commission, unless it be the plain unvarnished desire to withhold. It is no secret that there are some coal operators and others who would like nothing better than to hamstring the whole program. It is fortunate that they are in the minority and do not represent the feeling of the majority of the leaders or of the rank and file. So far as we are aware the opposition to supplying facts to the coal commission centers in southern West Virginia. The feeling is quite general, however, that eventually this district will not only put in all the facts but that it will put them in just a little more complete and in better form than any other field. Whoever he may be, anyone will think hard and several times before giving the commission occasion to test the power of its authority.

The Elements of a Lake Program

WHEN coal and railroad men begin to talk about the "Lake program" for the coming season, all may know that spring is on the way. From the high point for recent years of 28,000,000 tons in 1918 to the low of 18,000,000 tons in 1922 the Lake coal movement has varied. The real point of difference between years is not the total, however; it is the rate of movement. The railroads are showing concern over the prospect of getting coal started early and in volume for the Northwest. The dock operators fear that unless the freight rates to lower Lake ports are reduced or the costs of

transportation from Eastern and Midwestern fields are otherwise more nearly equalized there will be a dearth of coal put on the docks this year.

The ideal program for the Lakes is one that starts out strong, reaching a high rate of dumping early in the season, and tapers off late in the summer. Such were the records for 1919 and 1921. Contrasted with these ideal performances were the records for 1918, 1920 and 1922, when the humps in the curve came late in the season. Recent history shows all too clearly the difficulties that arise when the movement of this essential coal is too long delayed. Pressure of all manner of sorts develops and too often Washington becomes involved in the effort to make up lost time.

It will be noted that the best years were the easiest, when the natural laws of trade operated to pour the coal northward for storage in transit at the time of year when demand was at low ebb elsewhere. The inaccessible Northwest is a market that requires that the greater part of its winter coal be taken during the open months of the year. The trade via the Lakes was developed to supply that need, and thus to take advantage of the opportunity to mine and ship coal not called for by local markets. The commercial dock companies of the Northwest were originally and are now to a large extent subsidiaries of Eastern coal producers, established to furnish a summer outlet for production.

Under normal market conditions, as prior to the war and in 1919 and 1921, when summer demand for coal is slack, these companies can and do put sufficient coal up the Lakes to care for that territory. But when market conditions are abnormal—that is to say, when there is a strong demand for coal in the summer in nearby markets—the shippers having contracts or other arrangements to send coal to the Lakes must needs share the available car and transportation supply with a host of other shippers having no such obligations. Between bidding in a high spot market to make up for contract coal curtailed by car shortage and appealing to the government for preferential treatment the Northwest has chosen the latter as in 1918, 1920 and 1922. In these years the necessary supply was literally forced into that route after it became evident that not otherwise would the necessary supply be shipped.

The coming Lake season will take one form or the other. If coal from the Eastern fields flows easily and in volume when the season opens, the 23,000,000 tons or more of soft coal that apparently will be required for the Northwest will be obtained without particular effort. The attitude of railroads, utilities, industrials and retail dealers in the Northwest toward their fuel commitments will have much to do with the development of an early, strong start. Delayed buying will bring another last-month rush and appeals for help.

Fundamentally Wrong

LOOK at it as we may there must be something fundamentally wrong or we would not have so many mine explosions as recently have occurred. It would be difficult to find three better disposed companies than the Woodward Iron Co., Phelps Dodge Corporation and the Weyanoke Coal & Coke Co., a subsidiary of the National Cash Register Co., in whose mines, nevertheless, explosions have recently occurred. The fact that the mine of the last-named company was operated by the Pattersons is a guarantee that little if anything would be spared to make the workings safe.

We may hope later to hear more of the details, and when we do we may find that what is said here about our American practice of building up coal far above the sides of the wagons does not apply to any of them. However, that practice is one of the arguments against rock dusting. With such a large quantity of spillage the rock dust, if used, would have to be loaded out frequently in order to keep the percentage of coal in the floor dust down to a safe figure.

This apparently is the real objection to rock dusting. It would seem to necessitate a change in our equipment, one that the loaders would resent because it would add to the difficulty of loading, and one the operators cannot feel disposed joyfully to accept because it would lower production, involve an immense expense and displease their men. We are getting wider and longer cars. We are building them closer to the tracks, but we are not keeping the old standards of height, for we are utilizing the advances in breadth, length and lowness of bed to obtain large capacity with lessened car depth. Furthermore, it is felt that the building up of the cars with lumps puts a premium on large coal and saves expense in the equipment provided for hauling, hoisting and dumping cars.

Doubtless these considerations weighed but little with the companies mentioned, but we are all creatures of habit, and the practice of rock dusting not being established because of these considerations, even the companies more prodigal in providing protection have not taken kindly to extensive rock dusting because precedents in the practice were almost entirely lacking in this country.

Furthermore, sprinkling and moistening of the atmosphere seemed as good and a less expensive method. Clearly, however, it has not proved a complete solution of the difficulty and the whole problem of mine protection must be considered from a new viewpoint.

The dangers of derailed cars can be met as far as feeders are concerned by putting them in a trench covered by a plank. The trolley line should be safeguarded by taking care that the timbers are so protected that derailment of a car or even of a trip of cars will not dislodge the posts by which the trolley line is supported. Where the roof tends to break up as the air weathers it the roadways should be protected by a thin coating of cement mortar, and big barrier pillars should be provided so that the roof will be free of a strain that would make the cement mortar an unavailing protection.

Unfortunately such pillars cannot be provided in room entries. Here the trolley locomotive might give way to the storage-battery unit where the roof is bad, but in that case how could current be supplied to the machines if the trolley system or a special feed wire were not provided? Attaching the trolley supports to the side would be no preventive of damage from roof falls should the roof give way, for if the rock fell on the wire or the trolley supports both would come down and cause a severe short-circuit. The danger of accident would be greatly minimized, however, if the heading were plentifully sprinkled with rock dust. With more cemented roadways, with rock dust liberally bespread and with cars that do not spill their contents over the roadways the dangers from explosions would be greatly lessened. We are facing a situation nearly as bad as that when the Monongah, Jacobs Creek, Yolande and Naomi explosions confronted us, and something will and must be done to make our mines safer.

Pocahontas Coal Field and Operating Methods of the United States Coal & Coke Co.*

Mining Methods Now in Favor—Performance of Undercutting Machines—Consumption of Timber per Ton and per Acre—Car Duty and Maintenance Costs—Output per Man—Power Consumption—Expenditures on Materials

By Edward O'Toole†
Gary, W. Va.

THE Pocahontas district occupies the extreme southern end of West Virginia, principally McDowell, Mercer and Wyoming counties, and a part of Tazewell County, in southwestern Virginia. The first record of the coal field is a report by Prof. J. P. Lesley, of Pennsylvania, about 1880, in which he mentions a coal opening at the upper end of Abbs Valley, Tazewell County, Virginia. C. R. Boyd, a mining engineer of Wytheville, Va., published a series of articles in 1881, mentioning coal on Indian Creek, Tazewell County, and on Horse Pen Creek, which coals, he stated, extended toward the Ohio River. He also mentions the Abbs Valley coal reported by Lesley.

In 1881 F. J. Kimball (who became president of the Norfolk & Western R.R. in 1883), after examining the Scott mine in Abbs Valley, went northward across Abbs Valley Mountain to the place now known as Pocahontas, where he located what has since been called No. 3 vein of Pocahontas coal. In November, 1882, Jed Hotchkiss and others prepared a cross-section of the Flat Top Mountain coal measures, some notes on which were published by Mr. Hotchkiss, between 1880 and 1892, under the title of "The Virginias."

In May, 1881, the Norfolk & Western R.R. was organized through the purchase of the Atlantic, Mississippi & Ohio R.R., an old line running from Norfolk, Va., to Bristol, Tenn., with branches from Petersburg to City Point and from Glade Springs to Saltville. At that time charters had been granted for three railroads tributary to the New River Valley, but their proposed routes would indicate that the promoters were concerned with minerals, timber and a connection with the Chesapeake & Ohio R.R. rather than the development of any coal in the Pocahontas district. One of them was projected to extend up Bluestone River a short distance, but not far enough to reach the coal in the Bluestone Valley, and a little grading was done for a narrow-gage road between New River Station and a point in Giles County, Virginia, near the West Virginia line. All charters and railroads in this district were acquired by the Norfolk & Western R.R. early in 1882, and during that year construction was actively prosecuted on this company's main line from near Radford, Va., to the Pocahontas coal field.

In the meantime the Southwest Virginia Improvement Co. began to open coal mines and build coke ovens at Pocahontas and vicinity, so as to be ready to make shipments as soon as the railroad should be completed, which was in 1883. Shipments began in June, and during that year 81,800 tons of Pocahontas coal and 23,763 tons of coke were shipped. From 1884 to 1888 the Norfolk & Western extended its lines down Bluestone River to Flipping Creek and up the latter. In 1888 it completed

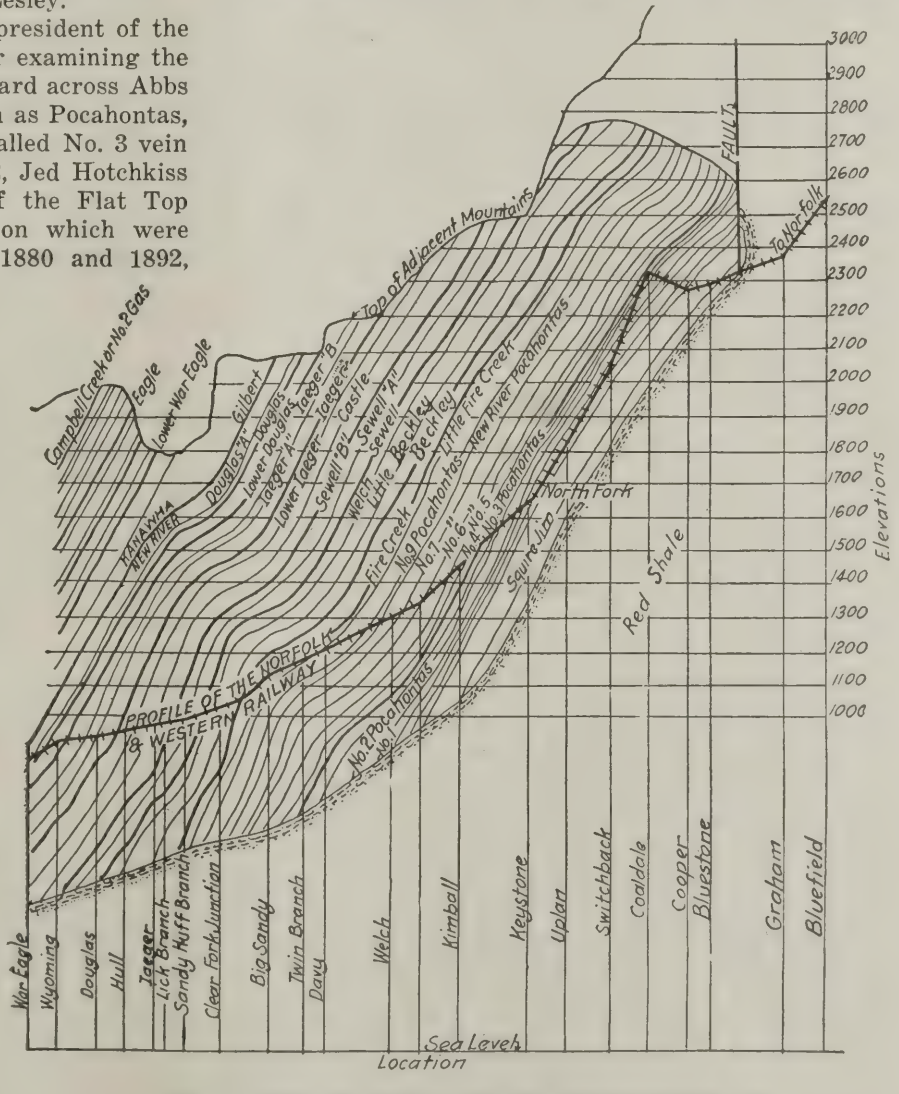


FIG. 1—PROFILE OF COAL SEAMS OUTCROPPING ON NORFOLK & WESTERN RY.

It will be noted that McDowell County not only has the Pocahontas, or Pottsville measures but, in the western end, the New River series and even part of the Kanawha series. However, this profile on the left oversteps the McDowell County line a little, Wyoming being in that county and War Eagle in Mingo. The Kanawha and New River measures lie unconformably on the Mauch Chunk red shale and so in a degree do the Pocahontas measures.

†General superintendent, United States Coal & Coke Co.

*Article delivered at the February meeting of the American Institute of Mining and Metallurgical Engineers, New York City, Feb. 20.



FIG. 2—NORFOLK & WESTERN RY. AND THE ADJACENT COAL FIELDS

This map does not show all the coal fields in the area presented but only those tributary in a degree to a railway system mentioned. Coal is found almost all over the area illustrated, Logan, Raleigh, Fayette, Boone, Kanawha and Letcher being important coal producers, and many of the others possessing some coal lands.

the Elkhorn tunnel and extended its line to Elkhorn, in McDowell County, West Virginia.

About 1886 to 1889 Messrs. McCreath and d'Invilliers made an extensive examination of the Pocahontas and adjacent coal fields for the Norfolk & Western R.R. Co. In 1890 construction began on the Ohio extension, which was completed to a connection with the Scioto Valley & New England R.R. at Ironton, Ohio, in November, 1892. This gave the Norfolk & Western an outlet to Columbus, Ohio and the West, and also to the Eastern seaboard at Lamberts Point, Va., where a coal pier had been erected in 1885 for the transfer of coal into ocean vessels. Another outlet was acquired by the purchase of the line from Roanoke, Va., to Hagerstown, Md. The railroad was reorganized as the Norfolk & Western Railway Co. in 1896.

The Pocahontas Coal & Coke Co., incorporated in 1901, is a land holding and leasing company and does not engage in coal mining or in trading in coal or coke. The areas held by this company have been increased from year to year, the present total being 300,000 acres. The largest single lease now is that of the United States Coal & Coke Co. The Crozer Land Association in the early period assembled 16,000 acres of coal land immediately tributary to the Norfolk & Western Ry., all of which is leased to mining operators.

The construction of the Tug River branch of the Norfolk & Western from Welch, W. Va., up Tug Fork and tributaries, for developing the leasehold of the United States Coal & Coke Co., was undertaken in January, 1902, and a second section in May, 1903. Fifteen miles were put in operation to and above Gary in June, 1904. Extensions in this valley have been made from time to time, and at present there are seventy-five miles of railroad on this branch.

According to I. C. White, state geologist of West Virginia, "The lowest and oldest rocks are the Mauch Chunk red shales, which crop to the surface in narrow belts along the crest of the Dry Fork anticline in the southeastern portion of McDowell County. The Pottsville measures, or basal formation of the Pennsylvanian, constitute at least 95 per cent of the outcropping rocks, the entire group being represented in Wyoming and McDowell counties." White also gives the sections, names and elevations of the coal seams of the Pocahontas coal field.

Fig. 1 shows a section (with greatly exaggerated vertical scale) along the Norfolk & Western Ry.; this road, except at the Elkhorn tunnel at Coaldale, follows the Tug River and Elkhorn Creek 15 to 20 ft. above their beds. So far as known at present, seven seams in the New River group, namely: Douglas, Iaeger "B," Iaeger, Sewell "B," Sewell, Welch and Beckley, are of workable thickness in McDowell County. Thus the Pocahontas coal field is not really synonymous with the McDowell County coal area, as has been quite generally believed.

Four of Pocahontas Seams Are Workable

Only four seams in the Pocahontas group, namely, Pocahontas Nos. 3, 4, 5 and 6, are known to be of workable thickness. No seam of either group is coextensive with the field. The thickest seam of the Pocahontas series is No. 3, which is 12 ft. thick at Pocahontas, but only 11 ft. in the Elkhorn tunnel, 3 miles from Bluestone; it gradually thins in a northwesterly direction until it reaches Kimball, 17 miles west of Bluestone, where it goes under water, with a thickness of 7 ft. On Tug Fork Branch, on the lease of the United States Coal & Coke Co., it is from 3 to 8 ft. thick.

The No. 4 Pocahontas seam on the lease of the United States Coal & Coke Co. runs from 3 to 7.5 ft. thick. These two seams are similar in character. The workable seams of the Sewell group, immediately above, have a maximum thickness of 5 ft. averaging about 3 ft. where worked.

As will be noted, the Pocahontas coals are found in the oldest coal-bearing measures of the Appalachian fields. Their present area is comparatively small, and is bounded by a fault on the southeast and by the edge of the basin on the east, north and west. All the coals in the Pocahontas field are low in sulphur, ash and phosphorus; it is seldom that an analysis shows ash more than 4 per cent, sulphur more than 0.6 per cent, or phosphorus above 0.008 per cent, unless portions of the overlying or underlying strata or of the partings have been included in the sample in which case these constituents run higher.

The topography of the Pocahontas coal field is exceptionally steep and rugged, consisting chiefly of high narrow ridges and V-shaped valleys, the latter affording limited space for railroads, highways and town sites. Much forethought is required in the planning of mining towns and plants. The fall of the main stream, Tug River, is approximately 0.5 per cent, except near its source. Railroads have been built along it and some of its branches with grades varying up to 3 per cent.

The climate is mild, and hard winters are of rare occurrence. The rainfall is unusually heavy, from 50 to 55 in. per year, and furnishes an abundance of water for all purposes except during the four or five dry months, when reliance must be placed on deep wells, as the stream becomes low and more or less polluted

This exceptionally heavy rainfall creates a serious problem in mine drainage.

The mountains were originally covered with abundant timber, but now all building material and about 80 per cent of the mine timbers is brought in from other localities, generally from Georgia, Alabama and Mississippi.

A large percentage of the labor now employed comes from the surrounding states and from foreign countries. The clerical, engineering, skilled labor and directing forces consist principally of native Americans, while the largest part of the manual labor is performed by the colored and foreign employees. The labor is well trained and efficient, diligent and loyal. There are no labor unions in the field, although there are various secret and benevolent orders among all classes of labor. All the mines of the Pocahontas field are served by the Norfolk & Western Ry.; the coal is easily accessible and outcrops on the mountain sides throughout the greater part of the territory.

Operating Developed Discontinuity of Beds

Previous to the entrance of the United States Coal & Coke Co. into the field, prospecting, drilling and correlating of the coal seams was done in a superficial manner. The operating companies were small and their holdings consisted of leases 3,000 acres or less in area. The land-holding companies found no necessity for prospecting up to that time.

Before it had thoroughly inspected its property the United States Coal & Coke Co. began the development of the Tug River section, and started to build its railroads and towns. The Pocahontas No. 3 seam had been thoroughly developed along the Elkhorn River by operating mines, and it was supposed that this seam continued through the mountain to the valley of the Tug River, but when the seam was developed at many points on the Tug River front it was found that in every opening the coal pinched out at a distance varying from 50 to 800 ft. from the outcrop.

As railroad and town building had been pushed vigorously, much expense had been incurred prior to the time when the coal disappeared. To avoid further loss the property was now most thoroughly prospected by outcrop openings and diamond-drill borings. Openings were started every 1,000 ft. along the entire outcrop of No. 3 seam, a distance of 105 miles, and openings were made also on other seams. Diamond-drill cores were taken at desirable points, ranging from 1,000 ft. to 5 miles apart. This work developed the fact that the openings on the Tug River side of the mountain were not in the famous No. 3 Pocahontas seam but on the No. 4 seam, 65 ft. above it. It further developed that under a considerable area both the No. 3 and No. 4 seams were wanting, but that, on the other hand, these two seams were in place, of good minable thickness, over a large portion of the property, and that the total area carrying both seams exceeded by about 20,000 acres the amount expected at the beginning. Had the property been only partly prospected at the start, disclosing that No. 3 seam was wanting over a large portion of the territory, and that the outcrop openings were on No. 4 instead of No. 3 seam, the lease probably would have been abandoned and development would have been retarded for years.

In the calculation of available tonnage a line 80 ft. inside the outcrop was taken as the limit of merchantable coal. The actual distance from outcrop to good coal averages 77 ft., thus confirming the estimate. The yield was estimated at 1,500 tons per acre-foot and this also has proved a fairly accurate assumption.

The United States Coal & Coke Co., a subsidiary of

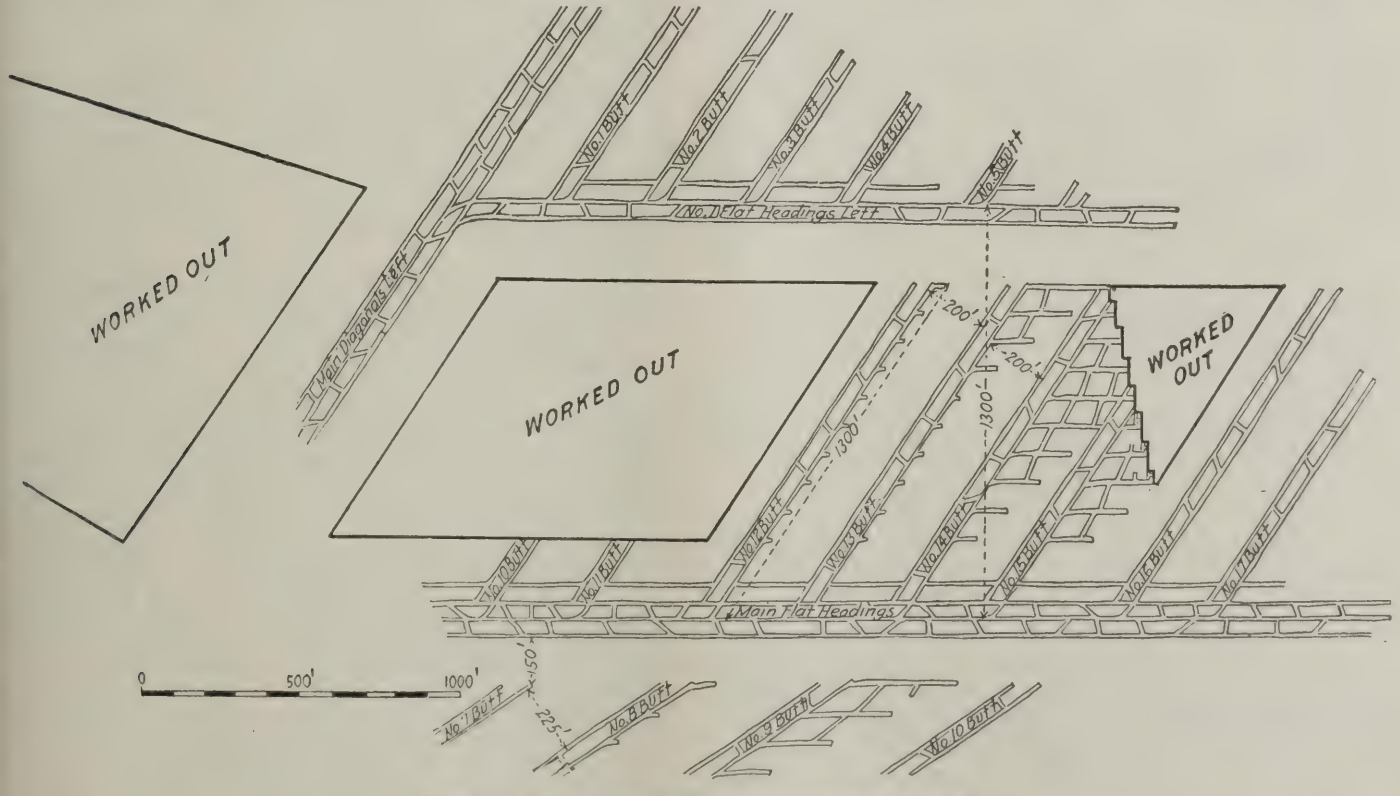


FIG. 3—OLD METHOD OF WORKING BY PANELS

This was the first method of mining that the Pocahontas region adopted. It was a slow way of developing the coal and an expensive way of extracting it. Too many roads had to be maintained, the ventilation was costly, coal was lost, too much territory was kept open, too much capital was needed for equipment, and supervision was difficult, resulting in high cost for this service and decreased safety to the men employed. Consequently the United States Coal & Coke Co. discarded it.

the United States Steel Corporation, is the largest coal producing company in West Virginia; its operations consist of one shaft, one slope and twelve drift openings. The shaft, which is 180 ft. deep and penetrates both No. 3 and No. 4 Pocahontas seams, has not been in operation since 1909. It is now used as a drainage outlet for the northern portion of the property.

The mines on this property at first were developed by the panel system. These panels were about 1,000 ft. square, and were developed with a set of main headings, comprising one haulage road and two airways. The intention was to drive the room headings from these main headings to the end of the panel before any room work or rib extraction was started. This method was soon found defective in the following principal respects: (*a*) Excessive time spent in development; (*b*) short life; (*c*) expense of mine roads, side tracks, etc.; (*d*) expense of ventilating; (*e*) expensive to operate principal haulage; (*f*) excessive quantity of coal left as barrier pillars; (*g*) loss of large percentage of this coal when pillars are removed; (*h*) large area remaining open for a given tonnage; (*i*) large quantity of equipment required for a given output; (*j*) excessive cost of proper supervision, due to scattered workings; (*k*) dangerous conditions, for the above reasons.

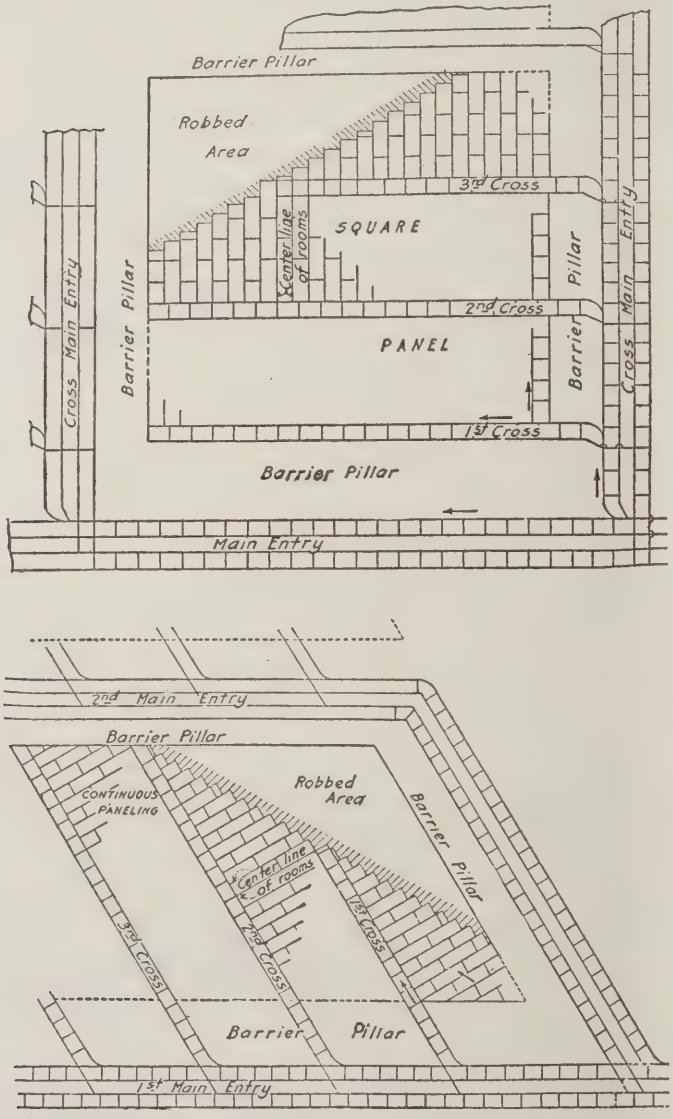


FIG. 4—TWO TYPICAL PLANS FOR WORKING A PANEL

These are standard methods in the Pocahontas region. Three cross entries are driven up for their full length and then rooms are started, the first room being at the end of the heading and the last against the barrier pillar of the cross main entry. The rooms are pillared retreating, giving a long pillar line which passes from cross entry to cross entry.

From a portion of mine No. 6, originally developed by the old panel system in 1904, ribs and pillars of rooms that were driven at that time are still being extracted, and it will require not less than six years more to exhaust this part of the mine. Fig. 3 shows a plan of the old system, now discarded by this company.

The principal methods of mining in the Pocahontas field were described in 1915 by William H. Grady, in a paper, "Cost Factors in Coal Production."[1] Fig. 4 is one of a large number of illustrations in Mr. Grady's paper; it shows the details in the exploitation of two individual panels of different shapes. These systems, with slight modifications, are still in use throughout the field.

The Pocahontas No. 3 and No. 4 are the fourth and fifth seams from the bottom of the series, the interval between them being 65 to 70 ft. A typical section of each seam is shown in Fig. 5, that of No. 3 being as it occurs in mine No. 10, while the section of No. 4 seam was measured in mine No. 6; these mines are about 1½ miles from Gary and located in different valleys.

Explosive Gas Is of Frequent Occurrence

The slate overlying No. 3 seam thins out in a northeasterly direction until it practically disappears, while the slate overlying No. 4 seam thickens in a southeasterly direction until it reaches a maximum of 5 ft., before it begins to thin, and it entirely disappears in the extreme southwestern extent of the seam. The roof of No. 4 seam varies from a sandstone, lying directly over the coal, to a laminated coal and slate (known locally as "rash"), which gradually appears between this sandstone and the coal until it has reached a thickness of 5 ft.; it is then gradually displaced in a southwesterly direction, from top down, by a slate which attains a thickness of 6 ft., when it in turn gradually disappears. Where slate or black "rash" is over the coal, it renders the mining conditions difficult and dangerous.

Till quite recently explosive gas has not been present to add to the ventilating problems of the mines of the United States Coal & Coke Co.; however, in those parts of the seam under heavy cover, a small quantity of explosive gas is found, which increases as the mine workings advance. The seams dip northwesterly from 2 to 8 per cent.

About 97 per cent of the coal in the Pocahontas region is mined through drifts on the mountain sides at various distances above the stream. The entrances are protected in various ways, such as timbering, stone side-walls with I-shaped cross beams, stone side-walls with stone, brick or concrete arches.

From the drift openings coal is delivered to the railroad by electric trams, steam trams, gravity planes, aerial tramways, retarding and scraper conveyors, pan conveyors and chutes.

The description of development plans will be confined to the practice followed by the United States Coal & Coke Co. at its mine No. 6, operating in the No. 4 Pocahontas seam, this plant being fairly typical of mining practice in the Gary district.

The general plan (Fig. 6) is a room-and-pillar continuous advancing and retreating system. While advancing, room ribs, heading stumps and heading chain pillars are extracted. Thus the full production of the mine can be constantly maintained from a short period

[1] *Trans.* (1916), Vol. 51, p. 138; previously published in *Bulletin* 101 (May, 1915), p. 1,035.

after beginning until the mine is practically exhausted. Each section is planned for a minimum capacity of 1,000 tons per shift, both while advancing and retreating; in practice this output is being exceeded.

During the advancing period the headings are continually progressing and rooms are being driven on the "inbye" end of them. As soon as these rooms reach their limits, the pillars are withdrawn, resulting in complete extraction over that portion of the section allotted to the advance. By this plan the room headings last throughout the life of the mine and become as long as the property; some such headings are now more than 6,400 ft. long and have two miles further to go before reaching the boundary. The life of one of these sections may be from 10 to 40 years.

Concentration of Workings Afforded

This method affords simplicity of ventilation, transportation and drainage; concentrates the workings and permits a maximum of superintendence. No standing pillars, with resultant open work to be ventilated, are left for later difficult and expensive extraction. It is never more than two years from the time a room is started until it has reached its limit and its ribs have been robbed back to the heading.

On all haulage roads 0000 grooved trolley wire is used, and both rails are bonded. Feeder lines of 1,000,000 and 500,000 circ.mil, paralleling the trolley wire, to which the latter is connected every 200 ft., are carried on the same hanger blocks. (See Figs. 7 and 8.)

The power from a central power plant is distributed to substations, one of which is at the mine entrance and the other 9,000 ft. inside. These substations are designed to run in parallel and furnish an even distribution of power at the working face and along the haulage roads. Direct current of 275 volts is used for all underground power, including lighting, haulage and undercutting.

Electric Lights One Hundred Feet Apart

On all haulage roads, electric lights are installed at 100-ft. centers and on curves one is set every 75 ft. In rooms two or more electric lights are maintained at the face, and one light at the room switch on the heading. (See Fig. 9.)

During robbing the measures generally break to the surface, and as there is no alluvial deposit or surface soil on the tops or sides of the mountains, the cracks remain open and a large quantity of water enters the worked-out areas, especially at certain seasons of the year.

The mines are drained by a tunnel driven in the coal seam as near as possible to the low side of the property. All water from this and adjacent higher mines drains to this waterway. This tunnel is part of a drainage system extending through other mines from the lowest outcrop point on the Tug River. During a period after heavy rains, weir measurements showed 12,000,000 gallons of water passing through the drainage tunnel in 24 hours. This water came chiefly from robbed areas.

All undercutting is done with electrically driven shortwall mining machines which are equipped with cutter bars varying from 6½ to 12 ft. long. Room and heading coal and also rib coal, when solid, is undercut. The coal in stumps and pillars which have sufficient weight upon them to crush the coal is removed by hand. The cover over the working places in mine No. 6 at present is so heavy that it is necessary to undercut only

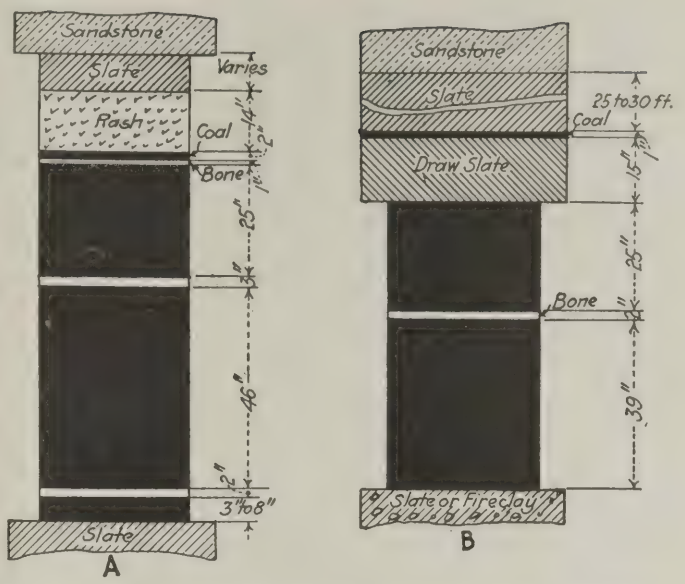


FIG. 5—CROSS SECTIONS OF LEADING GARY SEAMS

A is No. 3 seam, the fourth from the bottom of the Pottsville series. The slate thins out in a northeasterly direction. *B* is No. 4 seam. In places the sandstone is found immediately over the coal but in other places it is 30 or more feet above it. The draw-slate may change to laminated coal and slate, and in that case is dangerous.

42.5 per cent of the coal mined. Table I shows the work done by all mining machines in the company's properties:

TABLE I—PERFORMANCE DATA OF MINING MACHINES

Mine No.	Days Worked	Places Cut	Machines in Service	Places Cut Per Machines Per Day	Tons Machine Coal Per Machine Per Day
2	241	9,512	7	5.6	193
3	248	11,759	7	6.8	103
4	245	6,751	7	3.9	114
5	234	3,291	3	4.7	175
6	239	5,960	9	3.2	129
7	240	13,217	9	6.1	185
8	235	7,426	4	7.9	195
9	242	13,925	12	4.8	140
10	227	10,275	11	3.9	82
11	247	19,534	10	7.9	136
12	240	7,019	4	7.3	250

In the above tabulation "Machines in Service" means the total number of machines fit for duty. The figures under "Tons per Machine per Day" are based on the total number of machines at each mine and do not show the actual individual performance because the plants have more mining machines than necessary, these having been provided for the old panel system of mining.

When blasting machine-mined coal in narrow places the coal is likely to be broken excessively but in wide places the size of the product is the same as that of hand-mined coal. In places 36 ft. wide or more, and sometimes in places as narrow as 11 ft., where the cover exceeds 600 ft., the weight of the mountain breaks the coal down from the face while it is being undercut.

Holes for blasting coal are of 1¾ in. diameter and are drilled by hand with one-man twist augers. Their average depth is nine-tenths the depth of the cut. The miner drills and charges his holes with a permissible explosive and electric detonator, and tamps them with clay brought from the outside. The charge is fired by the assistant mine foreman during the day shift, with a pocket battery which he carries for that purpose.

Rooms are turned on a schedule which permits pillar extraction to commence immediately upon their completion (Fig. 6). They are spaced on 125-, 90- and 75-ft. centers, and are driven 60, 36 and 24 ft. wide, according to thickness of cover and roof conditions.

Only one track is required in places 18 ft. or less in

width. Track is laid next to the "outbye" side of the room in advancing sections and is aligned by sights. Places 36 to 40 ft. wide have two tracks, one on each side of the room, and sights are used to keep these rooms in proper alignment. In rooms 60 ft. wide three tracks are used, one in the center of the room and one on each side. With rooms 36 ft. or more in width only one cross-cut is driven between rooms, this being 80 ft. from the heading; ventilation is maintained from this point by a wooden brattice in the center of the room. (See Fig. 10.)

Partings in the seam are picked out by the miners and gobbed. The amount of bone thus removed by the miner is approximately 5 per cent of the seam. The coal is soft, has no definite cleavage planes and breaks with a columnar fracture. There are three bone partings in No. 4 seam, one being a few inches above the floor, another in the middle of the seam, and one 2 or 3 in. from the top. The bottom parting and the coal below it, which is only a few inches thick, are not mined. The middle and top partings are mined with the seam and partly removed by the miner before loading; but the 10 to 14 in. of overlying "rash," being soft, breaks into small particles, mixes with the coal and is loaded with it.

No timbering is permitted on haulage roads without written permission of the general superintendent, which is given only in exceptional cases. Where the roof is bad it must be taken down until all loose material is removed. Concrete posts are used on main headings where permanent support is required.

Timbering in rooms follows a standard plan (Fig. 10). Timbers having a minimum diameter of 5½ in. are used. A row of "road posts" is set parallel to the room track, 2 ft. from straight track or 30 in. from curved track, and 3 ft. apart. A cap piece 6 ft. long, placed on the top of each road post, extends over the track. The other timbers, "gob posts," are spaced 6 ft. apart and use a cap piece 4 ft. long. Timbers are maintained at a distance not greater than 6 ft. from the working face, irrespective of condition of roof, and closer where necessary.

No preservatives are used and there is no general scheme for recovering timber, only a small portion of which is reclaimed. The timber is delivered to the working places by locomotives and mules during the day shift, and placed by the miner as required. Table II shows the amount of timber per ton and per acre used for all purposes, including mine-car repairs, ties for mine roads, caps, props and miscellaneous:

TABLE II—TIMBER CONSUMED, BOARD FEET

Mine No.	Average Thickness of Seam, Ft.	Board Ft. per Net Ton	Board Ft. Per Acre
2	5.75	2.8	32,164
3	4.53	5.6	48,600
4	6.32	4.0	66,075
5	6.94	3.4	40,318
6	6.18	1.4	16,263
7	6.37	3.5	45,453
8	5.97	4.2	43,750
9	7.36	2.3	26,611
10	5.52	5.2	47,685
11	5.35	4.4	45,411
12	5.04	2.6	33,083
Average	6.06	3.3	38,163

Mine tracks and hauling equipment have been standardized. A gage of 48 in. is standard for straight track, 48½ in. on haulage curves, and 49 in. on room curves. The standard radii of curves and switches are 100, 150, 200 and 300 ft. for roads and 30 ft. for room turnouts. Rails are 60-lb. on main haulage roads, 40-lb. on room headings, and 20-lb. in rooms and temporary

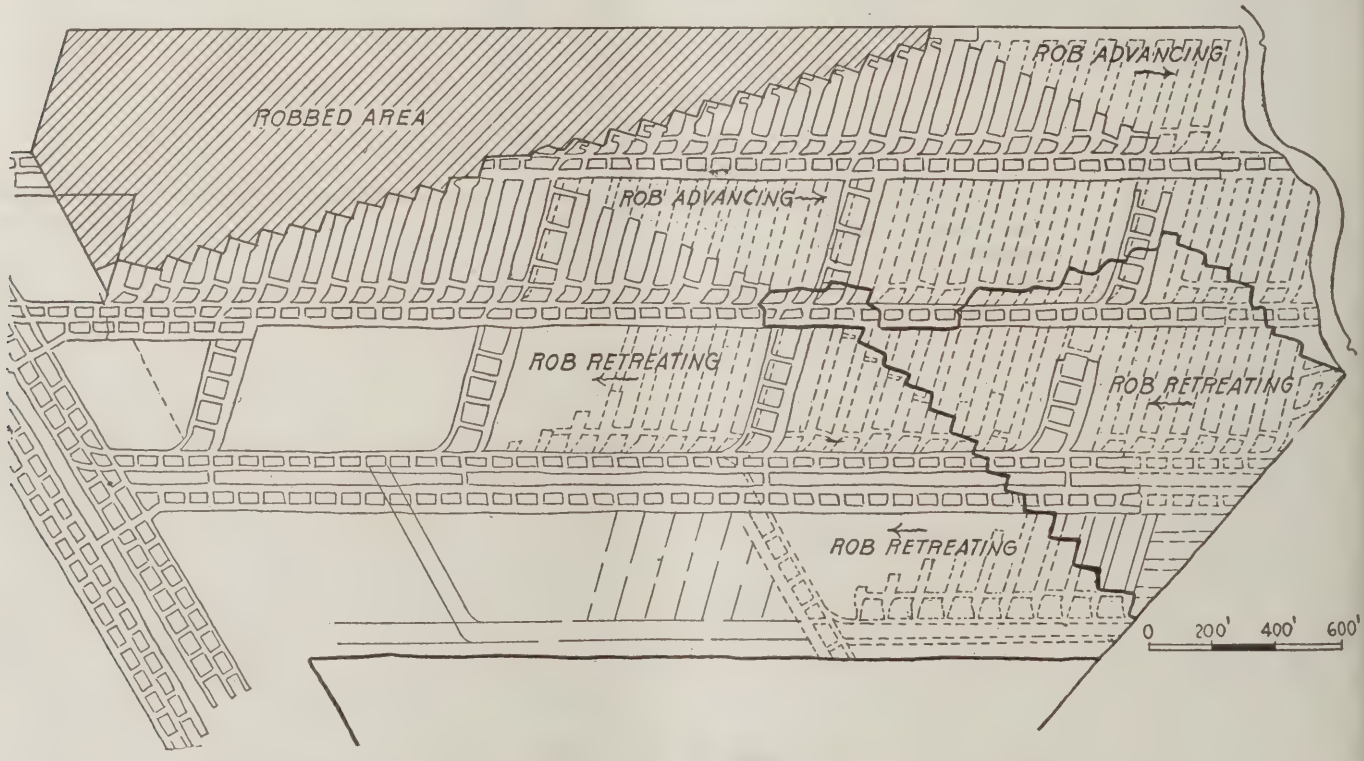


FIG. 6—GENERAL PLAN OF MINE NO. 6, UNITED STATES COAL & COKE CO.

Usually when rooms are driven and room pillars are drawn advancing the headings are maintained for years till their stumps and pillars can be withdrawn retreating. This withdrawal is in itself at times a matter of years. The presence of these heading pillars, necessary as they are, is to be regretted, for they divide the lines of fracture of the pillared area and, as has been said, the heading also has to be maintained for long periods of time despite the fact that it is subject to the excessive stress resulting from the fact that the coal on either side has been extracted. In contradistinction, in this method the headings at No. 6 Mine are provided with cross roadways so that the pillaring line can be extended to take in the heading pillars, approach being made to the heading thereafter by some one of the cross roadways. The main road, however, is kept well in solid coal and is mined retreating both as to rooms and pillars. With this arrangement the tonnage is maintained both on advance and in retreat. With thick coal the cross roadways are constructed at little cost.

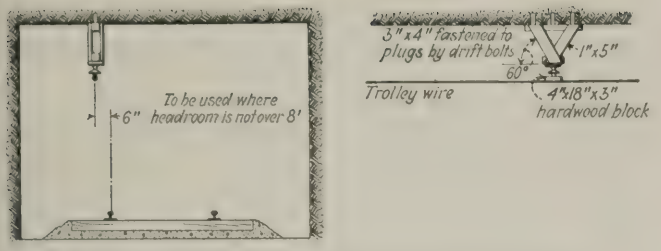


FIG. 7—STANDARD TROLLEY SUSPENSION FOR AN 8-FT. HEADING

The track is set 6 in. further from the rib than the line of the trolley. The bracket, being braced, does not work loose despite its projection from the roof.

headings. The main haulage road is double tracked and has no grade in excess of 2.5 per cent. Before any permanent track is placed on the main or branch haulage roads, a profile is made and it is graded according to elevations.

Room track is placed and maintained by the miners; all turns and switches are placed by company men. Ties 5½ in. x 6½ ft. are used under 60- and 40-lb. steel rails; ties 4½ x 5 in. x 6 ft. are used under 20-lb. steel rails, where conditions do not warrant the use of steel ties. On haulage roads, ties are spaced not over 24 in., and steel ties for temporary track are spaced not less than 36 in. In headings the temporary track is torn up, graded and

TABLE III—LABOR EFFICIENCY

	Tons Per Man-Hour	Man-Hours Per Ton
Miners in headings, including machine runners, (best miners usually assigned to headings)	2.115	0.463
Miners in rooms, and at pillars, including machine runners	1.870	0.534
Miners on slate or rock work (estimated)	2.500	0.400
All miners	1.910	0.523
All underground day labor	1.850	0.540
Men on transportation system	5.570	0.179
All surface labor, excluding office force	3.380	0.295
Total organization, excluding general office and engineers	0.728	1.365

laid permanently at such intervals that the end of the permanent track is never more than 150 ft. from the face.

On haulage roads the minimum clearance from any part of a locomotive or car is 2½ ft. on each side, and the least vertical distance is 5½ ft. above the top of the rail. Where grades exceeding 2 per cent are encountered, the floor or roof is excavated to allow as favorable a grade as possible. Room headings are on an average grade of 0.5 per cent in favor of the loads.

No side tracks, or partings, are required by the system of transportation in use. Mules are used only for hauling cars into and out of the working places, and hence can serve a larger number of places with less work than under a system involving side tracks.

The locomotive enters the room heading, pulling a trip of empty cars, which are distributed at the mouths of the various working places by disconnecting them from the rear end of the trip. At the same time it pushes together the loaded cars placed on the heading by the mules, until its trip is assembled. The motor then passes through a haulageway to a parallel heading and thence in

TABLE IV—CLASSIFICATION OF DAY LABOR

	Per Cent		Per Cent
Inside Labor:		*Outside Labor:*	
Mine foremen	0.60	Clerks	1.26
Fire boss	0.16	Janitors	0.09
Assistant mine foremen	6.13	Stablemen	0.94
Roadmen	9.27	Teamsters	2.06
Day labor	22.70	Garbage men	0.45
Bratticemen	1.29	Laborers	4.85
Wiremen	1.36	Labor foremen	0.48
Pumpers	0.78	Pumpers	0.77
Drillmen	0.19	Electricians	0.93
Machine repairmen	0.22	Motor repairmen	1.36
		Substation men	1.65
	42.70	Blacksmiths and helpers	1.75
Transportation:		Car repairers	4.63
Haulers (mule)	13.81	Carpenters	3.58
Motormen	3.47	Tipplemen	9.83
Brakemen	3.33	Greasers	0.59
Trappers	0.53	Plumbers	0.19
		Masons	0.18
	21.14	Machinists	0.17
		Watchmen	0.05
Total inside day labor	63.84	Supply clerks	0.13
		Painters	0.15
		Sanitary inspectors	0.07
		Total outside day labor	36.16

the direction of the tipple; these haulageways from the main heading to the room heading are driven at intervals of 800 ft. (See Fig. 6.)

Usually a 13-ton electric locomotive will gather from the mouths of the working places and deliver to the outside 600 to 700 tons of coal per day when the round trip does not exceed four miles. From five to seven haulers and seven to ten mules, depending upon the grades in the working places, are required to gather the coal hauled by one locomotive.

Wooden mine cars of 93 cu.ft. capacity are used. The axles are 3 in. in diameter and run in plain bearings. The wheels are of cast iron, 18 in. in diameter and run loose on the axle.* The wheelbase is 48 in., the same as the gage.

In 1921 each car made an average of 1.7 trips per shift. At that time 508 mine cars were in service at this plant. At present the average is over two trips per shift. In 1919 each car traveled an average of 878.4 miles loaded, and made an average of 507.7 round trips, the average haul at that time being 1.723 miles each way; it thus performed 3,039 ton-miles of work. In 1921 the cost of mine-car maintenance per ton was $0.0422, of which amount $0.0179 was for labor and $0.0243 for material.

Four 13-ton electric locomotives and one 26-ton tandem locomotive are used for all gathering and main-

*Steel wheels are now being used.—EDITOR.

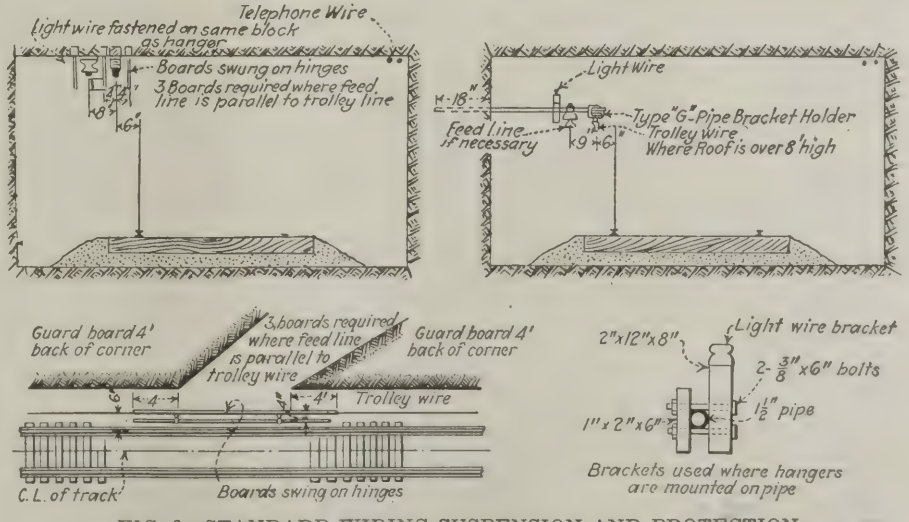


FIG. 8—STANDARD WIRING SUSPENSION AND PROTECTION

Where the roof is high the wire is suspended from a horizontal arm which carries also the electric line for lights, the feed cable, if any is needed, and the trolley wire.

TABLE V—SCALE OF WAGES FOR DAY LABOR; LATE IN 1922

Occupation	Per Hour	Occupation	Per Hour
Stableman (per month)	$145.00	Laborers, inside	$0.70
Teamsters	0.60	Haulers, inside; mule	0.80
Carters	0.55	Motormen	0.80
Mason tenders	0.55	Boss drivers	0.95
Outside laborers	0.40	Motor brakemen	0.84
Chargers	0.75	Loaders under tipple	0.70
Charger trailers	0.60	Dumpers	0.70
Car shifters	0.55	Car catchers	0.65
Draughters	0.55	Car pushers	0.65
Oven waterers	0.55	Car droppers	0.70
Coke machine boss	0.65	Pumpers, inside	0.75
Outside pumper and pipeman	0.65	Checkman	0.65
Watchman	0.55	Tipple foreman	0.94
Substation man	0.60	Greasers	0.60
Crusher repairman	0.65	Picking-table men	0.55
Blacksmith	0.90	Slate dumper	0.55
Slate picker	0.55	Bratticeman	0.80
Assistant mine foreman	0.95	Wireman	0.80
Shop foreman	0.90	Motor repairman	0.85
Machinists	0.90	Mining-machine repair man	0.85
Carpenters	0.80	Masons	0.80
Car repairman	0.90	Machinery inspector	0.85
Roadmen	0.89	Firemen	0.75

haulage work. The four smaller locomotives frequently handle as much as 875 tons apiece; their average for 1921 was 612 tons each per shift. The tandem locomotive hauls from 1,662 to 1,750 tons per shift, with a maximum haul of 12,000 ft. The most advanced workings are 17,000 ft. from the tipple.

The company employs no so-called contractors; miners and machine runners are paid on a piece basis, and loaders on a car basis (Table VI). Day labor is paid by the hour (Table V).

Table III gives the output, in tons per man-hour, based on records for May and June, 1922, when 1,027,795 short tons was produced.

While no satisfactory records are kept from which the percentage of labor turnover can be figured, it is believed to be small as compared with other mining communities. Many of the employees have been working for the company 15 to 18 years. The superintendents employ all men and discharge them for defective work. Mine foremen have authority, under the state mining law, to discharge for infraction of the mining laws.

Table V gives the wage scale in force at the close of 1922, for miscellaneous day labor, mostly on the outside; the length of the shift is 9 hours.

Table VI gives the coal mining and loading prices in force at the close of 1922. Miners in this occupation usually work about 8 hours a day.

Table VII gives the consumption of power during May and June, 1922 when the total production was 1,027,795 net tons, the figures including all transmission, transformer, and conversion losses. In Table VIII is given the cost of power, per ton mined for various purposes.

Table IX distributes the cost of material and supplies not previously included in the cost of power; the percentages are based on the total cost of these materials, not on the total cost of production.

Safety is the first consideration in all plans of organization, mining, construction, installation and operation. Specifications for all machinery must call for proper guards before quotations are requested. A standardized system of mining was devised as the best means of reducing the hazards of the work; the standard clearance on all headings and standard timbering in all rooms, as well as the removal of all slate in the headings, are among the most efficient provisions that have been adopted. Premiums are paid monthly to underground foremen for good accident records.

Frame dwellings are provided, all of which have electric lights in every room. Artesian wells have been drilled to supply water for all purposes, and the water is filtered. Running water is piped into all houses, and

TABLE VI—COAL MINING AND LOADING RATES; LATE IN 1922

Machine Rates		Coal Loading Rates, Per Car	
Room up to 24 ft., with 8-ft. cutter bar, or less:			
Runner	$1.70 per place	Room	$2.00
Helper	1.30 per place	Heading	2.12
Room over 24 ft., with 8-ft. cutter bar, or less:		Wet heading	2.15
Runner	$1.90 per place	Mining and loading by hand (pick)	2.10
Helper	1.55 per place	Slate	1.80
Room up to 24 ft., with cutter bar over 8 ft.:		Black rash	1.15
Runner	$1.80 per place		
Helper	1.50 per place		
Room over 24 ft., with cutter bar over 8 ft.:			
Runner	$2.30 per place		
Helper	1.85 per place		
Room over 45 ft., with cutter bar over 8 ft.:			
Runner	$2.45 per place		
Helper	2.00 per place		

TABLE VII—POWER CONSUMED, PER TON AND TOTAL

	Kw.-Hr. Per Ton	Total Kw.-Hr.
Cutting	0.25	256,949
Hauling	0.77	791,402
Pumping (inside)	0.138	141,836
Pumping (outside)	0.613	630,038
Ventilating	1.372	1,410,135
Tipple machinery	0.225	231,254
Lighting (outside)	0.3	308,339
Lighting (inside)	0.075	77,085
Shop and miscellaneous	0.2044	210,037
Total	3.9474	4,057,075

a drain system is provided. A number of the dwellings have baths and other modern conveniences.

Concrete and macadam streets and concrete sidewalks are laid on the principal streets, with concrete walks to the front and back doors of many of the houses. The Americans, both white and colored, and the foreign employees live together in harmony in these towns; the only segregation requirement is that white and colored shall not live in the same house. Churches for white, colored and foreign employees are situated at the company's plants.

Separate schools, managed by the district board of education, are provided for white and colored employees; these are rated as "First Class" by the State Department of Free Schools. The smaller children are taught at local schools, close to their homes, while junior and senior high schools are centralized at five

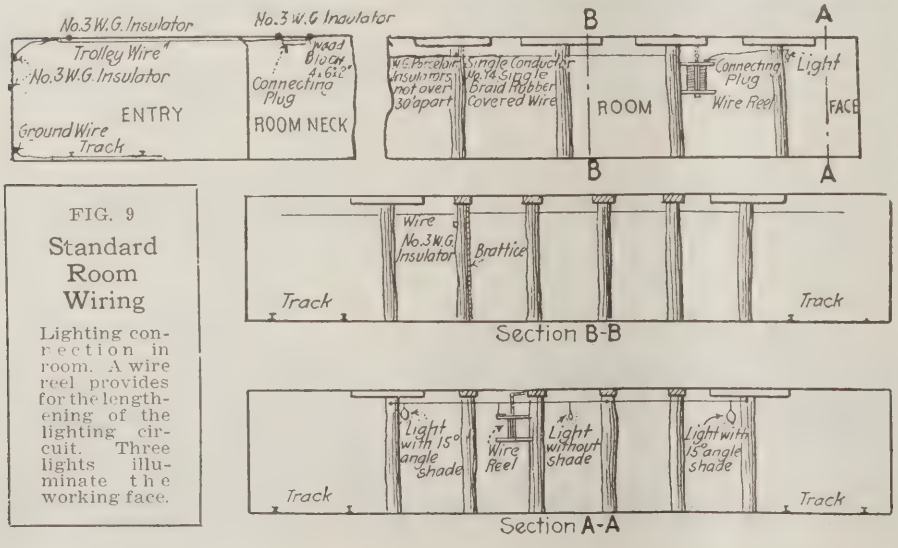


FIG. 9
Standard Room Wiring
Lighting connection in room. A wire reel provides for the lengthening of the lighting circuit. Three lights illuminate the working face.

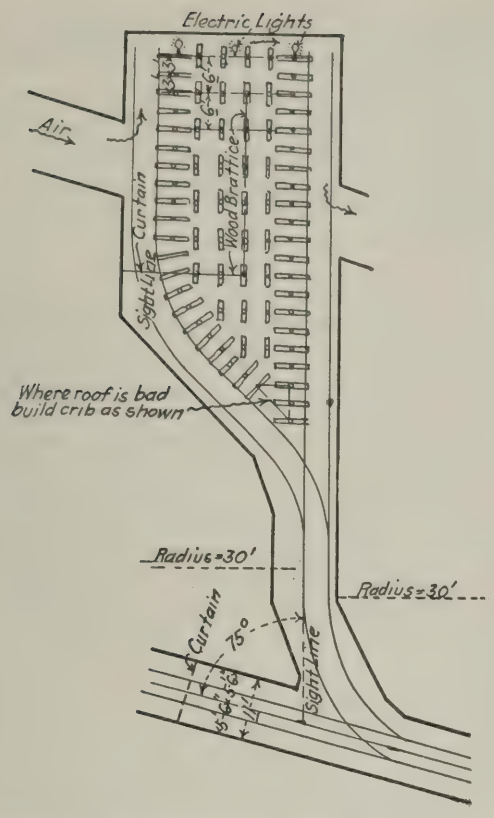


FIG. 10—STANDARD TIMBERING FOR TWO-TRACK ROOM

Where necessary temporary posts are set to protect the men while loading coal. The foremost posts are never more than 6 ft. from the working face. The distance from the rail to the outside of the posts is 24 in. on straight track and 30 in. on curves. Track is maintained on both sides of the room. When rooms exceeding 36 ft. in width are permitted the extra width must be put between track centers and the distances between props must be changed accordingly, the same number of these supports being used. In wide places where the top is bad cribs should be built.

different points on the plants of the company; the larger children are carried to school in automobiles during the entire school year. Gary High School is an accredited entrance school for the University of West Virginia and several other universities of equal standing.

Amusements are provided by motion picture theaters, bowling alleys, pool rooms, baseball grounds, tennis courts and the various athletic clubs. All employees can participate in these amusements. Club houses are provided among the various plants of the company, in which board and lodging are provided for the single employees and such married people as do not care to keep house. These club houses are used also for community gatherings. The recreation of the younger people generally is conducted under the auspices of the church or school authorities.

TABLE VIII—DISTRIBUTION OF POWER COST, PER TON MINED

Mining	$0.00250
Hauling and hoisting	0.00995
Pumping	0.00138
Ventilation	0.01372
Shop and miscellaneous	0.01192

Provisions, household necessities, etc., are supplied through an affiliated concern, the United Supply Co., which conducts a mercantile business at eight different points, in and around Gary. Each store has seven departments. As the stores purchase their goods in large quantities for cash, and their business is conducted on practically a cash basis, their prices to the consumer, after allowing for a fair profit, are lower than those of merchants in surrounding towns, such as Welch, Wilcoe and Anawalt.

TABLE IX—DISTRIBUTION OF COST OF MATERIALS

	Per Cent		Per Cent
Mine roads	18.66	Cleaning, crushing and washing coal	0.25
Mine cars	8.45	Fire protection	0.06
Haulage system	14.65	Other machinery repairs	0.50
Hoisting and dumping	1.00	Safety	0.06
Shaft, tipple and bins	0.31	Welfare	0.13
Ventilation	3.57	Miscellaneous	4.83
Drainage	1.31	Electric lights	2.88
Machine mining	4.45	Pit posts, caps and crossbars (3.3 board ft. per ton)	24.49
Explosives (0.117 lb. per ton)	1.31		
Horseback, rock and refuse	0.25		
Live stock	10.65		
Lubricants	2.19		100.00

Ground is rented by the United States Coal & Coke Co. to outside parties for running stores, devoted principally to the coarser grades of merchandise, such as feed, flour, etc., delivering to the purchasers by trucks. All employees are paid in cash and they are under no obligation to trade at any particular store.

A nurse has been employed by the Board of Education and the local chapter of the American Red Cross. This nurse visits the schools and examines the children, particularly for physical defects, but also for cases of malnutrition and other matters affecting their health. A dental clinic is provided by the county. The dentists visit each school, examine the children's teeth and do such dental work as is necessary; all without charge to the parents.

Can Electrical Detonators Be Fired by Stray Current and What Is the Cure?

AS THE result of an accident which happened at the Birdseye mine of the Hudson Coal Co., in the anthracite region of Pennsylvania, last November a conference was called by the State Department of Mines to investigate the possibilities that shots may be exploded prematurely by stray currents passing through their electric detonators. The meeting, which was attended by representatives from the anthracite mining companies, the powder companies, the street railway companies, the state department of mines and the U. S. Bureau of Mines, was held in the office of the Glen Alden Coal Co. at Scranton, Feb. 21, District Mine Inspector Evans acting as chairman.

Investigations made after the Birdseye accident indicated that after the wires were connected to the leads of the detonator and while the men were leaving the working place, the charge by some unknown means was discharged. The tests made by the Hudson Coal Co. showed stray currents in the mine. In fact, a voltmeter test showed 12 volts between a drill in the coal and the rail of an unbonded track nearby. In some places readings as high as 4 volts were taken between two drills on the coal. No ammeter readings were taken.

Doubt was expressed whether with such voltages enough current would flow to fire a detonator. A powder man stated that only with a current of one-fourth of an ampere or even more could a detonator be fired.

As a precautionary measure the Hudson Coal Co. is trying out a duplex rubber-covered wire for shotfiring. It is hoped by this means to eliminate the possibility of the lead wires picking up stray currents or of coming in contact with charged wires or open joints in the track.

No positive conclusions were reached at the meeting, the matter being laid over for future discussion and investigation. In the meantime those interested will make investigations of their own to supplement the work of the committee.

Precautions Taken to Guard Men from Seam Outbursts

Drillholes Serve to Reveal Danger but Are of No Value for Removing Gas—Limitations of Driving Rate—Jarring Shots to Provoke Outbursts—Means of Rapid Escape When Blowouts Unexpectedly Occur

By F. C. Cornet*
New York City

IN ORDER to protect the miners against the disastrous effects of blowouts, which occur so frequently in the deeper seams of the Belgian mines, it early became the general practice in such workings to drill the face with boreholes so as to drain out the gas contained in the seam. This practice long ago was found to be utterly ineffective, a worthless and illusory precaution.

Before the workings had penetrated into the seams now classed in the third category, which includes all beds subject to blowouts, boreholes only rarely produced any violent emission of gas and fine coal. The miners termed these rare manifestations "volcanoes" (*volcans*). It was believed that they resulted from the drill running into a pocket where gas was confined under high pressure. Although sometimes violent enough to throw the drill out of the hole and far to the rear, "volcanoes" generally were of short duration, causing fatalities only when the gas was ignited at a broken safety lamp.

Deeper Boreholes and More of Them

As operations entered more deeply into the seams subject to blowouts, volcanoes became more and more frequent and assumed a more and more vicious character. Deeper auger holes and more of them were prescribed, the idea continuing to prevail that after the holes had liberated the gas held in the empty spaces of the seam the latter were safe to a depth at least equal to that reached by the auger. An occasional volcano was thought to make conditions safer still. Therefore great was the surprise of management and men when it was shown repeatedly by experience that faces well drilled and supposedly well drained of gas would blow up without any warning other than that of the underground thunder and crushing of timbers to which the men had been accustomed in seams at a higher geological level, including those in which no gas is ever found.

Slowing Progress to Reduce Accidents

Several companies that were working the lowest seams that at that time had been reached conceived the idea that the rate at which the workings were advanced should be restricted, and when they applied that method they were rewarded with a certain degree of success. It was not, however, until 1879, after the spectacular Agrappe blowout that the Belgian Department of Mines formulated and made compulsory a comprehensive system of regulations concerning boreholes and a limitation of the driving rate in all mines subject to these manifestations (*dégagements instantanés*).

As most of the boreholes ceased to show any sign of gas after they had released what was contained in the cleavages and other empty spaces which they traversed the miners frequently attained a false feeling of security. This assurance still continues to some extent, despite the many blowouts that have occurred after the auger has revealed no conditions of a dangerous nature. But if, for seam-drainage purposes, holes drilled through what I have designated as safe coal are absolutely inadequate (for reasons previously explained) the fact remains that as a means of detecting a crushed zone lying ahead in the solid no substitute has been so far found for them. The same may be said of their use in *bouveaux*,* where they constitute the only means of ascertaining how near is the seam ahead. Even when the formations are regular, the engineer in charge seldom knows with an approximation closer than 5 or 8 ft. where the next seam will be met. In the highly disturbed territory to the south of the field it is nearly impossible to tell within 30 or 40 ft. how close the nearest seam is. Worse yet, the *bouveau* may miss the seam entirely, passing clear above or under it, to meet it perhaps only where it next turns upward or plunges downward as the case may be.

When workings proceed through hard or comparatively hard coal (meaning coal that, after being undercut requires wedging or picking before it will fall away from the face) the conditions as a rule will remain reasonably safe so long as the auger holes driven ahead reveal no marked decrease of coal cohesion and provided the daily rate at which the faces are driven be not too great.

Danger of Sudden Discovery of Crushed Coal

We have seen in the previous article† how a zone of unsafe coal may be close ahead, although still unrevealed by the auger holes, so close indeed that the advance of the face in the course of a single working shift may reduce the resistance of the barrier of safe coal till it no longer can oppose the expansion of the coal in the unsafe zone ahead. This causes the crushed coal to blow out into the workings in such a manner as to imperil the lives of the employees. Too rapid driving may cause this barrier to break down without the boreholes affording any indication that such a catastrophe is about to happen.

No matter how safe the driving rate adopted may seem to be, the advance work at the face must be distributed over as great a part of the working shift as will be found practicable. The work also must progress evenly from end to end of the face. When, as is generally the case in Belgium, several faces arranged in a group advance together into the seam, one should not be driven any faster than another. Suppose, for example, the driving rate adopted is 4 ft. a day and the working shift is of 8 hours' duration. To advance the whole 4 ft. during the first two hours of the shift

*Consulting engineer.

*Tunnels through rock driven to connect a shaft with pitching coal seams.

†"Blowouts in Belgian Coal Seams and the Way in Which These and Like Phenomena May Be Explained," *Coal Age*, March 1, 1923, pp. 367-372.

instead of distributing the work over, say, six hours, would be equivalent to a driving rate of 12 ft. per day instead of 4 ft.

To form an idea of how difficult it is to tell what is a safe driving rate, it is only necessary to point out that it varies from seam to seam, that it depends on the condition of the strata, including, of course, the seams themselves, and that even in a given seam it varies with the cohesion, pitch and regularity of the coal. For example, a certain driving rate which may be perfectly safe at a distance from a fault, syncline or anticline may prove positively dangerous in the neighborhood of such a geologic disturbance.

Experience Suggests Safe Driving Rate

A rate that may be safe in a strongly pitching part of a seam may be so no longer where the seam is flatter, or vice versa. With known seams, or rather, groups of seams, the safe driving rate under varying conditions may be determined from past experience, care being taken to give safety the benefit of the doubt whenever there is any uncertainty. When first reaching a group of seams at a new and lower geological level, the engineer always meets conditions more difficult to control than any he encountered at higher levels. But if he is really experienced and conservatively inclined he will find, eventually and without unnecessary loss of life, a rate of driving that is reasonably safe.

No matter how safe the driving rate may be, the day always will come when an area will be approached for which that rate will not afford the desired safety. Nevertheless even then the slow driving rate usually will save the day, for, fortunately, as long experience has shown, the familiar cracking of timbers, first wind and underground thunder precedes the collapse of the face by a longer period when the rate of driving has been conservative than it does when the rate has not been so limited. This is of great importance, for men have been known to lose their lives because they lacked a few seconds of time in which to turn a corner or drop down a rope to the gangway below.

Last Ten Feet Driven Without Explosives

Until recently it was provided that when a *bouveau* was shown by a drillhole to be 10 ft. from a seam, nine other holes were driven to reach the coal, whatever that distance might be. After this all work was suspended for 48 hours. This was in conformity with the old idea that the boreholes would drain the gas from the seam, making the latter less likely to blow out when the *bouveau* would finally approach, reach and pierce it. The rules provided that explosives might be used in driving *bouveaux* until the face was found to be within 10 ft. of a coal seam. Thereafter the passageway had to be driven without the aid of explosives until it was once more in the solid rock beyond the seam.

Mining men accustomed to tunneling through slate and sandrock will be able to imagine what it costs to drive that length of *bouveau* without the aid of explosives, using only a drill, wedge, pick and sledge. The examples I have given and the facts I have related in a previous article regarding blowouts in *bouveaux* do not indicate that the restrictive measures imposed for over 40 years on *bouveau* driving had much success. It is a fact that this kind of work was considered so risky that it always was difficult to get men to do it, even at a large increase in pay.

A policy radically different at last has been adopted by the Belgian Department of Mines. Not only are explosives allowed in driving the 10 ft. separating a *bouveau* from a seam but no limitation is put on the number of shots that may be fired simultaneously, provided no individual hole contains more powder than the limiting charge for the explosive that is being used.

Ten to twenty holes, depending on the nature of the strata traversed, are fired together from a safe place when none but shotfirers are in the mine. This blast is called the "jarring shot" (*tir d'ébranlement*), for the reason that its purpose is to shake the strata, including the seam, sufficiently to provoke a blowout and to cause it to occur then and there, if conditions are such that one is likely to happen.

The result of this more liberal policy on the part of the Belgian Department of Mines has been evident from the beginning. The new practice has been in operation for thirty months. In this period hundreds of blowouts have been willfully provoked in *bouveaux* and none has caused so much as a scratch to anyone. The material damage has been less in aggregate than would have been done had the blowouts been allowed to occur naturally, as they would certainly have done had they not been made to take place at the operator's own appointed time.

Eleven Blowouts in a Single Bouveau

In the Mons District between July, 1920, and December, 1922, a *bouveau* was driven a horizontal distance of 2,700 ft. through the lowest group geologically of all those which so far have been reached and operated in Belgium. The *bouveau* passed through sixteen seams in that distance. In eleven instances a blowout resulted. The longest time elapsing between the blast and the blowout was 17 minutes. The five seams that did not blow out were hard at the point where the *bouveau* intersected them, which explains why, although fully as gaseous as the other seams, they remained passive.

The jarring shot was adopted more than twelve years ago in the Gard coal field of France, where the practice is permitted in all parts of the mines instead of being limited, as in Belgium, to *bouveaux*. In the latter country explosives may not be used in and about the coal workings of seams of the third category. Signs abound, however, that Belgian operators will not be satisfied till they also are allowed to produce blowouts at the coal face by shots fired from a safe distance when nobody is exposed to the consequences of any gaseous manifestation that may occur.

With the new methods boreholes are not necessary except for the placing of shots. Moreover, the driving rate ceases to have any importance and may be as great as the operator may find practicable. Shots placed in the coal in sufficient number and so located that their operation will shake the whole face or group of faces operated are fired simultaneously or in series and in rapid succession. The firing is done electrically from a safe distance in the mine by two experienced men, after all other miners have gone home for the day.

When the men arrive in the morning all they have to do, besides loading the coal thrown out by the blast, is to set all necessary timbers and drill new holes in the face. The miners are strictly forbidden to cut into the face with a pick. If the blast of the previous night has left some fissures in the face and some coal looks as if ready to fall out, these conditions must not be disturbed. What one night's blast has left unfinished

must be left for the blast of the following night to complete.

It is easy to understand that when a zone of dangerously crushed coal is critically near, the shots will demolish the barrier of safe coal, which prevents that decrepitated material from expanding into the workings or will so weaken it that it will hold out only for a short time. One interesting example among many similar ones will be cited to show how really preventive is this method:

In a single year in a single seam in the Molière Shaft at Bessèges (Gard, France) forty-four blowouts took place, all of which resulted from shattering blasts fired at night. None occurred otherwise, and not one of them killed or injured anyone. In the whole Gard District not a single man has been hurt by a blowout since Nov. 15, 1912, when, as a result of disobedience to most positive orders, one of the shotfirers, impelled by curiosity, ventured into the workings 10 minutes after the blast, when a blowout took place, by which he lost his life. Although when a blowout is about to occur it generally does so promptly, that is, a few seconds after the shattering blast, it sometimes happens only after several minutes. In at least one instance 20 minutes of delay was noted.

Not a single inflammation of gas or dust has been recorded as yet as the result of a shattering blast. The fact that only safe explosives safely used are permitted in the operation is not enough to account for this freedom of ignition, which must be attributed mostly to the impossibility of the eruption of dust-laden methane taking place simultaneously with the blast. It is the latter that causes the former. Hence they cannot be simultaneous. In a procession of phenomena of this kind an interval of one second, the shortest ever recorded, is considerable compared with the rapidity with which a shot explodes.

French Use Shattering Blast at Coal Face

The French did not apply the shattering blast to seams subject to blowouts of methane gas until after they, successfully and for many years, had made use of the same process to provoke outbursts of carbon dioxide in coal seams where this rare kind of gaseous manifestation occurs. These outpourings of carbon dioxide in some mines had happened on many occasions most unexpectedly and had caused the death of many miners. It was natural for the French to think of applying in the case of methane a remedy that had proved efficacious with carbon dioxide, bearing in mind, of course, that the latter being inert while the former is most inflammable precautions must be taken with the one that would be superfluous with the other. As soon as the French Department of Mines became reasonably convinced that with permissible explosives the shattering blast was not likely to prove dangerous in seams subject to methane blowouts, they so advised the Gard operators, who lost no time in taking advantage of the permission to use that method. The results have been explained above.

So far as Belgian mines are concerned, there is no doubt that they will soon be allowed to follow the French example. All they are waiting for is the raising of the embargo put by the Mines Department on the use of any kind of explosive at or near the coal face in mines of the third category. There is no reason why a method which is good to the south of a boundary line should not prove valuable also to the north of it.

So much for "offensive prevention," as the method of jarring the coal by shots is termed. As has been said, Belgium still uses defensive prevention everywhere but in *bouveaux*. The precautions thus characterized now consist solely in a limitation of the driving rate. A daily advance of 4 ft. is exceptional in Belgium. As already stated, the 4-ft. advance should be distributed over not less than six hours of the eight-hour shift. At least three separate cuts are made, each being loaded into cars before the next one is started.

Under such conditions machine cutting as understood in the United States hardly can be considered in Belgian mines of the third category. In the case of the offensive-prevention method described, any kind of cutting by machine or by hand, is contrary to the very principle of the process. The shattering blast unfortunately produces much slack coal mixed with slate so small that it can be eliminated only by washing.

Precautions in Case of Unprovoked Blowout

I must pass on rapidly to the precautions taken to avoid, or at least minimize, the loss of life when a blowout occurs. To explain these precautions fully would nessitate going into details of a rather complicated sort concerning the many working methods followed in Belgian mines of the third category. As there are numerous variations of these methods made to suit the different conditions in which the seams are found, I must be satisfied with generalities if this paper is to be kept within permissible limits.

The faces always are so arranged in relation to each other and to the main gangway at the base of the workings that the men will find it possible to leave the workings promptly even if the lamps are blown out by the first wind. The escape of the men working along the face in the block of coal directly above the main gangway is comparatively easy even in darkness. Not so, however, with the men working at the other faces, for they must find their way not only down two or more faces but also from face to face through the connecting place called *bourre* by the miners of Belgium.

To make escape easier the faces are as few in number and follow each other as closely as possible. In other words, the engineer in charge tries to keep the general face line as straight as he can. When a man making his way out in darkness arrives opposite the *bourre* at the bottom of a face, he runs into a 2-in. manila rope to which bells are attached. He follows the rope to the next face, and so on. Men going out like this in succession keep the bells jingling, thus giving precious indications to those who may have lost their presence of mind as to the direction in which to proceed.

In workings steep enough to make the use of ladders necessary, there always is next to each ladder a rope by which the men may lower themselves quickly. By merely touching this rope a string of bells is set jingling. Sometimes, where the grades do not justify ladders but yet are steep enough to permit of this arrangement, narrow places are maintained in the gob in which troughs made of sheet steel are laid on the floor of the mine. Down these the men slide directly to the main gangway. This roadway is straight and high enough for big horses, so that once there the men make rapid progress to the *bouveaux*.

There is always the possibility, however, that the men may be delayed in their passage through the main gangway, as also in the workings above, by roof falls or by rocks thrown out of the floor in the manner

described in the previous article. When the *bouveau* is reached, comparative safety is in sight of the men, but even here there still are chances of their being either thrown down and incapacitated for further flight by the second wind or overtaken and smothered by an avalanche of dust traveling toward the hoisting shaft. This happened not only in the historic Agrappe blowout but in many other instances.

What I have designated as comparative safety consists in a string of cells dug in the solid rock ribs of the *bouveaux* at intervals of about 80 ft. These cells, made when the *bouveau* is driven, are entered through a door opening inward. Two storage-battery lamps independent of each other continually light each cell. In a small niche in the opposite side of the roadway two more storage-battery lights and two safety lamps are kept burning at all times. A window in the cell door of wired plate glass 4 in. square enables the men in the cell, even though the door is closed, to obtain a good view of the lights in the niche.

The door is provided also with a small hinged valve opening outward with great facility, but normally kept shut under its own weight. Finally, in a corner of the cell a 3-in. globe valve has been placed, closing the end of a branch of the main compressed-air line by which motive power is supplied to the pneumatic drills at the face of the *bouveau* and other workings, for these are everywhere in use. The main air line is kept under pressure at all times.

The men fleeing down the *bouveau* distribute themselves among the different cells to await developments. If the alarm that made them run out of the workings fails to be followed by a blowout, the men do not stay long in their cells. They are soon found at the shaft clamoring to be hoisted.

Do Not Return Till Face Is Inspected

Under no consideration may they go back to their working places before these have been inspected by the engineer in charge and his assistants. If the expected blowout fails to occur the men stay behind the closed doors of the cells until the fury of the gaseous manifestation has passed, anxiously watching in the meantime the safety lamps in the opposite niche. If these lamps go out, indicating a vitiated atmosphere in the *bouveau*, the 3-in. globe valve is opened admitting air to the cell in any volume necessary to make the atmosphere respirable. All excess of pressure is relieved automatically through the hinged valve in the door.

The electric lights, of course, do not go out. Besides serving to direct the men to the cells they have on countless occasions permitted those who had already reached safety to make quick sallies from the cells to rescue other men who had fallen in the roadway. The men are instructed not to leave their cells should the safety lamps in the niches go out, but to remain there until the atmosphere of the *bouveau* is shown to be safe by parties entering from the shaft. Nevertheless in only a few instances have the survivors of a blowout waited in their cells for the arrival of rescuers. Carrying the wounded and those too weak to walk, they generally start for the shaft as soon as they have reason to believe the air in the *bouveau* again has become respirable.

Tests Are Being Conducted at the experimental mine of the Bureau of Mines, Bruceton, Pa., for the purpose of determining the value of salt in conducting moisture to dry coal dust.

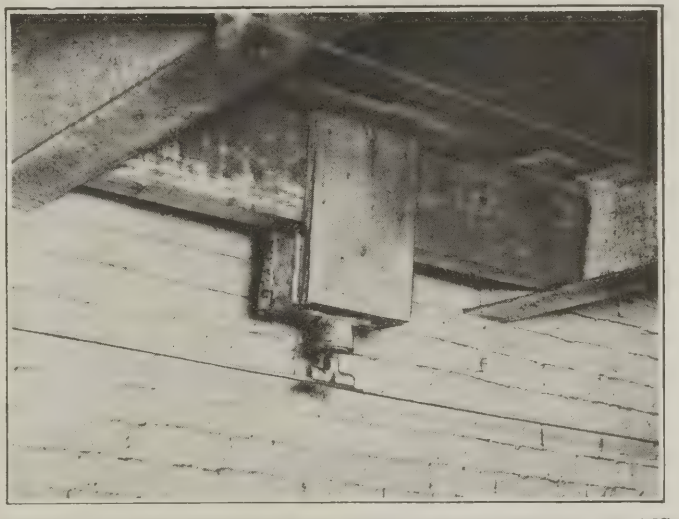
How to String Trolley Wire Below the Steel Cross Beams in Gangways

By Alphonse F. Brosky*
Pittsburgh, Pa.

MANY ways have been devised for carrying trolley wires under the steel collars or cross beams which support a haulageway. The problem is one often presented near or at the main bottom of a shaft mine. The way it was solved in the Criterion mine of the Westmoreland Coal Co., at Rillton, Pa., is illustrated in this article.

In this mine the steel sets extend 800 ft. and have been placed both on the loaded and empty sides of the big bottom. The cross beams consist of 10-in. I-beams placed on 4-ft. centers. They rest upon an 18-in. brick wall which extends along either rib. The roof is lagged with 4- to 6-in. poles which rest on the steel cross beams.

A wooden trolley hanger is inserted between each fifth and sixth beam, and to this is attached a trolley clamp of the timber type. The timber by which the hanger



METHOD OF SUSPENDING HANGER BELOW STEEL BEAMS
This hanger is easily placed and removed, and its height is easily adjusted at such a level that the trolley wheel will not rub on the collars or cross beams and, if dislodged, no arc will be formed through the head of the trolley arm.

is supported is a 4x8-in. plank of yellow pine to which two boards are spiked so as to project the required distance. A block is spiked between the boards so as to bear against the cross timber, this timber being wedged snugly between the beams and made secure to the roof by wedge blocks. All these details are shown in the illustration.

A hanger of this design has the merit of being held without nails, screws or bolts and therefore of being easily placed or removed. Furthermore, it can be assembled on the job, the correct height of the trolley wire being maintained by regulating the length of the boards. The minimum clearance between the trolley wire and the lower flange of the steel beams is kept at 11 in., so that, should the trolley leave the wire, there will be no short-circuiting or flashing, as the wooden pole and not the harp of the trolley wheel or the trolley head will strike the wire. The minimum clearance between the trolley wire and a steel cross beam should be greater than the over-all length of the metallic head of the trolley arm.

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Annual Meeting of Institute Makes Good Start in Its Inquiries Into Subsidence and Excavating Methods

Does Roof Tumble Till It Clogs or Come Down Shattered but Not Destroyed?—Is Simplicity in Coal Preparation Desirable or Possible?—Can Tests Be Made of Rope by Magnetic Methods?

By R. Dawson Hall *
New York City

SUBSIDENCE, coal washing, stream pollution, the operating methods and costs for labor and materials at the Gary mines, safety in hoisting, fire prevention and fire fighting furnished a good coal-mining program at the one hundred and twenty-seventh meeting of the American Institute of Mining and Metallurgical Engineers, held at the Engineering Societies Building, New York City, Feb. 19-22.

At the morning meeting J. Parke Channing described the subsidence at Miami, Ariz., and was followed by Howard N. Eavenson with an abstract of his paper "Mining an Upper Seam After a Lower One Has Been Extracted." Mr. Eavenson's paper appeared in full in last week's issue of *Coal Age*. In that article he successfully shows that the fears of the conservationists that the mining of a bed of coal would ruin all the seams above it and render them valueless were not justifiable by the facts. Still there were many who had been made aware of those facts many years back. Mr. Eavenson showed that the injury was so slight that he effectually confuted the notions of those who believe that the roof disintegrates into blocks which pile up and eventually fill up the excavated area. George S. Rice is not altogether exempt from this point of view, as his article showed.

Dome Theory Lives Long and Dies Hard

Advocated by such capable experts the belief dies hard indeed. The way the name Fayol passed from mouth to mouth showed how the primitive notions of that early investigator still had their devotees, and no wonder! Actions much resembling what Fayol describes actually happen and any mining man can see them. But the other breakages no one notes, for the line of fracture is unapproachable from below and may be invisible above, but the possibility of mining the beds above proves that what finally happens is not describable in the wording of Mr. Rice or of the long deceased M. Fayol. The roof does not, at least generally, break until it clogs itself.

The public owes a great deal to Mr. Eavenson for his practical paper. Hereafter it may not be necessary to send engineers scouting the country for data on this subject. Mr. Eavenson has settled the question once and for all.

J. J. Rutledge followed with a paper on "Subsidence in Southwest Coal Mines," in which he described the collapse of the mines at Adamson, Okla. He showed clearly that as a result of the catastrophe the ground was broken about 250 ft. ahead of the face of the workings, but as the mine was 750 ft. deep and as it dipped at 15 deg. the slope of the break was not much beyond the normal and rather to be expected therefore under all the older theories. Mr. Rice remarked that it was the only case of which he knew where a mine worked by rooms showed signs of collapse extending over the solid face, and he ascribed the action to the suddenness with which the breaks occurred. Dr. Rutledge also described the injury done to the Spring Valley schoolhouse which in the center rested on a heading pillar. The ends of the building extended over an area that had been first-mined but with pillars so small that the workings collapsed.

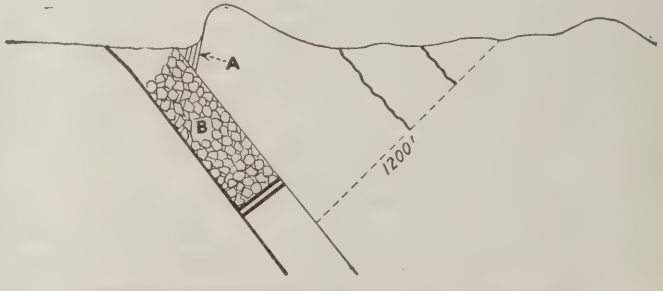
Mr. Rice's paper was accompanied by illustrations. He showed maps in which breaks to the surface coincided closely with excavated areas and did not extend beyond the limits of excavation. However, the contention of the advocates of "draw" is not that caving usually takes place, at least at first, beyond the limits of excavation but that fracturing and some tilting occurs beyond those lines, and this in the case of a plowed field may not exhibit itself on the surface. Moreover, where the opening extends to the top of the ground the failure usually is by vertical shear rather than by bending moment.

A French Roof Disregards Laws of M. Fayol

Eli T. Connor in his discussion said that at Essen, in Germany, where the seams had been filled by hydraulically placed material, the ground had sunk about 8 ft. as a result of the removal of 40 ft. of coal. At St. Etienne, in France, where the coal was on a 25-deg. pitch, the subsidence was 15 per cent of the total thickness of the seams worked.

George S. Rice said that at the Silesian steel works the underground excavations were filled with granulated slag which cements, and the subsidence resulting from mine excavations was only 3 in. Mr. Connor declared that granulated slag is not as strong as sand, as experiments of the Bureau of Mines had conclusively proved.

Thomas H. Clagett said that the damage to the upper seam is greatest at the first break and that the damage is slight if the break is carried steadily forward. J.



ILLUSTRATING EDWIN LUDLOW'S REMARKS

A mine working in a steep seam near Lansford, Pa., caused cracks to appear several hundred feet from the line of outcrop. Several drill holes were made in the hanging wall from the surface as shown at *A* and shots were fired, dislodging huge rocks which filled the workings at *B* and prevented any further cracking of the surface.

*Engineering Editor, *Coal Age*.

J. Rutledge declared that in northern Illinois the cracks at a mine were found to form in a limestone quarry above the mine 8 deg. 15 min. ahead of the working face. The mine was operated by longwall and over a long period of time the advance was only ½ ft. per day. The depth of the seam was 426 ft. below the point where the cracks were noted and the horizontal draws were 60 and 63 ft.

Edwin Ludlow described a weakening in the roof in a steeply pitching bed near Lansford which opened cracks along the planes of stratification parallel to the bed. This action manifested itself some 1,200 ft. from the bed extracted and tended to do further damage. (See Fig. 1). Large rocks were blasted off the nose, *A*, in the hope that they would fill the opening, *B*, and hold back the strata. To date this method has proved successful. Some fears had arisen that the town might be badly injured by the cracking of the strata.

Henry A. Buehler, state geologist of Missouri, Rolla, Mo., stated that in the longwall workings of northern Illinois described by Mr. Rutledge it was noted that the elevations of strata over the still solid coal increased about ¼ in. In the case of a single station this might be regarded as the result of an error in leveling but it was so general that another explanation must be sought.

Bumps Manifest Themselves at Lynch Mines

General Edward O'Toole remarked that at Lynch, 2,600 ft. of cover has been attained and bumps are beginning to occur. About 8 per cent of the coal is left behind, the pillars crushing under the load. It was noted that a stream was bled by the workings long before they extended to points beneath it. He added that it was found that the pressure was greatest when the pillaring line had advanced a distance from the point of first pillaring equal to about 1½ times the depth below the surface of the bed being worked. The mining methods meeting just described extended into the afternoon, lasting far longer than the time appointed for it.

In the evening the members met at a smoker, enlivened by a humorous address with lantern slides by Captain Walter E. Traprock on his alleged trip to the North Pole, by the singing of adaptations of popular songs prepared by D. E. A. Charlton and by entertainment furnished by Jack Armour, of the McGraw-Hill Co.

In the morning of the following day the Institute held its official meeting, electing E. P. Mathewson, president; T. T. Brewster, general manager, Mt. Olive and Staunton Coal Co., and F. M. Smith, vice-presidents, and the following directors: W. H. Aldrich, G. H. Clevenger, A. N. Diehl, Reno H. Sales and Seeley W. Mudd.

Secretary F. F. Sharpless reported on the affairs of the Institute. The operating loss on *Mining and Metallurgy* for the year 1922 was $9,307. The membership committee reported that the total membership, which at the close of 1921 was 10,205, had been augmented by 701 and decreased 1,493, leaving 9,413, of which, however, only 7,186 were members and 19 honorary members and the rest associate members and junior associates. The treasurer's annual report showed receipts of $177,013 and expenditure of $174,479.76. The assets totalled $696,965.05, including an equity in the United Engineering Society of $486,792.79 and books in the library of $40,000.

Vipond Davies discussed the affairs of the United Engineering Society by which the Engineers' Societies' Building is held. The land was purchased by the three Founder Societies each of which paid $250,000. Still later the American Society of Civil Engineers gave up its building and affiliated with the United Engineering Society, paying into the fund $250,000. The building was enlarged by two stories so as to accommodate the "Civils." The insured value of the library is $329,000, but the real value is much greater.

Parke Channing was called on to advocate support to the Federated American Engineering Societies, which he said was doing much to raise the civil status of the mining engineers. Charles F. Rand, the treasurer, said that the surplus after forty-eight years had reached the wholly inadequate figure of $40,000, which should be reduced by $17,000 because the proceedings for 1922 had yet to be published. This would leave only $23,000 for nearly a half century of effort. Other speakers were Arthur Dwight, the retiring president; A. H. Rogers, and P. M. Moore, relative to the discontinued relations with the National Research Council.

At the mining session General O'Toole read his paper on the "Pocahontas Coal Field, and Operating Methods of the United States Coal & Coke Co.," which appears in this issue of *Coal Age*. This is one of the first of the papers being sought by the mining methods committee. It gives the costs of units of labor and material in producing a ton of coal. At the conclusion of the paper S. A. Taylor, who is much interested in stream pollution, endeavored to elicit from the speaker the number of tons of water passing through the mine for every ton of coal mined. This General O'Toole could not state, most of the water not being pumped but led by a tunnel to the surface. Mr. Taylor declared that in western Pennsylvania the weight of water leaving the mine was about 7½ times as great as the weight of coal.

Want Simplicity and No Middle Product

E. A. Holbrook briefly recounted the points made in the valuable paper of Thomas Fraser and H. F. Yancey, entitled "Interpretation of Results of Coal-Washing Tests." J. R. Campbell, in praising the paper, said that the demand of today was for less elaborate washeries with less sizing and less auxiliary apparatus. Only two products were desired, good coal and refuse. Middle products, the operator found, were not profitable. G. R. Delamater said that he did not believe that one figure for efficiency could be obtained for the whole country but it was valuable to obtain such figures at any one plant as an index of improved or less efficient operation. He had been told that the capacity of by-product ovens had been increased 10 per cent by reducing the moisture content. This figure he said, seems unduly high but if correct it shows how important is a separation that will eliminate water.

Ralph H. Sweetser, assistant to the president of the American Rolling Mill Co., Columbus, Ohio, said that every per cent of ash above 6 per cent added 30c. to the cost of a ton of pig iron. Carl A. Wendell declared that two products were all that were desired. In England it had been found that the best size for washing was 1 in. It was difficult to screen sizes under $\frac{3}{16}$ in. where the coal was not dry. He believed that much might be said in favor of wet grinding to 200-mesh and amalgamation of the coal thus ground.

In the afternoon, M. W. Ditto delivered his paper on the "Design and Operation of the Roberts Coke Oven." He declared that the ovens, at times, had operated exclusively on the Franklin County coal, from southern Illinois, the product of the oven running only 1.35 per

cent sulphur. The oven was 14 in. wide at the narrow end and 15½ in. at the wider end. He did not believe that the success of the Roberts oven in handling Illinois coal lay in the narrow coking space, for he had coked the coal entirely from one side. The cell structure got coarser as it neared the far wall and the time was longer but the coal coked.

He believed that the secret of success in coking Illinois coal lay in the construction of the oven wall. About 4,200 cu.ft. of gas was obtained in the Roberts oven by coking a ton of coal containing 10 per cent of moisture. The time had been varied from 11 to 48 hrs. and the coal had coked in all cases, showing that the success did not depend entirely on the temperature of the oven.

His company had used the recuperator but he did not believe this to be necessary, and in future regenerators will be used. The Roberts oven uses interruption and impingement as a means of removing the heat from the gases. Hitherto, when seeking to get heats that will coke quickly, it has been customary to drive the gases through the flues at high speed. With interruption and impingement the speed can be cut down, reducing the water gage necessary.

Coking Time Has Been Reduced to 10½ Hours

Mr. Ditto added that the coking time on occasions had been cut to 10½ hrs. Nothing, he believed, would prevent the time being reduced to 9 hours, except that the brick may fuse if the temperature is made too hot in order to lower the coking time. On J. V. Freeman, of Joliet, Ill., asking the names of the mines furnishing coal to the Roberts ovens, Mr. Ditto said that the Old Ben Corporation, the Chicago, Wilmington & Franklin Coal Co. and the company's own Black Briar Mine in Williamson County had been among the sources.

Mr. Ditto said that the coke made in the Roberts oven is somewhat more free burning than that usually produced in byproduct ovens. He thought that the coke was somewhat lighter than the standard product and declared that the zone of combustion is smaller in furnaces using the coke and that accordingly the temperature at the mouth of the furnace is lower. Asked as to the possibility of cooling the Roberts oven without danger, he said that a second cooling seemed practically to wreck the oven. Carl A. Wendell said that he believed that further efficiency might be obtained if flues were run through the coal.

In a further discussion of the Fraser and Yancey paper Eli T. Conner remarked that the Chance separator had done excellent work, but that it had been found difficult to separate the sand from the sizes below ¼ in. It was hoped that better results on these fine sizes could be attained by the use of the Conkling separator, which relies on material of a finer mesh.

George S. Rice remarked that concentrating tables were not proving successful at the mines of the Granby Consolidated Mining, Smelting & Power Co., as the crushing of the coal by earth movement had made the product of the mine shell-like and not granular, resulting in as much as a 40 per cent loss.

Ray W. Arms stated that the air separator would treat coal running anywhere between 2½ in. and 150-mesh. At Raton an air separator is working on coal of 55 to 60-mesh. He did not believe that there was as much objection to fine sizing as some of the speakers had urged, especially with the air separator. Ten tables are often required to obtain the needed output. In consequence what extra expense other than the cost of screening was incurred in giving every table a separate size? Surely it was well to use several sizes and thereby attain maximum efficiency in preparation.

George S. Rice called attention to the danger of allowing the air of the tippie or "washery" to be filled with fine coal. It is true that an explosion will not occur where the particles are not so close that the burning of one will cause the combustion of another. Where dust collects on the tops of timbers and comes down in a stream, however, danger is imminent, especially where motors are working. If the timber surfaces are beveled or iron surfaces are sloped with cement mortar the danger is greatly reduced.

An article by Andrew B. Crichton, of Johnstown, Pa., was then presented, its subject being "Mine-Drainage Stream Pollution." In discussing it Mr. Taylor said that there was much danger that legislation to prohibit the dumping of oil within the three-mile limit might be passed in such vague terms as to prevent operators from discharging mine water into the streams, thus putting the coal industry almost entirely out of business without the legislators realizing what they were doing.

E. A. Holbrook said that the acid in the streams had a most beneficial effect in that it destroyed the germs in the sewage dumped therein, and it was a pity that no careful inquiry had been made into this factor in "pollution." Looked at from that point it was difficult to determine whether the water from the mines polluted the streams or purified those that were already polluted. Mr. Taylor stated that by reason of the acid water from the mines and other sources it was not necessary to treat the sewage discharged by manufacturing towns.

In the evening some motion pictures illustrating the manufacture of charcoal and charcoal pig, the formation and eruption of volcanoes and matters of zoological interest were exhibited. A dance followed.

Rope Safety Received Renewed Consideration

The joint session of the industrial relations committee and the mining section of the National Safety Council met on Wednesday morning with B. F. Tillson in the chair. Rudolph Kudlich read a comprehensive paper entitled "Safe Practices in Mine-Hoisting Equipment." Commenting on this paper Mr. Sunderland said he agreed with the author that "the angle of fleet [the angle between lines drawn from the sheave to the center and the ends of the drum] should be kept within 1½ deg." He would add, however, that where the drum had an ungrooved face the fleet should be less. He recommended watching the interior wires when cutting a rope. The internal was more important than the external wear, as exhibited by breaks in the surface wires.

B. F. Tillson urged that where tracks were good, even 3,000 ft. a minute was not excessive in hoisting men. He did not believe the greater speed with good tracks was any more dangerous than 500 ft. per minute. In case of an accident the probability of fatalities would be equally menacing. Mr. Stone asked if the factor of safety suggested was based on the load or on both load and bending stresses and was told that it was based solely on the former. B. F. Tillson said that unfortunately the factor of safety had to be kept at a lower figure in deep shafts than in shallower ones, for in a deep shaft the rope was so long that it was impossible

to get a high factor of safety, the rope itself being the real burden to be supported.

Turning to fire protection, a paper written by Orr Woodburn, of Globe, Ariz., was read. C. A. Mitke of Bisbee, Ariz., delivered a similar address. He said that at Globe the question arose as to whether a reversible fan should be installed. It was decided that the temptation to reverse a fan sometimes was so strong in case of a mine fire that men would yield to it, with disastrous results, and that it was better therefore to have the fan non-reversible.

Knowing that the fan could not be reversed, the men would know what they should do and would not be uncertain as to the way in which the air would travel. However, the men at Globe, who had been reading about the Argonaut disaster, were of a different mind. They wanted arrangements made so that they themselves could reverse the fan. Orders and notices sometimes avail nothing in preventing reversal where a fan can be reversed.

A Reversal That Almost Caused Fatalities

At the Jerome (Ariz.) mines the manager went down to fight a fire and left strict orders that the fan was not to be reversed. The man in charge of the fan obeyed orders despite all persuasion till after about two hours when the manager had not returned. Flame beginning to show up and the manager having failed to leave the shaft at the time he had set for his return the man reversed fan, and the manager barely escaped death from the noxious gases thus driven toward him.

Mr. Mitke said that only after much discussion with Mr. Woodburn did the men consent to give up their notion. The reversal of a fan takes about 15 minutes and the air is not immediately reversed thereby, consequently with every reversal there is a period of uncertain movement, and the results sought may not be attained. Furthermore the fan may be reversed, but the doors, not being secured, will be opened by the reversal. Mr. Mitke urged control of doors electrically. The cost of supplying reversal equipment of fans was not expensive. No one, certainly not the Old Dominion Co., would begrudge the cost, but unfortunately the power to reverse was so likely to be misused that it was better that it should not be provided.

George S. Rice read the new provisions to be required hereafter at California mines and said that at the Cherry mine disaster the evidence all showed that reversal was advisable. Where the air entered by an unconcreted shaft the gases from a fire in that intake might be spread all over the mine by means of the fan. Many extremely deep shafts could be concreted only at a prohibitive cost. To require that they be concreted would involve the closing of the mine. Guniting is not so expensive and would be effectual in preventing a fire if the gunite was unbroken. Where the shaft was in moving ground, however, gunite was not effectual, and many shafts were subject to such movement.

Another speaker said that, after all, reversal might take place as a result of the fire, whether that reversal was desired or not, and, moreover, the slowness with which a fan can be reversed might be corrected by operating the doors by electrical means. B. F. Tillson read a paper on fighting mine fires by hose, declaring that he believed it would be better to use a small hose and small nozzle and use water under high pressure rather than use a larger hose and limit the pressure. He had put a plate with a circular hole in it in the outlet of his globe valve so as to limit the outflow of water. George W. Booth, of the National Board of Underwriters, agreed with Mr. Tillson, saying that in houses the fire departments were using 1½-in. hose with ¾ in. nozzles with a fixed orifice such as Mr. Tillson was advocating.

Mr. Tillson also commented on the variety of hose connections and Mr. Rice called attention to the fact that at the Cherry mine disaster it was found that the Chicago fire department was helpless because it could not connect its hose to the water lines of the coal company. Mr. Rice said that the recommendations as to the size of hose and the pressure in the line in Technical Paper No. 43 were based on experiments made with the aid of the National Board of Underwriters after the Cherry mine fire. He was not unwilling to admit that further inquiry might reveal that high pressures and small diameters were desirable. All the recommendations for legislation made by the committee formed after the Cherry mine fire had been found practicable and of value except that for automatic fire alarms.

Mr. Booth said that more and more the fire departments of the cities were coming to the 7½ taper thread prescribed by the standard. He added that this standard was made twenty years ago. It seemed likely, he said, that if a new standard were made today it would be of 6 threads to the inch instead of 7½. Those who had coupled on a hose in a volunteer contest would recall how easy it was to get the threads crossed. With the iron pipe thread the difficulty, of course, was much greater.

Formed Committees and Talked Over Problems

J. N. Houser, general manager of the Tennessee Copper Co., at Copperhill, Tenn., described that company's methods of selecting committees and talking matters over with its men and inducing them to accept readjustments. Clarence Starr asked several questions as to the reaction of the union to such an arrangement and to readjustment of wages, discovering much difference between the anthracite region, where men are scarce and unions are entrenched, and the copper situation, where in the recent hard times men were in excess and the union weak. Dr. Jau Don Ball's paper on "Industrial Psychiatry" was briefed by T. T. Read. Apparently "psychiatry" is the science of dealing with the subnormal man—the man with the ingrowing grouch and the "inferiority" complex. "Psychology" is the study of the mind of the normal individual, "psychiatry" that of the diseased mind of the subnormal man. The author thought that industrial relations should be in the charge of experienced psychiatrists as the subnormal mind is all too prevalent.

The banquet of the evening of Wednesday was marked by the modest but intensely interesting description by Prince Gelasio Caetani, Italian Ambassador, of his training at Columbia, his experience as a cub engineer in the Far West and Alaska and his exploit during the war in blowing off the top of the Col di Lana, the eye of the Austrians, which towered 10,000 ft. above the sea. The first Douglas medal was presented to Frederick Laist, manager of the Anaconda Copper Mining Co., for his advances in the art of metallurgy.

On Thursday, Feb. 22, a visit was made to the plant of the American Brass Co., at Ansonia, Conn., where the visitors were entertained by the company and conducted in three large parties through the works.



Problems of Operating Men

Edited by James T. Beard



Standardizing Methods in the Mining of Coal

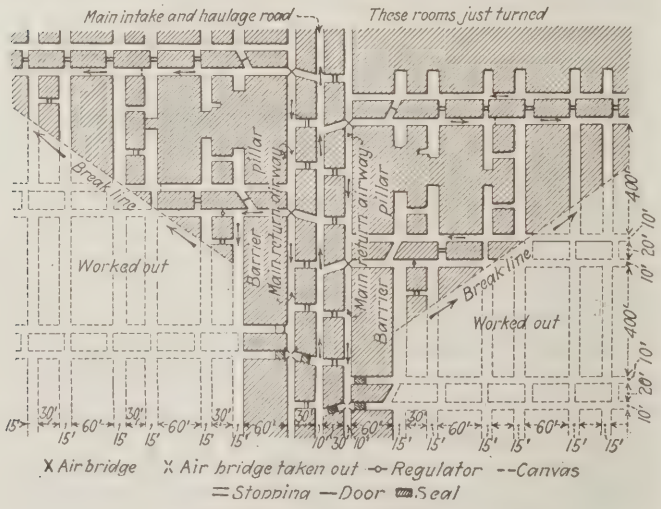
Driving Main Entries Three or Four Abreast —Narrow Stalls Driven in Pairs Off the Butts—Other Precautions to Avert Disaster

EVERY mine should be planned with the constant aim in view of securing the largest percentage of extraction of the coal while insuring the greatest degree of safety to the workers. It is generally recognized that the chief sources of danger, in coal mining, are the fall of rock and coal at the working faces and the presence of gas and dust in the mine air.

These items should be kept in mind continually when considering the method of working best adapted to the conditions in hand. We all know that different methods of working are adapted to different conditions regarding the character of the roof, floor and coal, depth of cover, thickness and inclination of the seam and other items.

Speaking generally, however, and assuming the room-and-pillar method (bord-and-pillar), or the pillar-and-stall method, is to be employed in preference to longwall, there are features that lend themselves to safety, in the planning of the work.

With this explanation, allow me to present the plan shown in the accompanying figure, which appeals to me



PROPOSED STANDARD PLAN FOR ROOM-AND-PILLAR WORK

as the standard of working coal in this and many other districts. No doubt the plan can be modified.

The plan shows the main headings driven three abreast, in which case the center heading is made the main haulage road and intake for the entire mine, and the two flank headings will then serve as the return air-courses for their respective sides of the mine. In my judgment, there should not be less than three main headings as here shown.

In the working of a large gassy mine, it will often be found an advantage to drive the main headings four abreast. However, I consider that the limit, as a larger number of headings is apt to prove a menace to the safety of the mine, by reason of the headings becoming dry and dusty.

When the main headings are driven four abreast, the two center headings are intake airways, one being used for the haulage road and the other as a manway. This arrangement, I believe, is particularly advantageous in the working of a gassy seam.

Gassy Mine Requires Duplicate Exhaust Fans to Insure Uninterrupted Circulation

As shown in the figure, the mine should be equipped with two exhaust fans of equal dimensions, one fan working on each main return heading. Butt headings are driven in pairs to the right and left of the main headings, on 450-ft. centers, leaving a solid block of coal 400 ft. wide between each pair of butts.

One main feature, in respect to the safety of working, is the driving of narrow rooms or stalls in pairs. In the figure, these are shown as driven at right angles to the butt headings. The stalls are 15 ft. wide and separated by a 30-ft. pillar. As shown in the figure, a solid pillar of coal, 60 ft. in width, is left between each pair of stalls. This plan provides for a one-fourth extraction in the first working, the remaining three-fourths being left to be taken out when retreating.

The driving of narrow stalls, with wide pillars between them, is not only a safeguard against falling roof and coal; but it will, in most cases, reduce the cost of production by requiring less timber and avoiding loss of coal in drawing back the pillars.

Arranging a Uniform Breakline

All haulage roads should provide a good clearance on both sides of the track. As shown in the figure, overcasts are built at the mouth of each pair of butt entries. These are taken down and the air-course to that pair of headings sealed when the breakline has reached the face of those headings. At the same time, a canvas is hung, or a regulator installed at the mouth of the entry, to prevent the short-circuiting of the air when the overcast is removed.

As a further precaution in avoiding disaster, a water line, under 80 lb. pressure, should be laid in all entries. Also, during the winter months, steam should be introduced into the intake air, for at least four hours each day when the men are out of the mine.

Too rapid a development of the mine is always a source of danger and should proceed only fast enough to keep ahead of the breakline. At the working face, all coal should be blasted down before the miner is permitted to start loading. If this is done, it will go a long way toward reducing the number of accidents from falls of coal in miners' places.

Parnassus, Pa. C. W. Atkins.

Competent Machine Runners

Factors that increase cost of machine work—Need of efficient plan—Employing too small a number of machines gives poor results.

I HAVE read with much interest the timely article by O. Kennett in the issue of *Coal Age*, Jan. 4, p. 18. He has opened a subject worthy of general discussion. I believe there is no one class of mine work that gives more trouble and is the cause of greater expense than the operation of chain machines. All that Mr. Kennett has stated is true and I hope to add some further thoughts to keep the subject alive.

Having operated machines under various conditions I have about reached the conclusion that the high cost of machine repairs, the big bottoms left in every other place and the increasing number of accidents from this kind of work is entirely the fault of the plan of operation and not so much due to an indifferent class of workmen.

Pell-Mell Drive Increases Cost of Cutting

To illustrate this point, let us assume a mine where the coal is cut by the ton and the cutting is done at night, on account of insufficient power to do it on the dayshift. Usually, under these conditions, as few machines as possible are used, in order to conserve the power, and the result is that each cutter has, say twice as many places to cut as he should have. The result is a pell-mell drive, a stop-for-nothing attitude to cut the places assigned by the boss.

The cutter starts "sumping up." He strikes something hard and away goes a few of his bottom bits. He does not take the time to pull out the machine and replace the broken bits, with new ones. Instead, he keeps a going and when he gets to the opposite side of the room he is about a foot off the bottom. The fact that he has left big bottoms in a room means nothing to him and he cares little about his overworked machine. His only thought is that his wages do not take a slump and he manages to hold the machine together until the shift is over.

While it requires a sturdy machine to stand this grind, it takes a still stronger man to stay with the machine and the fact that he is making good wages makes it a matter of little importance to him when he is blamed for carelessness and indifference. The man, indeed is about exhausted when the shift is over and, as a result, sickness may keep him from work for a day or two. He is even ready to quit if pressed too hard for an explanation of the condition of his machine.

Cutting Arrangements Must Be Favorable to Execution of the Work

It is not profitable to subject machines and men to this kind of treatment. All operators should so arrange their system of cutting that a machine crew will have a fair chance and be able to do their work right and safely. The best way to bring this about is to put cutters on during the day. This may, of course, necessitate buying more machinery, but it will pay in fewer repairs being required and providing more satisfactory working conditions.

No man wants big wages if he must kill himself to get them. Moreover, the knowledge that cutters and scrapers are making such big wages does more to dissatisfy other workers than anything else. The only men who know how much hard bone labor is involved in cutting eighteen places with a shortwall machine are the men who go in, night after night, and do it under the trying conditions found in the average coal mine.

Finally, in regard to the suggestion that the electrician should employ the machine men, I do not agree with that idea. To my mind, the mine boss should bear that responsibility entirely alone. The electrician is one of the most important men around an electrically equipped mine. He has his hands full when he keeps the machinery going, without being bothered about keeping the machinery manned.

One plan I have seen that brought good results was where the cutter was permitted to select his scraper. Another instance was where the electrician or an assistant examined all machinery once a day, even to the farthest mine pump or rock drill.

Pikeville, Ky. George Edwards.

Care Needed in the Operation of Coal-Cutting Machines

Careless handling of machine invites trouble—Machine must be oiled regularly—Correct use of controller averts burning of contact points—Cutting for speed dangerous.

THE excellent article on the employment of competent machine runners, which appeared in *Coal Age*, Jan. 4, p. 18, has expressed a new opinion and one that should prove of vast interest to operators of machine mines.

The writer of the article emphasizes the fact that an inexperienced or careless operator can do serious damage to a machine in a short time. He may cause injury to himself or his helper, to say nothing of the loss of time and expense suffered by his employer as the result of his neglect or lack of knowledge.

It is important to remember that carelessness in the operation of a machine, particularly a coal cutter, acts as a magnet to disaster. In the handling of men and machines, for several years past, it has been my chief objective to discover and avoid habitual carelessness in workmen.

Numerous Types of Machine Runners Who Damage Machines in Various Ways

Among machinemen, a dangerous type is the speeder, who cuts coal with the sole thought in mind of increasing his wages. He neglects to oil his machine and, by this and other lack of care, damages the machine, endangers his own life and that of his helper and then produces a lesser tonnage than the man who works with greater moderation and more steadily.

One matter of chief importance in running a coal-cutter is to understand the proper use of lubricant. The machine must be kept well oiled. This is much neglected by the average runner, who fails to realize its importance to the work performed. The failure to use a proper amount of oil, by a machineman, should be promptly investigated by the company as it means a saving of expense and an increase in production.

Great damage will result from continuing to run a machine that has not been properly oiled. In many cases, the result is hot bearings that have to be rebushed at a great loss of time and expense. On several occasions, I have known the machine boss, on being called to repair a machine, would find the bearings badly scored by reason of being run without oil or other lubricant.

Coal-cutters must operate, necessarily under hard conditions, which require greater carefulness on the part of the runner to avoid damage to the machine. A careless operator will allow the oil openings to become clogged with fine dust and dirt and seldom make any effort to clean them out sufficiently to permit the oil to reach the bearings.

At times, the fiber washer on the bottom of the main gear becomes soaked with oil carelessly poured over the machine. The result is the runner tightens the friction nut to cause the machine to haul. This gives an effective pull on the feed-chain when the oil has worn away, greater than that for which the chain was designed and the latter is broken. Replacing the broken link means a loss of time, but the mended chain is seldom a satisfactory part of the equipment.

Need of Testing Each Machine Regularly

With every machine there is always sent a device for testing the pull of which it is capable. The machine should be tested at least twice a month, in order to keep the friction properly regulated. Too often this device is thrown aside and forgotten; or it may have been tossed out on the junk heap.

Another type of machine runner is a controller fiend, so to speak. Such would I describe the fellow who has little concern in his use of the controller when starting his machine. He will throw the handle from the first position around to full input, hardly allowing any time for the motor to pick up speed. The result is the burning of contact points, which makes it a dangerous practice.

Assume, for a moment, that this occurs when the machine is cutting up to the rib, the result would possibly break the feed-chain or pull the jack-pipe from the hitch supporting it. The jack falling might harm the machine; or, perhaps, break the cutter chain if the machine was not making a full cut. It would be fortunate if it did not cause the binding of the machine under the cut.

When the Machine Binds in the Cut the Runner Must Act Promptly

In that event, the friction should be promptly released and the bit clutch disengaged; or the emergency plug at the rear of the machine should be pulled. Never try to operate a machine when the contact points are burned on the starting box. It is better to stand the loss due to the machine being out of commission than to run the chance of accident.

I have mentioned the speeder—the man who is cutting for high wages. This fellow is careless of his own safety when working around a machine. He will take his life in his hand by stepping across the cutter-bar when the machine is running. If the machine should, at that moment, strike a hard substance and kick, or if the man's trousers should catch in the chain bits the poor fellow would be torn to pieces, before the machine could be stopped.

In closing, let me urge more care in selecting men who are habitually careful in running their machines. We should remember that the efforts of a few, in this direction, may prove the safety valve of the multitude.

The efficient machine man is one who cares more for his machine than for the amount of coal he cuts. He will always be on the watch to detect anything that is wrong and will keep his machine well oiled.

Armbrust, Pa. W. D. Rhodes.

Inquiries Of General Interest

Best System of Rail Bonding in Mine Haulage

Welding Fishplates to Rails and Cross-bonding by Welding Steel Ties to Rails Every 100 Ft., as Compared with Flexible Bonds Made for Bonding

IN OUR mine, which is electrically equipped, it has been the custom to weld the fishplates at all rail joints, so as to give a good electrical contact, besides welding the rails to the steel track ties every 100 ft. This was done, perhaps, through preference, or, it may be, to save the cost of buying flexible rail bonds made expressly for the purpose.

It is my desire, now, to learn what *Coal Age* and others think of this method, in respect to its relative efficiency and cost, as compared with other means of securing the same results. It seems to me that the matter of rail bonding, in reference to mine haulage, is worthy of discussion. The question is, Are we getting the greatest possible efficiency, per dollar expended?

We shall watch for the reply to this question and the later accounts of the experiences of others with deepest interest, as I am assured we can all profit by such a discussion. Mine Manager.

La Salle, Ill.

This correspondent has probably voiced the thought and wish of numerous other operators and mine officials who have been blindly following some previous practice or method installed by a predecessor, years before, and has not had the courage or ingenuity to question its relative efficiency and devise ways of improving the situation. In other words, there are too many mine officials who are satisfied to let well enough alone and plod along in another's tracks. They are not progressive.

The question presented is one capable of much profitable discussion, as coming issues of *Coal Age* will undoubtedly show. In the opinion of the editor, there is no system or method of bonding the rails of mine tracks that can compare, in respect to all-round efficiency, with the use of flexible rail bonds that are manufactured for the purpose and now so widely used in mining practice, in every district, both in this country and in Great Britain. The extra first cost of the equipment will soon pay for itself in lesser cost of upkeep.

Different types of these bonds are illustrated and described together with much other information regarding bonding in Catalog No. 18, recently published by the Ohio Brass Co., Mansfield, Ohio. When a good type of flexible bond is properly applied there is little need, generally, for the cross-bonding mentioned by the correspondent and this extra work of welding the rails to the track ties becomes unnecessary.

The question is open for the discussion of its merits by those whose experience in rail bonding will be of value to the industry and we hope there will be a generous response to this appeal.

Examination Questions Answered

Miscellaneous Examination Questions

(Answered by Request)

QUESTION—*The quantity of air passing in a mine is* 200,000 *cu.ft. per min. The average temperature of the return air is* 60 *deg. F. all the year round. On a certain day in winter the temperature of the intake air is* 20 *deg. F.; and on a certain day in summer it was* 65 *deg. F. Then, assuming that, in each case, a cubic foot of air at the inlet weighs* 0.08 *lb. when estimated at a temperature of* 32 *deg. F., what is the difference in horsepower required to produce the given circulation in these two periods?*

ANSWER—A cubic foot of intake air, at the winter period, is then (460 + 32/460 + 20) 0.08 = 0.082 lb.; and at the summer period, (460 + 32/460 + 65) 0.08 = 0.075 lb. The difference in the weight of the intake air in winter and summer is, therefore, 0.082 — 0.075 = 0.007 lb. per cu.ft. But the temperature of the return air being constant throughout the year, the weight of the upcast column is constant and the weight of the downcast column, in winter will exceed that in summer by 200 × 0.007 = 1.4 lb., which is the excess in ventilating pressure due to change of season, expressd in pounds per square foot.

Expressed in horsepower, it is fair to say, the circulation of 200,000 cu.ft. per min., in this mine, will require (200,000 × 1.4) ÷ 33,000 = 8.48 hp. less at the winter than at the summer period.

QUESTION—*Name three essential elements in the efficient ventilation of a mine.*

ANSWER—(1) A sufficient volume of air must enter the mine to comply with the requirements of the law and to make the mine safe for work. (2) The air must be divided and conducted to and made to sweep the working faces, in each district or section of the mine, so as to keep each place clear of gas. (3) The quality of the air with respect to oxygen content, humidity and freedom from gas and dust, must be such as to make it healthful to breathe and safe.

QUESTION—*(a) What will be the rubbing surface in an airway* 3,000 *yd. long,* 6 *ft. high and* 12 *ft. wide? (b) How much air will pass in this airway if the velocity is* 565 *ft. per min.?*

ANSWER—(a) The perimeter of a 6x12-ft. airway is 2 (6 + 12) = 36 ft. For a length of 3,000 yd., the rubbing surface is 3 × 3,000 × 36 = 324,000 sq.ft.

QUESTION—*Why is it necessary to place a regulator in a given section of a mine?*

ANSWER—A regulator is required in any section of a mine that takes more than its due proportion of the circulation because of its lesser resistance. The regulator restricts the flow of air in that section by offering additional resistance.

QUESTION—*How should a hoisting cable be attached to the cage?*

ANSWER—A steel rope socket such as is commonly used in hoisting practice, or a steel thimble must first be attached to the end of the rope. To attach the socket the end of the rope is first passed through it from the small end of the bore. The strands are then parted and some of the wires cut out of each strand. The remaining wires are bent back on themselves and the rope now pulled back into the socket. The bore being conical, the enlarged end of the rope formed by bending back the wires holds it fast in the socket. A steel wedge is driven down into the center or lead is used to fill the socket and bind the wires.

When the thimble is used as a rope end attachment the rope is simply wound around the thimble and the end secured by clevices binding it to itself, or the end is spliced into the main body of the rope.

QUESTION—*Why are spring safety catches to be preferred to those operated by weight and lever?*

ANSWER—The spring acts independently and is more reliable than the weight and lever, the action of which depends on gravity. When the cage is falling the weight falls with it and, as a consequence, exerts no force to move the lever that controls the catches.

QUESTION—*What quantity of air is required to ventilate a mine (Ill.) in which are employed* 150 *miners,* 21 *daymen,* 10 *mules being used to haul the coal?*

ANSWER—The Illinois Mine Law (Sec. 14) requires the circulation of 100 cu.ft. of air, per man, and 500 cu.ft. per mule, where the mine is not gaseous; or 150 cu.ft. per man if gaseous. Assuming the former condition, the air required, in this case, is 100 (150 + 21) + 500 × 10 = 22,100 cu.ft. per min.

QUESTION—*If* 60,000 *cu.ft. of air per minute is produced under a water gage of* 1.6 *in. what is the horsepower of the ventilating current?*

ANSWER—A water gage of 1.6 in. corresponds to a unit pressure of 5.2 × 1.6 = 8.32 lb. per sq.ft. The horsepower on the air is then (60,000 × 8.32) ÷ 33,000 = 15+ hp.

QUESTION—*An airway has an area of* 66 *sq.ft. and the reading of the anemometer is* 675 *ft. per min. What is the quantity of air passing, allowing* 4 *per cent for the resistance of the instrument?*

ANSWER—The velocity of the air current, making this allowance for the resistance of the instrument, is 675 (1 — 0.04- = 648 ft. per min. Then, taking this as an average velocity of the air current, the volume of air passing is 648 × 66 = 42,768 cu.ft. per min.

QUESTION—*Suppose you were testing for fire damp and an explosion occurred in your lamp, what would you do?*

ANSWER—If the explosion did not force the flame through the mesh of the gauze it is fortunate. Keep cool and lower the lamp promptly but cautiously, screening it as much as possible from the air while withdrawing from the place. Any quick movement of the lamp would always be dangerous.

QUESTION—*Should a fall occur on the intake airway and a large amount of marsh gas be given off from the roof, what steps would you take to prevent an explosion and rescue the men at work inside?*

ANSWER—Notify the men at once to extinguish their lamps and withdraw by the safest possible route. When the men have passed out of the mine station reliable men at the entrance to prevent anyone from returning. The work of conducting the gas by the shortest route out of the mine should then be undertaken by the firebosses. Before the men are allowed to again enter the mine, every portion must be carefully examined and the mine reported safe for work.

Raise Pay of Independent Alabama Miners

Birmingham, Ala., March 1.—Wage increases averaging 12½ to 15 per cent for mine workers in the pits of the Tennessee Coal, Iron & Railroad Co. were announced by the company today. The increase, effective March 15, affects approximately 10,000 coal and ore diggers of the Tennessee company, and brings the new wage close to 50 per cent higher than the level of May, 1922.

The first increase, effective May 15 last, was 10 per cent; the second, effective Sept. 1, 20 per cent.

Independent operators have announced their intention of making substantial increases, effective March 15. The scales now being worked out are expected to follow the lead of the Tennessee company.

The Alabama division of the United Mine Workers is now working out a scale of wages which will be demanded in union mines, it is announced. The Tennessee company operates on an open-shop basis.

Midwest Roads Offer "Compromise" on Mine Ratings; Operators Object

The railroads of Illinois, Indiana and western Kentucky late last week came back with what they say is a compromise proposal for a new system of rating coal mines for car supply. They propose that they create a joint railroad board of three men to rate all mines in those three general territories on the mines' past performances, using only full-day operation as a basis. If any mine is aggrieved it will be permitted to have its claimed rating until such time as the board gets around to re-examine it, in case that re-examination is not made within ten days. This plan meets the hearty disapproval of most Illinois and Indiana operators. Several of them said they would not agree to it but would take the matter back to the Interstate Commerce Commission, which still has the car-rating case under consideration.

What the operators of Illinois and Indiana insisted upon at a conference with the railroads in Chicago two weeks ago was that each mine be rated each month on the performance of the preceding month as under CS 31, now in effect. Western Kentucky was agreeable to the carriers' plan provided it were not applied to that field alone. Many of them believed tipple hours and not underground working time should be the basis. They offered as a "compromise" that the roads create their proposed rating board but that the monthly basis be preserved. This the roads have now declined to accept.

The new proposal of the roads varies little from the original and does not introduce the element of flexibility in rating for which the operators have been contending all along. Car ratings should change from month to month with the change in coal demand and with the consequent fluctuations of production is the opinion of most well-informed coal men.

190 Died in January Coal-Mine Accidents; 3.23 per Million Tons Mined

Accidents at coal mines in January, 1923, according to reports from state mine inspectors to the U. S. Bureau of Mines, resulted in 190 deaths. Based upon an estimated production of 58,891,000 tons, the fatality rate was 3.23 per million tons mined, as against 3.65 in January last year, a reduction of more than 11 per cent. The average fatality rate for January over a ten-year period (1913-1922) is 3.96 per million tons; thus the rate for January, 1923, represents a decrease of nearly 19 per cent from the 10-year average rate for the month.

The explosion of gas at Dolomite mine No. 1, at Dolomite, Ala., on Jan. 10, which resulted in the death of five men, was the only major disaster reported for the month. In January last year there also was but one major accident, a dust explosion in a coal mine in Kentucky, in which six lives were lost.

The reports for January, 1923, show slight decreases in the fatality rates per million tons from falls of roof and coal, mine haulage, gas and dust explosions, and powder and other explosions, as compared with the accident record for January, 1922.

COAL-MINE FATALITIES DURING JANUARY, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	5		1	5		1		1					13													13	10
Alaska																										0	0
Arkansas																										0	0
Colorado	3		2						1				6													6	4
Illinois	12		3	1									16			3		3								19	19
Indiana	1		1		2								4													4	7
Iowa	1							1					2	1				1								3	0
Kansas	2				1								3													3	1
Kentucky	3	1											4													4	13
Maryland	1												1													1	0
Michigan																										0	0
Missouri																										0	0
Montana	2							1					3													3	0
New Mexico	2												2													2	0
North Dakota																										0	0
Ohio	8		3			1					1		13	1				1								14	9
Oklahoma																										0	0
Pennsylvania (bituminous)	17	6	7					2				1	33						1		1		1		3	36	25
South Dakota																										0	0
Tennessee	2				1								3													3	0
Texas																										0	0
Utah						1							1													1	3
Virginia	4												4													4	0
Washington																										0	2
West Virginia	15	1	8			3		2		2			31	1				1					1		1	33	17
Wyoming	1												1													1	1
Total (bituminous)	79	8	25	6	4	6		7	1	3		1	140	3		3		6	1		1		2		4	150	111
Pennsylvania (anthracite)	12	2	6	3		4						3	30						1	1	3		1	4	10	40	49
Total, January, 1923	91	10	31	9	4	10		7	1	3		4	170	3		3		6	2	1	4		3	4	14	190	
Total, January, 1922	65	16	30	6	10	8		4		2		4	145	1				1	6		1		2	5	14		160

U. S. Coal Commission Granted $400,000 Appropriation; Union Not to Have Access to Cost Reports

By Paul Wooton
Washington Correspondent of *Coal Age*

While the continuance of the President's Coal Commission was imperiled by the delay in voting its appropriation, Congress in an eleventh-hour effort gave the commission all of the legislation which it had asked. This included the appropriation of $400,000, the authorization to require sworn answers to questionnaires, the extension of the life of the commission until Dec. 31 and the authorization for Judge Alschuler to serve as a member of the commission.

The appropriation was added to the third deficiency bill in the Senate. It was approved with practically no objection. A separate vote on the amendment was demanded in the House, but the item was approved without a roll call. Prior to that action, however, the House had passed the bill which authorizes the commission to require sworn answers to its questionnaires. The amendments to the original act included the desired increase in the appropriation. The amendments were approved by a vote of 212 to 76.

When the deficiency bill was taken up in the House Representative Blanton, of Texas, opposed the coal commission appropriation and also further investigation into the coal industry.

Representative Goodykoontz, of West Virginia, seconded the effort made by Mr. Blanton to force Chairman Madden of the House Appropriations Committee and in charge of the bill, to give assurances that the commission appropriation would be striken from the bill. Chairman Madden, however, refused to give such assurances.

Chairman Hammond of the coal commission, when called upon by the chairman of the Committee on Appropriations of the House of Representatives to justify the $400,000 additional which the commission was asking, said in part: "We can justify this appropriation simply from the recommendations of a practical nature that we can make regarding improvement in mining methods, in the relations between the operators and employees and in many other respects. I am confident that the engineering recommendations alone will justify this appropriation many times over each year. The industry is the worst conducted, from an engineering point of view, that I have ever seen."

The commission had asked originally for authorization to extend its activities to Dec. 31, if that should be found necessary. Since that time the situation which prompted that request has changed sufficiently to make it practically certain that the commission can conclude its work by Sept. 22, the original date set. Congress, however, did not take cognizance of the fact that the commission no longer believes that an extension if its term is necessary and authorized the President to advance the limit as might be found necessary to a date not later than Dec. 31. In commenting on that phase of the legislation, Chairman Hammond stated that he can foresee no contingency that will interfere with the submission of the final report on Sept. 22.

In the same manner Congress took no note of the fact that Judge Alschuler had tendered his resignation to the President and that the President had accepted it. The action of Congress in authorizing him to serve on the commission was entirely unexpected.

The attention of the commission has been called to the plan, encouraging coal storage by the small consumer, which was devised by L. S. Storrs, president of the Connecticut Company, large operators of electric railways. Mr. Hammond and Commissioner Smith are outspoken in their commendation of the plan whereby the company guarantees payment for the orders of domestic fuel placed by their employees on April 1. The plan is to be called to the attention of large employers in the belief that it offers the opportunity to obtain the maximum possible amount of storage on the part of domestic consumers.

While it would be outside the province of the coal commission to request state legislatures to postpone consideration of pending coal legislation until the commission reports, Mr. Hammond did point out on Saturday that it is obvious that the state as well as the federal government would be in a position to legislate much more intelligently if it had before it the basic facts which the commission is assembling. This statement was called forth by a letter on the subject addressed to the commission by the bituminous operators' special committee.

In connection with the announcement that W. Jett Lauck is to serve the commission on certain special assignments it was pointed out that Mr. Lauck does not have access to the commission's files. Mr. Lauck has been so actively connected with union activities that his appointment is not being met with favor in all quarters. Evidently with the idea of anticipating some of the opposition, Mr. Hammond pointed out that Mr. Lauck is not to be regarded as a member of the regular staff but that he feels advantage should be taken of the service that Mr. Lauck can render in certain matters in which he has had special experience. In connection with that discussion attention was called to the fact that the information contained on questionnaires is scrupulously guarded by the commission. With the exception of the men specially chosen for their reliability, who compile the data from these returns, no member of the commission's staff has access to these questionnaires.

Miners' Representatives Not to See Cost Figures

In one of the communications submitted to the commission recently by the United Mine Workers it is asserted that the commission has promised to allow the examination of cost figures by miners' representatives. Mr. Hammond is at a loss to know how any such misunderstanding should have come about. That the officials of the United Mine Workers had this misconception first came to the attention of the commission in January. At that time the presidents of the anthracite districts were distinctly informed that the promise is confined to the matter of miners' earnings. The commission expects to allow the unions to check payroll figures as reported by mines in the union fields. Both Mr. Hammond and Dr. Smith subscribe to the following: "This commission as it is organized is as well qualified to analyze and criticize figures and accounting systems as is either party to the controversy between the operators and miners. Indeed we represent both of them, as well as the consumer. When it comes to the examination of the records in this investigation, everyone concerned must put some confidence in the integrity and efficiency of the commission. We know we are impartial and we intend to be thorough."

Chairman Hammond, Governor Marshall and Mr. Howell are spending this week in Alabama. They decline to prepare an itinerary and will look around as it suits their own fancy, with the idea of building up first-hand information and a general background which they believe necessary to the intelligent determination of many questions. Dr. Devine is visiting mines in Oklahoma and Texas.

Regardless of what the unions may think, Mr. Hammond is convinced that coal mines should operate at least sixteen hours a day. He says it is so obviously poor business to obtain but one-shift production from a mine, which represents large capital expenditure, that he feels more general resort to a two-shift system should be undertaken. He said some investigation already has been made as to the possibilities of obtaining substitute employment for the 200,000 or more men which would not be needed in the coal mines if the industry were conducted in the most efficient manner.

It was revealed at Saturday's conference with representatives of the press that the commission is receiving many requests from New England for additional supplies of anthracite. Dr. Smith expressed regret that the commission has been unable to disabuse the mind of the domestic con-

sumer in New England of the impression that the commission has power over distribution. He said it is to be regretted that Federal Fuel Distributor Wadleigh does not have the miraculous power of furnishing the 40 per cent of the anthracite production lost during the strike.

Chicago, March 6.—Judge Samuel Alschuler married Miss Ella Kahn, daughter of a wealthy clothing manufacturer, in Chicago March 5. Judge Alschuler, who is 63 years old, had been a bachelor.

Sufficient Anthracite Moving to Satisfy Real Needs of Northeast, Says I. C. C.

The Interstate Commerce Commission made a report Feb. 28 to the U. S. Senate in response to Senate Resolution 418, which directed the commission to investigate the advisability of ordering an embargo on anthracite coal to foreign counteries.

The substance of the commission's report is that after an exhaustive investigation and through co-operation of federal, state and local fuel administrators and of railroad officials, the movement of anthracite coal is sufficient at this time to take care of the real needs of the consumers in the northeastern portion of the United States, and that preference and priority is being given without materially changing the plans of operations that might arise from the imposition of a priority order upon the carriers, which are at present under great stress in operating their lines. The report further states that no substantial evidence as to purchase or sale of anthracite either unreasonable or unjustly high has been brought to the commission's attention.

Cushing to Speak Unofficially in Canada

George H. Cushing has accepted an invitation from the Canadian Mining Institute to present certain phases of the commercial situation of coal in Montreal this week. A request for such a presentation was received recently by the Secretary of the Interior from the Canadian Government. In reply Secretary Fall pointed out that his department is not in a position to speak for the commercial interests but suggested that Mr. Cushing had long contact with the marketing phases of coal. This resulted in the invitation being extended to Mr. Cushing by the Canadian Institute. While Mr. Cushing will appear as a private citizen and in no way will be authorized to reflect the views of government officials, because of the official correspondence that has been exchanged he submitted his speech to various officials conversant with coal so as to guard against any utterance that might embarrass them.

Drop Indictments in Clifton Mine Battle

Indictments charging 126 men with conspiracy to attack and destroy mine property at Cliftonville, W. Va., last summer were "nolled" in Circuit Court at Wellsburg, W. Va., March 5. The defendants had been at liberty under bond for several months. The charges grew out of the Clifton mine battle, in which Sheriff Duvall and six others were killed.

Lehigh Valley Dissolution Decree Filed

Attorney General Daugherty on March 3 ordered filed in the U. S. Court for the Southern District of New York a final decree for separation of the Lehigh Valley Railroad Co. from its coal subsidiaries. The representatives of the Attorney General were instructed to inform the court that the end desired by the government was the complete separation of the railroad company from the mining and selling of anthracite to such an extent that there should not be any connection, direct or indirect, between any stockholders or officers of the railroad company and of the coal companies.

On the same day Judge Learned Hand in New York heard a discussion on the separation plan proposed by the railroad company. Edgar H. Boles, general counsel for the railroad company, presented a full draft of the proposed decree. A. T. Seymour, acting U. S. Attorney General, said that while he considered the plan contained features intended to accomplish practical results he said he did not want to be placed in the position of agreeing to it, as the government wanted to bring about a complete separation between the railroad company and the mining and the sale of anthracite.

Judge Hand was told objections by stockholders of the railroad company had been presented to the Department of Justice.

McAuliffe Is Union Pacific's Coal Chief

Eugene McAuliffe, well known in the American coal industry, especially during his presidency of the Union Colliery Co. of Illinois since 1917, is now directing the coal affairs of the Union Pacific Railroad Co. On March 1 he became president of the Union Pacific Coal Co., operating sixteen mines in the Rock Springs (Wyo.) coal field, and president of the Washington Union Coal Co., operating the Tono mine at Tono, Wash. Mr. McAuliffe's offices are at the Union Pacific system headquarters in Omaha, Neb. E. S. Brooks who has been president of the railroad's coal company, continues as field chief in the capacity of general manager of the Rock Springs group of mines and is now a vice-president.

Mr. McAuliffe's step into the control of all Union Pacific coal properties and coal interests is but another stage in a striking career. Not so many years ago he was a "hogger" pulling a throttle on a freight engine. But he had ideas and never was satisfied with just holding a job. That was why he rapidly ascended from shop apprentice on the Northern Pacific in 1888 through various shop and engine-service jobs on various railroads in this country and Mexico until an official of the old Kansas City, Ft. Scott & Memphis, now a part of the Frisco system, pulled him out of the right hand side of an engine cab and made him fuel agent in 1903. In 1908 he became general fuel agent of the Chicago, Rock Island & Pacific, St. Louis & San Francisco, and Chicago & Eastern Illinois railroads and was elected president and general manager of the Brazil Block Coal Co., operating mines in Illinois and Indiana. He returned in 1913 to the St. Louis & San Francisco as general coal agent in charge of locomotive and shop-fuel purchases, coal-traffic and coal-mine development work. On Feb. 1, 1917, he resigned railroad service to joiin the staff of the North American Co., owners and operators of electric public utilities, coal-mining properties and river transportation facilities, serving as vice president of the West Kentucky Coal Co., later organizing the Union Colliery Co., where in the capacity of president and general manager he constructed and operated the Kathleen mine, in southern Illinois, assisting in the purchase of fuel for the public utilities in St. Louis, Milwaukee, Detroit and Cleveland. He resigned as president and general manager of the Union Colliery Co. in September, 1922, and has since engaged in special work for the North American Co.



EUGENE McAULIFFE

Explosion at Arista Mine in West Virginia Takes Toll of Ten Lives

An explosion at the Arista mine of the Weyanoke Coal & Coke Co. on the Widemouth branch of the Norfolk & Western Ry. in Mercer County, West Virginia, last Friday morning at 10:30 exacted a toll of ten lives and seriously damaged a part of the mine. The bodies of six of the ten miners killed were recovered on the day of the accident. It was impossible to reach the others until the following day owing to the destruction wrought by the explosion.

Other than it seems to have been a dust explosion, the direct cause is uncertain. Some of the officials of the company were inclined to believe that the dust might have become ignited by excessive shooting or because of a blown-out shot. First reports of the cause were to the effect that a runaway trip in striking the side of a passageway in the mine had raised dust which exploded. The force of the blast was such as to hurl timbers, boulders and other débris from the opening on the west side of the mine. The explosion was in the vicinity of the seventh, eighth and ninth entries of the west main, about 3,200 ft. from the entrance to the mine.

Until reorganized on Jan. 1, 1923, the Weyanoke Coal & Coke Co. was the S. J. Patterson Pocahontas Coal Co. It is owned by H. D. Patterson, a relative of the late John H. Patterson, of the National Cash Register Co.

R. L. Lambie, chief of the West Virginia Department of Mines, received word of the explosion within a few hours after it occurred and organized a party of mining inspectors and first-aid experts who left Charleston for Mercer County in the new mine-rescue car of the U. S. Bureau of Mines.

An explosion of three boxes of powder, Feb. 26, at the Superior mine of the Superior Fuel Co., near Curtisville, Pa., injured several persons, destroyed the powder house and two adjoining sheds, tore the roof off the main building, badly damaged the main machinery building and broke many windows in two small towns near by.

Coal Commission Engineers Gather Data In Central Pennsylvania Field

In conference with the board of directors of the Central Pennsylvania Coal Producers' Association last week in Altoona were M. B. Matson and Charles Young, mining engineers, working as personal representatives of John Hays Hammond, head of the U. S. Coal Commission. Later, engineers will visit the district and confer with the miners and with the officials of the United Mine Workers.

The engineers were studying the economic, labor and engineering phases of the industry and under these general headings are obtaining data on labor costs, production costs, investments, profits, wage rates, absenteeism, labor turnover, strikes and their causes, earnings, efficiency of union and non-union miners, living conditions, marketing, transportation, waste, overdevelopment, etc.

One of the primary objects of the visit of the commission engineers to the central Pennsylvania field was to stimulate operators and miners to take an interest in the investigation and furnish the commission with information that will prove valuable when it comes to reaching a conclusion. The engineers expressed themselves as well pleased with the hearty co-operation of the operators and the association in the central Pennsylvania field.

The Central Pennsylvania Coal Producers' Association, which embraces in its membership practically all the operators in the field, having withdrawn its affiliation with the National Coal Association, is now engaged in preparing the case of the district operators to be presented to the commission.

The association will give the commission the information desired as far as it is possible to do so. Data for form C-1, which covers cost, income and tonnage, and L-1, embracing earnings of miners, are being filled out as fast as the data can be tabulated. These forms are most elaborate and complicated and require much work.

Also a survey will be made by the operators covering investments and profits in the industry in the district from 1906 to 1921, inclusive, and the effects of competition and the decreasing tonnage in central Pennsylvania, which will be set forth in full in a brief that will be sent to the commission.

A discussion of the cause of overdevelopment of the industry in the district will be included and an attempt will be made to draw a proper distinction between development and capacity.

One of the chief features of the report will deal with the industrial situation between the operators and the United Mine Workers of District No. 2. The relations that have existed for twenty-five years and the changes that have taken place will be set forth and the full effects of the policies shown.

President Harding Makes Position Clear On New England Coal Situation

President Harding made clear his position on the New England coal situation in a letter to Representative Rogers written just before the adjournment of Congress. The letter follows:

"If I am quoted in the New England press as your letter indicated, it is the fault of the newspaper world in quotation, and the blame cannot be attached to me. I did say to the newspaper men, in a recent press conference, that representatives of the Interstate Commerce Commission had reported to me that their agents, who are sent to investigate every reported distressing situation, had said that much of the trouble was 'psychological' and that there was a good deal of hysteria because of the menacing depletion of fuel supplies on hand. I have recognized all along that there is a very anxious situation in New England. I do not see how such a situation could be avoided.

"All the country knows that we had a coal strike last summer of several months' duration and that, in spite of everything that the federal government could do, the strike very greatly diminished our normal supply of anthracite coal. As a matter of fact we are passing the winter on about a 60-per cent supply. In these circumstances I do not see how great inconvenience and much distress could be avoided. Communities accustomed to the use of anthracite coal have rebelled against any substitution of bituminous coal and have hoped from week to week and day to day to obtain an ample supply of anthracite. The ample supply is not available. From the time of the very first complaints coming from New England I have transmitted them to the Interstate Commerce Commission, which is the only governmental authority we have to deal with the situation. To be sure, the Federal Fuel Distributor is authorized by Congress to make recommendations, and these recommendations have been made with great earnestness.

"There is no one with power to tell the commission what to do. Priority orders have been recommended, but the commission is clearly reluctant to resort to that remedy. Members of the commission report to me that every reported distressing situation is being promptly investigated by personal representatives of the commission, and that necessary steps are very promptly taken to afford relief. I should be glad, of course, to see every apprehension removed. If someone will tell me wherein I have the authority to do so I will be glad to adopt vigorous measures. I do not think it is either prudent or desirable to attempt an embargo.

"It does not help the situation, but I venture to express the hope that the Congress will make provision to carry on the work of the Fact-Finding Coal Commission so that the very unfortunate state of affairs so often reported this winter will never be possible again in the United States."

MEETING ON LAKE TRAFFIC.—A meeting of the Lake Committee of the West Virginia Coal Association was held at the Washington Hotel, Washington, D. C., March 2 for the purpose of considering Lake traffic for the coming season. No action was taken at this meeting but it was arranged to hold a further meeting subject to the call of Mr. Hartwell of the Northwest Dock Operators' Association.

Prof. H. H. Stoek Falls Dead

Harry Harkness Stoek, professor of mining engineering in the University of Illinois, Urbana, Ill., and a former leader in coal mining circles in Pennsylvania, fell dead March 1 in an automobile painting shop in Champaign, Ill.

Professor Stoek had been professor of mining engineering and head of that department in the University of Illinois since 1908 and previous to that date had occupied a prominent place in Pennsylvania coal-mining circles. After being graduated from Lehigh University in 1887 and taking the degree of mining engineer there in 1888, he was for about two years assistant engineer of the Susquehanna Coal Co. at Wilkes-Barre. Then he returned to Lehigh, where for three years he was an instructor in mining, metallurgy and geology.



PROF. H. H. STOEK

From 1893 to 1897 he was assistant professor of mining engineering at Pennsylvania State College and from 1897 to 1909 was editor of *Mines and Minerals*, published in Scranton. In the latter field especially he occupied a prominent place not only in the coal-mining industry of Pennsylvania but throughout the United States. Professor Stoek had served as secretary of the Illinois Mine Rescue Commission, was a member of the Illinois Mining Investigation Commission and was a prominent leader in mine-rescue work. He was a member of the American Institute of Mining Engineers, an ex-president of the Coal Mining Institute of America, and was a member of the Institute of Mining Engineers of Great Britain, the Lake Superior Mining Engineers, the Illinois Mining Institute, the West Virginia Mining Institute and the Western Society of Engineers.

He published several volumes on coal mining, among these being "The Anthracite Coal Field," "The Economic History of Anthracite," "Subsidence in Mining," "The Education of Mine Employees" and "The Storage of Coal." He was particularly interested recently in the problems of the storing of coal and had just been appointed by the American Engineering Council to serve on a committee of engineers to make a detailed study of storage for commercial and industrial purposes. Professor Stoek was a widower at the time of his death. His wife was Miss Miriam Ricketts, of Wilkes-Barre, Pa., to whom he was married Dec. 20, 1894. He is survived by one daughter, Miss Leigh Stoek, Urbana, Ill. He was just past fifty-seven years of age and was born in Washington, D. C., Jan. 16, 1866.

Blames Hugh Willis for Herrin Murders

The second Herrin massacre trial is well on its way. Last week attorneys both for the defence and prosecution made their opening statements and examination of witnesses began. Five men, including Hugh Willis, state board member for the United Mine Workers, are on trial charged with the murder of one of the armed guards at the Lester strip mine near Herrin, Ill., last June when a mob accepted the surrender of 48 non-union men and slaughtered 22 of them.

C. W. Middlekauf, attorney for the state, in his opening speech blamed Hugh Willis for inciting the mob to murder the captives. Angus Kerr, head of the union's defence, declared "the prayer of the meek and lowly is that this jury shall decide the day has gone by when great corporations in their greed for profits can use gunmen in an effort to set up an industrial autocracy." Kerr, in a statement following the acquittal of the union defendants in the first trial, declared that acquittal to be just such a decision as he now seeks.

Kerr, who moved to Williamson County last autumn at the beginning of the Herrin trial, has just been appointed City Judge of Benton. The appointment is traced by political observers back through the hands of a Williamson County political boss who has been loyal to Governor Small.

Charges Bad Faith in Union Statements To U. S. Coal Commission

Walter Gordon Merritt, counsel for the General Policies Committee of anthracite operators, filed March 1 with the U. S. Coal Commission a protest against recent communications from the United Mine Workers of America, asserting that these statements are prepared not for the information of the commission "but for the purpose of disseminating sham and misleading arguments and conclusions through the medium of the newspapers."

Mr. Merritt's communication to the commission is as follows:

"Two statements from the United Mine Workers of America to the commission with reference to wages, prices, profits and production costs in the anthracite industry have come to my attention through the newspapers. We regret that these statements are not calculated to promote a fair understanding and a square deal between the parties involved or between them and the public. The circumstances show that they are prepared not for the use or information of the commission but for the purpose of disseminating sham and misleading arguments and conclusions through the medium of the newspapers.

"As you are aware, the producers of anthracite, in cooperation with the commission, are now preparing accurate data with respect to wages, cost of production, prices, profits, etc. This data will be the most complete and comprehensive ever collected on the subject and will include details as well as conclusions. The Policies Committee of the anthracite industry is pledged to a full disclosure of these facts and, so far as we know, none are being withheld. In due course this information will be compiled, examined and weighed by the commission and, we hope, made public. Statements on these matters before the data are available are obviously so unworthy of serious consideration that they cannot be inspired by a spirit of helpfulness.

"The real motive behind this propaganda is shown by the constant assertion in these statements that the operators are paying inadequate wages to maintain inordinate profits. The conclusive answer to this claim is the repeated willingness of the operators to arbitrate and the open insistence of the miners' union that there shall be no more arbitration. If the facts were as represented in this propaganda, the miners would willingly rely upon reason rather than force to sustain their claims and instead of inflicting privations on our people through anthracite strikes and coal shortages, would entrust their case to the peaceful adjustment of a fair and disinterested agency. The most antisocial practice in the anthracite industry today is the willingness to paralize the industry and injure the public by general strikes and intermittent outlaw strikes, when machinery for conciliation and arbitration exists. If the miners must issue statements, they should tell the public what they propose to do about this abuse instead of discussing costs and profits, concerning which they do not possess the facts.

"For these reasons we respectfully but earnestly protest against the irresponsible procedure now being followed by the miners' organization, while at the same time expressing our confidence that the commission will place no dependence upon this reckless propaganda. If the time has come when all statements of parties before the commission must be sent piecemeal to the press, the commission can at least rest assured that the operators' statement will be based on a careful conformity to investigated facts."

Secretary Davis Says Coal Radio Release While Commission Sat Was Coincidence

James J. Davis, Secretary of Labor, has written a reply to the remarks of Alfred M. Ogle, president of the National Coal Association, printed in *Coal Age*, Feb. 8, wherein Mr. Ogle characterized a radio release by the department as "a most unjustifiable and indefensible attack on the entire coal industry." Secretary Davis' letter, dated March 3, is as follows:

"Referring to your recent observations on the problems of the Coal Industry as copied in the *Coal Review* from *Coal Age*, I note that you very properly call attention to the general tendency of the press and public to misinterpret the preliminary report of the Coal Commission for want of more careful study and necessary knowledge to a correct interpretation.

"Later in the same interview you call attention to a recent radio release of the Department of Labor, and as your interpretation of same indicates a lack of familiarity with the functions and activities of this branch of the federal government, permit me to briefly outline same.

"The following constitute the activities of the Department of Labor: Bureau of Labor Statistics, Bureau of Naturalization, Bureau of Immigration, Children's Bureau, Women's Bureau, Housing Bureau, Division of Conciliation, Employment Service. Each of these bureaus and divisions are continuous in their activities and investigations, and are required by law to give the public the benefit of their findings as soon as possible.

"The survey release made by the Children's Bureau about which you complain as 'a most unjustifiable and indefensible attack on the entire coal industry, in addition that the said release can be regarded only as a serious courtesy to the President's Coal Commission,' was begun in 1921 and continued during the year 1922, before, during and after the great coal strike, and therefore began long before there was any coal commission considered.

"The broadcasting of a summary of the findings of the Children's Bureau was according to the regular schedule of publicity, and it was a mere coincidence that it was concurrent with the sittings of the Coal Commission.

"The purpose of all investigations of this department is to ascertain the *truth* about conditions affecting the welfare of all labor. That this survey began a year or more before the Coal Commission convened, and that it happened to be in relation to child welfare in the coal-mining camps, was another coincidence without the least intention or knowledge that a concurrent general investigation of the problems of the coal industry would be functioning before the survey was finished.

"I said that we want only the truth, and if we can be shown that said survey is in any way a perversion of the truth, let me assure you that a prompt correction will be forthcoming, and if it can be shown that any or all the investigators lent themselves to prejudice the truth about any condition found, the correction will be accompanied with such discipline that will prevent any immediate repetition in the further making of similar surveys.

"Therefore, Mr. Ogle, you will contribute something in the way of real constructive criticism if you will be good enough to furnish me with detailed proof of any errors made in this survey, with the assurance that they will be promptly checked by this department. I would prefer to have the checking done jointly by representatives of your National Coal Association and this department.

"It may further interest you to know that a complete copy of said survey has been filed with the Coal Commission.

"May I also suggest that the survey was believed to be the truth and if it (the survey) proves to be the truth, the publication or broadcasting of same as required by law could hardly be construed as an attack on the coal industry or an act of discourtesy to the Coal Commission, but rather as an aid to the further education of the public showing some of the contributing causes of unrest in some mining districts, that show the necessity for the thorough study now being conducted by the President's Coal Commission.

"May I also say that the Coal Commission is a temporary but concentrated effort to develop the facts of the industry to meet an emergency, while the Department of Labor, through its various activities, is a permanent institution to gather, tabulate and correlate these facts from time to time for the public information, which of course includes Congress, commissions, federal departments, employers and labor generally.

"The Department of Labor is not a perfect institution, and there is room for much improvement, therefore constructive criticism is always welcomed, as the only desire we have is to turn the light on various industries in a helpful way, so that the causes of discontent may gradually be removed and the friendly relationship of employer and employee be insured by such removal."

Says Miners Would Take 20 per Cent Cut in Wages if Assigned Cars Were Abolished

Arguments in the assigned-car case were concluded on Friday, March 2, before the Interstate Commerce Commission. Attorney Ballard, for the National Coal Association; Attorney Ropriquet, representing Illinois operators; Attorney Boyle, the Southern Ohio Coal Exchange, and Attorney Liveright, of the central Pennsylvania operators, all argued against the assigned car. Attorney J. J. Kintner, of Lock Haven, Pa., appeared on behalf of District No. 2 of the United Mine Workers of America in opposition to the assigned car in all of its phases. Mr. Kintner stated that if it were not for the assigned car there would be a big reduction in the production cost of coal and also a big reduction in miners' wages. When asked by Commissioner Potter how much reduction in wages would result, in his opinion, from the abolition of the assigned car, he stated that he believed that the miners could take a 20 per cent reduction if the assigned-car practice were discontinued.

Mr. Kintner said that the railroads in the district for which he was speaking have used the assigned and private car to discriminate against union labor. He made public a letter dated Feb. 10 to Dr. Edward T. Devine, of the U. S. Coal Commission, from John Brophy, president, District No. 2, United Mine Workers of America, in which the assigned-car evil is brought to the attention of the coal commission with a request that the practice be abolished.

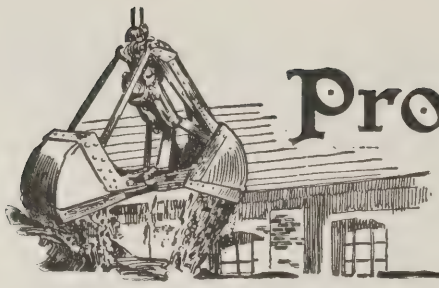
Attorneys Gutheim and Bronson appeared on behalf of the railroads and James Carmalt on behalf of the owners of private coal cars. Messrs. Gutheim and Bronson's argument was to the effect that the railroads could not get their coal in an orderly manner without the use of assigned cars. Attorney Carmalt took the position that privately-owned coals cars augment the general supply and he did not claim for them any preferential or special service.

Senate Gets Report on Anthracite Impurities; Walsh Presents Coal Inspection Bill

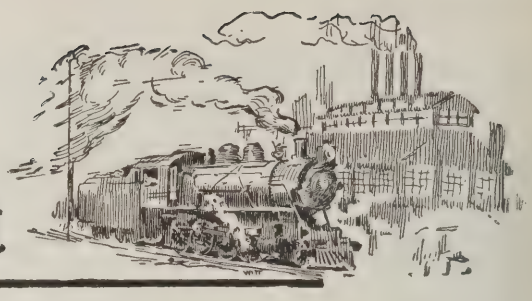
The U. S. Bureau of Mines transmitted to the Senate March 2 a report in response to a resolution adopted by that body calling for information relative to the extent of misbranding and impurities found upon investigation to be contained in anthracite being marketed. The bureau states that although its studies show that much high-ash coal is shipped and that many letters have been received from the anthracite-using districts complaining of the quality of coal, it "has made no special investigation that would enable it to say what proportion of such coal carries an unreasonable amount of ash."

The report adds that there are no generally accepted standards for comparison; that the determination and maintenance of grades for coal depends upon extensive sampling and analysis, and a suitable inspection system and competent force. The bureau expresses the opinion that the recommendation by the Secretary of the Interior in 1919 proposing the establishment of a coal-inspection system "would best meet with the needs of the case."

Senator Walsh, author of the resolution, introduced a bill in the Senate March 2 along the lines suggested by the Bureau as above stated. The measure was referred to the Committee on Mines of the Senate.



Production and the Market



Weekly Review

After the slump in the holiday week production of bituminous coal recovered last week and reached the 11,000,000-ton mark. Prices, however, continue their downward trend, *Coal Age* Index dropping nine points in the week to 279 on March 5, with the average spot price at $3.38. Consumption of soft coal has been at a high level for the past three months, the immediate result of the business revival and the domestic demand. The output of bituminous coal has been held in check by car shortage in the East and lack of demand west of the Mississippi.

That prices on the whole have been slumping for the past two months does not tell the whole story, for in the process of readjustment the market on high-grade low-volatiles in the East has been more resistant than on the lower grade steam coals or on the high-volatiles in the Midwest When all the accounts have been checked up for this winter it will be found that on the whole production has been in excess of consumption and that there has been a continuous if somewhat diminishing stream of soft coal going to storage, which fact accounts for the steady softening of the market.

It is quite evident that no satisfactory basis for contracting for the next coal year will be reached until well after April 1. Buyers are waiting to see how the railroads carry the load that general business is putting on them and how competition between the various fields cuts prices when the cold weather demand is out of the way.

Demand from Foreign Countries

The demand from foreign countries for American coal grew in strength early in the week, only to fall again following a sharp advance in steamer rates. For a few days quotations for Southern coals were slightly stronger, but they soon relaxed. Late last week it was reported that from six to twelve steamers had been chartered to carry coal from Hampton Roads or other Southern ports across the seas, most of the chartering being done in London.

There is plenty of coal throughout the Midwest. In Milwaukee the demand for anthracite or its substitutes remains strong. Dock supplies in that city are short. Increased industrial activity in the mountain states is absorbing a 60 per cent production at most of the Colorado and Utah mines.

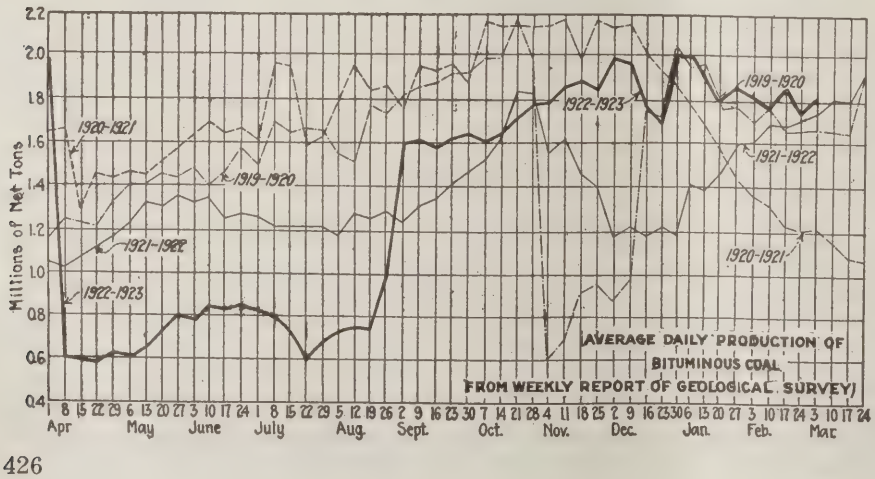
Operations in central Pennsylvania are suffering from poor car supply, embargoes on shipments into New England and dull market. Most operators are anxious for contract business. The majority of contracts closed have been renewals. Buyers continue to hold off, believing they will do as well in the open market as by signing up at the current quotations.

New England Situation Quiet

Market conditions in New England are quiet. Consumers, especially large users, are marking time. Both all-rail and by water there is ample coal offering, and there is every indication the supply will exceed the demand during this month and April.

"Present estimates of soft-coal production in the week ended Feb. 24 indicate a total output of 10,332,000 net tons, including coal shipped, mine fuel, local sales and coal coked," says the weekly report of the Geological Survey. "This is 100,000 tons less than the revised estimate for the week preceding, but the daily rate of output, considering the observance of the holiday in some districts, was essentially unchanged.

"That the downward trend in production is checked is further indicated by preliminary reports of cars loaded during last week (Feb. 26-March 3). These show 42,732 cars loaded on Monday, 32,984 on Tuesday, 31,150 on Wednesday, and 28,398 on Thursday, the total for the four days being 7 per cent greater than for the



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Feb. 10	10,309,000	10,725,000
Feb. 17 (*b*)	10,285,000	10,431,000
Feb. 24 (*a*)	10,402,000	10,332,000
Daily average	1,734,000	1,736,000
Coal year to date	380,351,000	366,878,000
Daily average coal year	1,373,000	1,322,000
ANTHRACITE		
Feb. 10	1,822,000	2,023,000
Feb. 17	1,703,000	1,828,000
Feb. 24	1,701,000	1,838,000
Coal year to date	79,823,000	46,213,000
COKE		
Feb. 17 (*b*)	135,000	378,000
Feb. 24 (*a*)	157,000	370,000
Calendar year	997,000	2,758,000

a) Subject to revision. (*b*) Revised from last report..

corresponding part of last week. The indicated total output for the week therefore is about 11,000,000 tons."

Moderating weather conditions have affected the anthracite situation. While there is a continued demand for the domestic sizes it is believed the crisis has been passed. Repeating their requests of a few weeks ago and later asking that the orders be reinstated dealers from many faraway points have cancelled orders for the domestic coals.

Coke production decreased during the week ended Feb. 24 for the first time in many weeks. The total output estimated by the Geological Survey from reports of cars loaded by the principal coke carriers and in part on reports of producers was 370,000 net tons, as compared with 378,000 net tons in the week preceding.

Midwestern Market Quiet

Nothing happened during the past week to liven up the Central Western market to be viewed from Chicago. Soft weather kept domestic demand quiet. This, however, was not sufficient to decrease the general supply enough to hoist the price of steam sizes. Nobody demanded coal of any sort. Big steam buyers laid back on their contracts so that little spot coal was traded to the advantage of the operator. A good deal, on the other hand, got into difficulty and had to be dumped at weak prices.

Franklin County operators, best fortified with contracts, were able to maintain circular prices pretty well on big lump while weaker grades of coal from surrounding properties were undercutting them 50@75c.

Central Illinois, with all too good car supply, could not maintain its $3.50 price on 6-in. lump. Some of the country trade took a thin stream at that price but more of it sold for $3.25. Screenings from that field went down to $1.25 along with the fine sizes from the Standard district east of St. Louis, where cars were just as numerous. Several central Illinois mines have already shut down, along with about 25 per cent of Indiana mines, for lack of market.

Illinois and Indiana coals continue to have all the business there is in the Midwest because of the continued transportation jams at the Cincinnati and Toledo gateways.

Dropping off of railroad tonnage in all Illinois fields helped in the general sogginess. Car supply ran little better than two days a week in any of the southern or southwestern Illinois fields. Cheaper coals sold through the St. Louis market with less pushing than superior grades, just

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

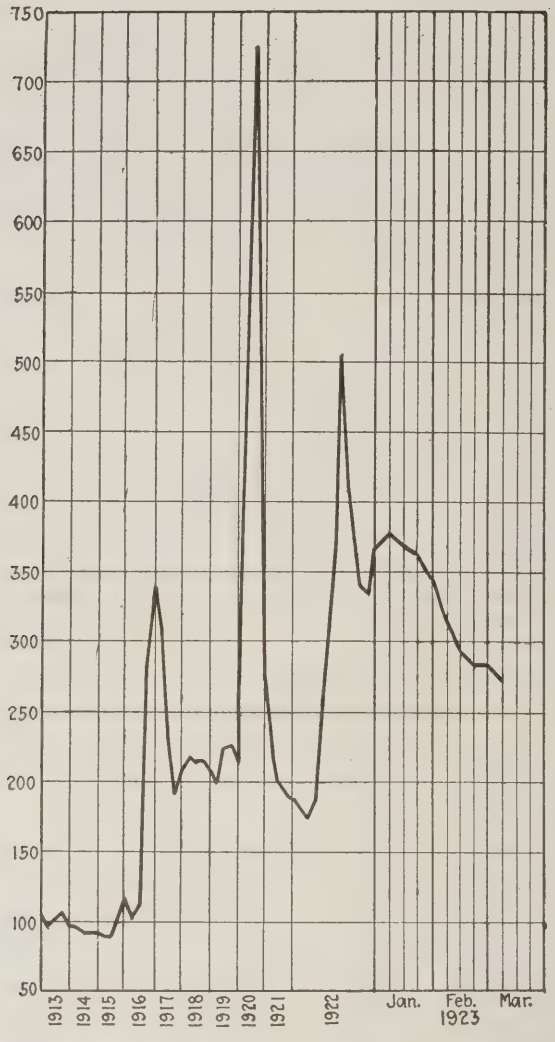
	Market Quoted	Mar. 6 1922	Feb. 19 1923	Feb. 26 1923	Mar. 5 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.20	$7.00	$7.00	$6.50@$7.50
Smokeless mine run	Columbus	1.85	4.35	4.50	4.25@ 4.75
Smokeless screenings	Columbus	1.35	4.35	4.45	4.25@ 4.65
Smokeless lump	Chicago	3.15	7.00	7.00	6.75@ 7.25
Smokeless mine run	Chicago	2.00	4.75	4.50	4.00@ 5.00
Smokeless lump	Cincinnati	3.15	7.25	7.50	*7.00*
Smokeless mine run	Cincinnati	1.75	4.75	4.75	4.50@ 5.00
Smokeless screenings	Cincinnati	1.15	5.00	4.10	**4.50@ 5.00**
*Smokeless mine run	Boston	4.65	6.70	6.20	*6.00@ 6.35*
Clearfield mine run	Boston	1.95	3.85	3.75	*3.25@ 3.75*
Cambria mine run	Boston	2.45	4.50	4.35	*3.75@ 4.50*
Somerset mine run	Boston	1.90	4.10	4.00	*3.50@ 4.00*
Pool 1 (Navy Standard)	New York	3.00	4.80	4.75	4.50@ 5.00
Pool 1 (Navy Standard)	Philadelphia	3.05	4.80	4.70	*4.45@ 4.85*
Pool 1 (Navy Standard)	Baltimore	2.70	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.50	4.00	3.85	3.50@ 4.25
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	4.35	4.25	*3.60@ 4.00*
Pool 9 (Super. Low Vol.)	Baltimore	2.30	3.60	3.50	**3.75@ 4.25**
Pool 10 (H.Gr.Low Vol.)	New York	2.10	3.70	3.50	*3.00@ 3.75*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	3.70	3.60	*3.40@ 3.50*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.15	3.25	3.25	*3.00*
Pool 11 (Low Vol.)	New York	1.75	2.90	2.90	*1.90@ 3.00*
Pool 11 (Low Vol.)	Philadelphia	1.75	3.15	3.05	*2.75@ 3.10*
Pool 11 (Low Vol.)	Baltimore	1.95	2.65	2.60	*2.25*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.60	2.60	2.25	**2.00@ 2.60**
Pool 54-64 (Gas and St.)	Philadelphia	1.50	2.75	2.45	.....
Pool 54-64 (Gas and St.)	Baltimore	1.55	2.45	2.65	*2.25*
Pittsburgh sc'd gas	Pittsburgh	2.70	4.10	4.10	4.00@ 4.25
Pittsburgh mine run (St.)	Pittsburgh	2.15	2.75	2.75	2.75
Pittsburgh slack (Gas)	Pittsburgh	1.65	2.85	2.80	**2.75@ 3.00**
Kanawha lump	Columbus	2.50	4.30	4.50	4.00@ 5.00
Kanawha mine run	Columbus	1.60	2.60	2.85	2.75@ 3.00
Kanawha screenings	Columbus	1.30	2.35	2.45	2.35@ 2.65
W. Va. lump	Cincinnati	2.25	4.25	4.75	*3.75@ 4.25*
W. Va. Gas mine run	Cincinnati	2.00	3.35	2.75	2.50@ 3.00
W. Va. Steam mine run	Cincinnati	1.35	3.35	2.50	**2.50@ 3.00**
W. Va. screenings	Cincinnati	1.30	2.35	2.35	2.25@ 2.50
Hocking lump	Columbus	2.65	4.25	4.30	*3.85@ 4.50*
Hocking mine run	Columbus	1.90	2.50	2.60	2.50@ 2.75
Hocking screenings	Columbus	1.45	2.10	2.10	**2.00@ 2.35**
Pitts. No. 8 lump	Cleveland	3.10	4.25	4.35	*3.65@ 4.50*
Pitts. No. 8 mine run	Cleve'and	$2.00	$3.20	$3.85	*2.90@$3.15*
Pitts. No. 8 screenings	Cleveland	1.80	3.10	2.90	2.85@ 3.00
Midwest					
Franklin, Ill. lump	Chicago	3.25	4.60	4.60	4.50@ 4.75
Franklin, Ill. mine run	Chicago	2.50	3.35	3.35	3.25@ 3.50
Franklin, Ill. screenings	Chicago	2.00	2.55	2.35	2.25@ 2.50
Central, Ill. lump	Chicago	3.00	3.35	3.35	3.25@ 3.50
Central, Ill. mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.75	1.60	1.60	*1.25@ 1.35*
Ind. 4th Vein lump	Chicago	3.25	4.35	4.35	4.25@ 4.50
Ind. 4th Vein mine run	Chicago	2.50	3.10	3.10	3.00@ 3.25
Ind. 4th Vein screenings	Chicago	2.15	2.10	2.10	2.00@ 2.25
Ind. 5th Vein lump	Chicago	2.80	3.60	3.60	3.50@ 3.75
Ind. 5th Vein mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Ind. 5th Vein screenings	Chicago	1.65	1.80	1.80	1.75@ 1.85
Standard lump	St. Louis	2.60	3.10	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.95	2.25	2.25	2.25
Standard screenings	St. Louis	1.10	1.45	1.45	*1.30@ 1.40*
West Ky. lump	Louisville	2.45	3.35	3.35	3.25@ 3.50
West Ky. mine run	Louisville	1.85	2.05	2.20	*1.90@ 2.25*
West Ky. screenings	Louisville	1.80	1.85	1.85	*1.70@ 2.00*
West Ky. lump	Chicago	.....	3.60	3.60	3.50@ 3.75
West Ky. mine run	Chicago	.....	1.95	1.95	*1.75@ 1.85*
South and Southwest					
Big Seam lump	Birmingham	2.60	.....	.....	.....
Big Seam mine run	Birmingham	1.85	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	4.60	4.60	4.50@ 4.75
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.45	4.75	5.00	4.50@ 5.50
S. E. Ky. mine run	Louisville	1.55	2.60	2.60	2.25@ 3.00
S. E. Ky. screenings	Louisville	1.30	2.35	2.20	2.00@ 2.40
S. E. Ky. lump	Cincinnati	2.25	4.00	4.75	*3.50@ 4.00*
S. E. Ky. mine run	Cincinnati	1.40	2.60	2.35	**2.25@ 2.75**
S. E. Ky. screenings	Cincinnati	1.20	3.35	2.10	**2.00@ 2.35**
Kansas lump	Kansas City	5.00	5.00	5.00	5.00
Kansas mine run	Kansas City	4.00	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.50	2.50	**2.50@ 2.75**

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	Feb. 26. 1923 Independent	Feb. 26. 1923 Company	March 3, 1923† Independent	March 3, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35 @8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.50@ 5.25	4.00@ 4.10	*4.50@ 5.00*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	4.00@ 5.00	4.00	4.00@ 5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 3.00	2.75@ 3.00	**2.50@ 3.00**	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.40@ 2.00	2.00	1.40@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 279, Week of March 5, 1923. Average spot price for same period, $3.38. This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the U. S. weighted in accordance first with respect to the proportions each of slack, prepared tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

as they have been selling for two or three weeks. The Standard district may not be making much money but it is getting most of the available business with 6-in. lump moving at $3@$3.25, steam egg and nut at $2@$2.25 and screenings at $1.30@$1.40. On that market a small volume of Mt. Olive lump has been selling at $4 around the city and $4.50 to the country. Mt. Olive screenings bring $1.75. But buying of every sort of coal is in small quantities. St. Louis is getting a little hard coal for the first time in several weeks and Arkansas semi-anthracite is again coming in.

Kentucky Is Not Discouraged

Western Kentucky operators are getting enough business to absorb most of their output, even though it takes some lively pushing. Dealers and most large consumers with small stocks still on hand are using up those supplies steadily now and are buying cautiously. But railroads, with a heavy volume of freight to move, are buying with some freedom. This is largely contract business, however.

The outstanding feature of the present situation in Kentucky is that it is much better than last year. There are no big stocks in retailers' hands to interfere with present or spring business. Industrial consumption generally is much better in all sections than it was last spring. Prices of coal are much better than those of last spring and there are no labor, railroad or other serious troubles in prospect.

Milwaukee jobbers are worried so by the traffic jams at Eastern gateways that they are now beginning to cancel bituminous orders which they had made for inland customers. Six weeks' deliveries are about the best that is promised them. The recent reduction of 75c. on Illinois domestic coal has not yet been reflected in Milwaukee because so much coal from that state's fields which was bought at the old prices is still on hand.

Around the Head-of-the-Lakes nobody is worrying much. Anthracite stocks on the docks are swept out almost to the last ton. Not since 1902 has such a clean-up been observed. But there is just enough coal in the bins of consumers and just enough of briquets, coke and other substitutes available to prevent complaint.

Estimated stocks of soft coal on the Superior docks Feb. 1 totaled 1,175,000 tons, which was low. Shipments off the docks have been steady, especially during February, which was 40 per cent better than January, but slow since then and weak prices are still the rule.

West Does Some Business

In the mountain states of the West, coal trade is not so dull in spite of the return of soft weather. A general pick-up in industrial activity is absorbing a 60 per cent production at most of the Colorado and Utah mines and prices have remained fairly level. For once there is a place for the lignite slack of northern Colorado and the steam sizes of most other Colorado, Wyoming and Utah coals find ready acceptance.

In and around Kansas City, however, the market is quiet as a Midwestern village on a hot Sunday afternoon. Industrial demand is fair but warm weather has killed the domestic call and such surpluses of prepared sizes of Kansas and Oklahoma coals are piling up that the old, old question "what to do?" faces almost every operator. The list prices on domestic sizes have not been changed but undercuts, of course, are being made.

Ohio Fields Show Greater Strength

More strength is showing in all Ohio fields due to curtailed output rather than to consumption. Buying on the part of both dealers and steam users in and about Columbus is general although orders are generally small. Dealers are not anxious to buy heavily, because of the lateness of the season and also because of the possibility of reduced prices on prepared sizes. Heavy reductions in lump and egg coals are looked for during this month.

General manufacturing concerns are using up reserves accumulated some time ago and are now buying from hand to mouth. Contracting is reported on a small scale; it is not expected to be active until after April 1. Embargoes are holding up shipments. Empties are slow in being returned and mines as a rule are operating but a day or two each week. The Hocking Valley is producing about 20 per cent and the same figures are reported from other fields.

Production in the eastern Ohio mines was cut into during the week ended Feb. 24 by the holiday and inadequate car supply. The output was 253,000 tons, the lowest of any week since the strike.

Operators in West Virginia are beginning to look forward to the opening of the Lake season as affording additional outlets for their product. Few if any mines along the Chesapeake & Ohio R.R. are getting more than a day and half's car supply per week. Mines along the Norfolk & Western are producing at the rate of about 35 per cent of capacity.

Car supply in Virginia shows a slight improvement, while the mines in northeastern Kentucky are still limited in output owing to poor car supply.

The Pittsburgh market remains steady, rather because of poor car supply than demand. Consumption has increased in the steel industry as mill operations have been increasing steadily for two months. Demand for domestic lump increased somewhat because of the cold snap.

Car supply along the Pennsylvania R.R. in central Pennsylvania is declared by operators to be worse now than at any time during the winter. Many operators have closed down rather than do business on the present basis. Conditions at the mines reached by the New York Central and B. R. & P. railroads are somewhat better.

There is some activity in the contract market at Buffalo. Figures proposed now are $2.75@$3 for Allegheny Valley mine-run, the lower figure appearing most often. The market is quiet and no immediate recovery is looked for.

New England Bituminous Market

The bituminous market in New England territory is extremely quiet. Large consumers have comfortable reserves and with respect to future supply are simply marking time. Both all-rail and by water there is ample coal offering, and there is every indication the supply will exceed the demand during March and April.

All-rail there are still embargoes in effect that curtail deliveries here from several districts, but there is clearly enough coal moving to take care of current light requirements. Pressure to get steam coal for domestic use has eased off very materially, and with the approach of mild weather this sort of demand will cease almost entirely.

Operators of central Pennsylvania are striving not only to sell spot coal for March but also are making a thorough canvass for contract tonnage to see them through the summer and autumn. Buying in New England will be slow starting, and so much depends upon the Hampton Roads situation that it will be several weeks, if not months, before the Pennsylvania grades settle down into a season basis as to price. Contracts are being offered all the way from $2.50 to $4, depending upon grade, but consumers are counting upon either a marked reduction among all-rail coals or purchases from Hampton Roads, where prices have already dropped to last autumn's level.

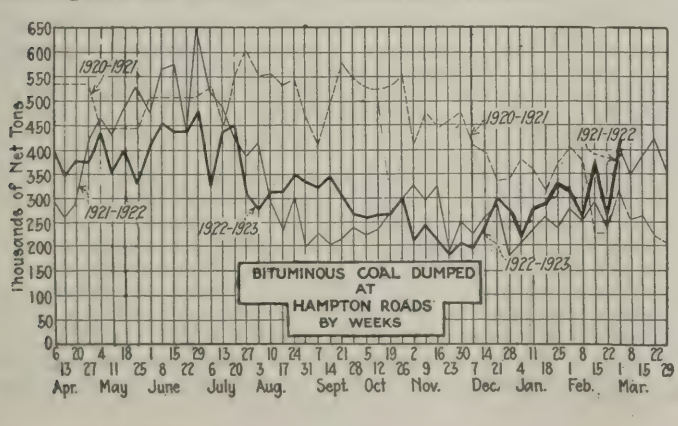
Accumulations continue at Hampton Roads with only mild demand even for Navy standard grades. The best fuel at $6.25 is an easy purchase, and the less favorably known coals can be had at $6, in each case per gross ton f.o.b. vessel. Tonnage is moving in measurably good volume on contract business coast wise, but offshore and along the line and to the west the amount of coal absorbed is relatively light. For distribution inland from Providence, Boston and Portland there is only scattering inquiry. Prices range upward from $9.25 per gross ton on cars, but the market generally is spotty and quotations fluctuate.

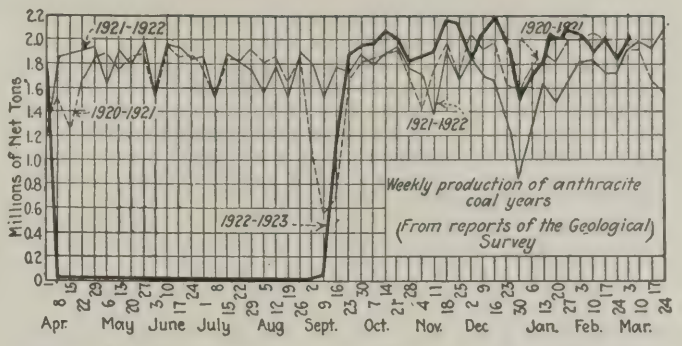
Ice conditions in Long Island and Vineyard sounds have seriously interfered with boats and for nearly a week the Cape Cod Canal was blocked with ice in Buzzards Bay. Higher temperatures already are having their effect and no further trouble is expected. With boats moving freely there will be ample coal for all purposes.

New York Shippers Look to Lake Opening

Water shipments from the New York terminals to New England increased somewhat but heavy ice in the harbors interrupted the unloading of the vessels. Local shippers look for a much brisker market following the opening of the Lake season. There were 2,108 cars at the New York terminals on March 2, as compared with 2,841 cars on Feb 23.

Consumers in Philadelphia appeared to be less interested in the soft-coal market than during the previous week. Producers of high-grade Pennsylvania coals on the other hand, assert that they are hard put to fill all the orders they have in hand, and insist that the so-alled market prices do not accurately represent the situation. Shippers say that car supply is inadequate and that they could find a market for a great deal more coal if cars were available.





Demand at Baltimore is poor. There was more than 100 per cent increase in the amount of coal exported from Baltimore during February over that shipped during the previous month, the tonnage during February amounting to 10,424 tons including 1,212 tons in bunkers, as compared with 4,379 tons in January, including 260 tons in bunkers.

Anthracite

The anthracite market is much easier. New York State Fuel Administrators believe the crisis has passed and that only unusual conditions will again create a shortage. The purchase of substitutes has almost fallen into the discard, neither dealers or consumers taking any unless absolutely necessary. Dealers in Philadelphia are endeavoring to create reserve stocks notwithstanding the nearness of April 1.

The hard-coal situation at Baltimore is easier.

The production of anthracite in the week ended Feb. 24 was practically the same as in the week before and is estimated at 1,838,000 net tons, including coal shipped, mine fuel, local sales, and dredge and washery output, says the Geological Survey. Production was at a low rate on Washington's birthday and Saturday. Early returns on car loadings during the first four days of the week Feb. 26-March 3 indicate production at the rate of 2,100,000 tons for the week.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Feb. 17, 1923 Inclusive	Week Ended Feb. 17, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	29.4	25.6
Panhandle, W. Va.	51.3	57.3	55.9	59.0
Westmoreland	58.8	65.8	56.8	52.8
Virginia	59.9	55.7	52.7	49.5
Harlan	54.8	22.1	22.1	20.1
Hazard	58.4	16.4	19.3	14.4
Pocahontas	60.0	36.6	37.1	35.2
Tug River	63.7	28.8	33.0	30.3
Logan	61.1	26.2	30.7	28.0
Cumberland-Piedmont	50.6	31.7	44.2	40.8
Winding Gulf	64.3	30.4	32.3	27.8
Kenova-Thacker	54.3	42.4	38.6	38.0
N. E. Kentucky	47.7	28.4	27.9	(a)
New River	37.9	31.6	34.6	32.9
Oklahoma	59.6	59.1	51.3	42.6
Iowa	78.4	75.9	80.1	87.1
Ohio, Eastern	46.6	40.8	34.1	35.6
Missouri	66.8	76.3	76.2	75.1
Illinois	54.5	49.9	52.2	47.6
Kansas	54.9	55.9	51.7	49.9
Indiana	53.8	37.7	54.4	53.4
Pittsburgh†	39.8	41.2	64.5	61.3
Central Pennsylvania	50.2	53.4	42.8	41.1
Fairmont	44.0	35.5	36.2	29.4
Western Kentucky	37.7	32.4	34.0	32.9
Pittsburgh*	31.9	56.1	32.6	31.1
Kanawha	13.0	15.6	21.6	21.9
Ohio, Southern	24.3	38.1	35.6	29.3

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended Feb. 17, 1923	817,778	180,988
Previous week	853,289	190,860
Same week in 1922	773,275	188,783

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
Feb. 14, 1923	27,172	7,094	72,855	38,123
Feb. 7, 1923	28,628	7,438	70,522	37,626
Same date in 1922	278,481	70,523	.....	.....

Foreign Market And Export News

Foreign Demand for British Coal Still Strong; Slight Decrease in Production

The Welsh market continues steady. France is buying heavily while business with Italy is substantial. South America, India, coaling stations and Egypt have taken heavy tonnages recently. A feature of the market is the sustained Continental demand.

The market in the north of England remains very strong. The increasing scarcity of fuel in Germany, France and Belgium is indicated in the pressing demand from these countries.

Production in the British mines during the week ended Feb. 17 was officially reported at 5,560,000 tons, says a cable to *Coal Age*. This was 7,000 tons less than the previous week, and the smallest tonnage produced since the first week of the year, when it was 4,384,000 tons.

In an effort to relieve the dock congestion at Cardiff the coal tippers and trimmers have agreed to experiment with the three-shift system for three months. Before the war these men worked three shifts of eight hours each, but for the past five years they have only worked two shifts of eight hours. With the renewed demand for Welsh coal the docks have become greatly congested.

During the week ended Feb. 9 there was an increase of 72,172 tons to 618,034 tons in the British Channel exports. Exports from Cardiff and Newport, in tons, were:

France	122,302
Italy	97,074
South America	58,531
Spain	29,298
Portugal	13,005
United States of America	37,687
Canada	3,518
British coal depots	87,072
Other destinations	54,526
Total	503,013

Business Brisk at Hampton Roads

Business has been brisk at Hampton Roads. The market stiffening in consequence, and increased coastwise movements gave promise of better conditions in the trade. A generally stronger tone was the feature of last week's market.

The strengthening of prices was regarded by shippers as only temporary. The belief was general that prices are due for a still further slump, and that the consequence will be ability of American shippers to get back into export business which has been neglible at Hampton Roads.

General shipping showed improvement, bringing activity to the bunker trade. All piers operated at full force, with stocks somewhat cut down but with movement from the mines improving.

Raise Wages in French Mines

At a conference held at Douai between the mine owners of the Nord and Pas-de-Calais and the delegates of the Federation Nationale des Travailleurs du Sous-sol, the non-communist miners' organization, whose members had remained at work, it was agreed that the wages of adult workers should be raised, as follows: Two fr. per shift as from Feb. 1, retroactively, and 1 fr. 25, as from Feb. 15. The wages of boys and girls are to be proportionately increased.

The increases restores the wages in the Nord and Pas-de-Calais to the scale in force in December, 1921.

To the delegates of the same faction of miners in the Loire coal fields the mine owners have offered an increase of 3 fr. per shift, which was the decrease in wages put into effect in August, 1921.

French Miners Formulate Demands

The Federation Unitaire des Travailleurs du Sous-sol, the communist organization of French miners, early in February formulated the following demands, applicable to all French coal fields.

"Return of wages to their maximum level since the armistice plus 1 fr. 50 per shift for underground and 2 fr. 50 for surface workers.

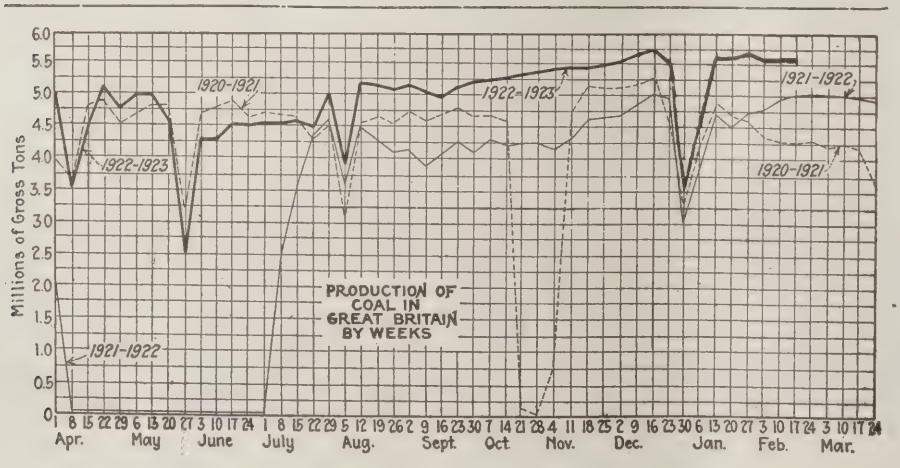
"Incorporation in wage rates of the indemnity for high living costs.

"Creation of workmen's committees.

"Suppression of tax deductions from wages."

Strikes and the lack of coal as a result of the interruption of shipments from the Ruhr have caused a scarcity of French industrial coals and the government has given instructions that the railway requirements must be met first and then the ordinary industrial wants.

Between Jan. 19 and the middle of February, France received practically no fuel shipments from Germany, although it was expected they would be resumed shortly.



Italian Coal Imports in 1922

Coal imported into Italy during 1921-22 for the Italian State Railways and the Ministry of Finance totaled 3,731,-604 tons, against 1,557,280 tons during the year 1913-14. The coal used during the past year on the Italian state railways totaled 184,955 tons, and in the Italian navy 184,955 tons. British fuel shipped to Italy amounted to 550,332 tons; American, 182,306; while German coal imported on reparation account totaled 2,792,761 tons.

Export Clearances, Week Ended Feb. 24. From Hampton Roads

FROM HAMPTON ROADS

For Cuba:	Tons
Amer. SS. Carozal, for San Juan	4,002
Nor. SS. Sangstad, for Havana	3,716

FROM PHILADELPHIA

For Cuba:	
Dan. SS. Sarmatia, for Havana	...
Nor. SS. Gaute, for Havana	...

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	Feb. 22	March 1
Cars on hand	1,287	962
Tons on hand	88,242	61,183
Tons dumped for week	88,096	151,121
Tonnage waiting	35,400	14,300
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,542	1,428
Tons on hand	89,370	82,830
Tons dumped for week	63,021	132,174
Tonnage waiting	9,226	30,282
C. & O. piers, Newport News		
Cars on hand	1,323	591
Tons on hand	72,835	70,055
Tons dumped for week	84,207	92,070
Tonnage waiting	6,110	5,253

Pier and Bunker Prices, Gross Tons

PIERS

	Feb. 24	March 3†
Pool 9, New York	$7.25@$7.50	$7.25@$7.50
Pool 10, New York	6.50@ 6.75	*6.25@ 6.75*
Pool 11, New York	5.50@ 6.00	*5.50@ 5.75*
Pool 9, Philadelphia	6.95@ 7.15	*6.90@ 7.10*
Pool 10, Philadelphia	6.35@ 6.65	*6.30@ 6.55*
Pool 11, Philadelphia	5.55@ 6.00	5.70@ 5.90
Pool 1, Hamp. Roads	6.25@ 6.50	6.40
Pools 5-6-7 Hamp. Rds.	6.25	*5.75*
Pool 2, Hamp. Roads	6.25@ 6.50	6.40

BUNKERS

Pool 9, New York	$7.50@$7.90	*$7.60@$7.85*
Pool 10, New York	6.80@ 7.25	*6.60@ 7.10*
Pool 11, New York	6.80@ 6.50	*5.85@ 6.10*
Pool 9, Philadelphia	7.15@ 7.50	*7.10@ 7.35*
Pool 10, Philadelphia	6.70@ 6.95	*6.65@ 6.75*
Pool 11, Philadelphia	5.90@ 6.35	*5.80@ 6.25*
Pool 1, Hamp. Roads	6.50	6.50
Pool 2, Hamp. Roads	6.50	*5.75*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	Feb. 24	March 3†
Admiralty, large	29s.@29s.6d.	**30s.@32s.**
Steam, smalls	22s.6d.	**23s.@23s.6d.**
Newcastle:		
Best steams	28s.6d.@30s.	**32s.6d.@34s.**
Best gas	29s.@30s.	**32s.6d.**
Best bunkers	28s.@32s.6d.	**32s.6d.@35s.**

† Advances over previous week shown in heavy type; declines in *italics*.

News Items From Field and Trade

ALABAMA

The Sartain-Boyer Coal Co., with headquarters in Jasper, has been incorporated with a capital stock of $150,000, of which $126,000 has been paid in. Incorporators are Charles M. Sartain, Mrs. E. F. Guy, F. M. Sartain, J. H. Boyer and Frank Boyer. The company will engage in coal mining in Walker County.

John Hays Hammond, chairman, and **Thomas R. Marshall** and **Clark Howell**, associate members of the U. S. Coal Commission, arrived in Birmingham for a visit of several days on March 7 and will make an investigation of the several phases of the industry in this district.

ARKANSAS

Sept. 10 has been set as the date for the **new trial of the suit of the Coronado Coal Co. against the United Mine Workers of America** in the United States District Court at Ft. Smith. The Supreme Court of Arkansas last summer reversed a verdict of $600,000 that was obtained by the coal company. The suit grew out of the destruction of property of the Coronada Coal Co., the Mammoth Vein Coal Co. and a group of other mines, known as the Bache Denman Coal Syndicate, in the summer of 1914, during the labor troubles in the Hartford Valley of Sebastian County.

CALIFORNIA

The educational committee of the Woman's Auxiliary of the American Institute of Mining and Metallurgical Engineers have announced **a free scholarship worth $500 a year** to commence next autumn. It is open to but one citizen desirous of studying for a degree in mining or metallurgy at a standard school of mines. Candidates may send their names to Mrs. Horace V. Winchell, 728 W. 28th Street, Los Angeles.

COLORADO

D. Harrington, supervising mining engineer of the U. S. Bureau of Mines, during the middle of February, spent several days at Dawson, New Mexico, investigating the recent explosion in the mines of the Phelps Dodge Corporation, which killed 122 men.

Wood & Weber, consulting engineers, of Denver, have been entrusted with the design of the **power plant and hoisting equipment for the mine of the Alamo Coal Co.**, near Walsenburg. A 1,250-kw. turbo generator has been purchased and will be installed in the summer, along with the necessary boilers and auxiliary equipment. A large electric slope hoist is yet to be bought.

ILLINOIS

Coal rights under 1,300 acres of land north of the Sangamon River, near Springfield, a part of the Carpenter estate, **have been sold to the Midland Counties Coal Co.**, allied with the Peabody interests. The coal rights brought the sum of $16,500. The Midland Counties Coal Co. was incorporated Dec. 15, 1913, with capital stock of $5,000. The incorporators were Arthur W. Underwood, Nathan E. Smyser and Charles R. Young. The company certified to an increase in its capital stock from $5,000 to $3,000,000 Dec. 17, 1913. The certificates were signed by Arthur Woodward as president and Frank M. Wright as secretary. The offices of the company at present are at 72 West Adams Street, Chicago.

The Southern Mining Co., of 214 North Vermillion Street, Danville, has been incorporated with a capital stock of $150,000. The incorporators are Walter L. Millner, Richard Y. Hoffman and Kenneth M. Fiske.

Mike Miller, 45 years old, was killed and five other miners were injured when they were caught under a fall of coal at the mine of the Franklin County Coal Co., at Benton, Ill. The men were working on the night shift and were placing props in the mine when the accident happened.

The Clover Leaf Coal Co., 1201 Public Square, Marion, has been incorporated with a capital of $150,000 by R. B. Mitchell, H. W. Ragel and Wm. H. Warder.

The Clyde Coal Co., Cicero, has increased its capital stock from $20,000 to $25,000.

Work will be started in the next few weeks on the **erection of a new five-track steel tipple** at Mine No. 1 of the Wasson Coal Co., at Harrisburg. The new tipple will be modern in every respect, will be equipped with the latest machinery known in the coal preparation business and will handle over 3,000 tons per day. The new tipple will replace their old four-track tipple and will be the most modern in the district. Machinery made by the Jeffrey Mfg. Co. will be installed in the new plant and work will be started not later than April 1.

The workings of mine No. 18 of the By-Products Coal Corporation at West Frankfort were damaged recently when a fire was discovered raging on the inside of mine. The portion of the mine in which the fire was discovered was immediately sealed off in an attempt to smother the flames. An estimate of the amount of loss from the fire has not been announced by the company.

The offices of the Franklin County Mining Co. at Benton suffered a recent loss by fire. The fire started from an overheated stove and only by prompt action on the part of the Benton fire department was the building saved.

INDIANA

Operators of coal mines at West Clinton, owned by the Jackson Hill Coal & Coke Co., assert that additional demands made by 800 miners on working conditions has resulted in the men quitting work and **tying up the operations of the three mines owned by the company**, which have a daily capacity of 5,000 tons. The officials said that about a month ago the miners in one of the plants made demands to be transported to work and that the time of working commence when the miners arrive at the bottom of the shaft. This dispute was settled but recently the workers made additional demands of a similar character and called out the workers of the other two mines in the grievance, officials of the coal company declare.

The Star Coal Co., Jasonville, has been chartered with a capital of $20,000. The directors are: W. C. Warrick, I. S. Ritchey, Monroe Beatty and Robert E. Mason.

The Mt. Pleasant Coal Co., Terre Haute, has increased its capital from $25,000 to $50,000.

Coal has been reached in the No. 5 vein at the shaft of the Deep Vein Coal Co. south of Princeton, at a depth of 420 ft. The vein is 8 ft. 9 in. thick and is a fine grade of coal. The company expects to open one of the largest and most modern mines in the state and has a block of leases of more than 5,000 acres. The new shaft is concreted to a depth of more than 60 ft. down to the solid rock. A steel tipple will be erected and when the mine reaches full production more than 1,000 men will be employed. Switches have been laid and during the summer these will be connected to an interurban electric line. The opening of the Deep Vein mine is **the first of several new mining operations** started in that vicinity. The coming summer will see a greatly increased coal output from the Gibson County mines. **The Francisco Coal Co.** now has two of its mines in operation and work of sinking the shaft for the third will start during the summer. **The General Fuel Co.** is proceeding steadily toward putting its new mines in operation. One is virtually completed and the shaft of the second is nearly finished. The company will sink a total of four mines.

Can a miner who is driven out of a community by United Mine Workers collect damages from the union? This is one of the questions involved in the suit of John W. Smith, of West Frankfort, Ill., against Local 1,005 of the union for $3,000 damages and for a permanent injunction to prevent that local from molesting him at work. The suit has been transferred in the federal court from Indianapolis to Evansville and will be heard by Judge A. B. Anderson some time in April.

IOWA

The Lanning Coal Co., Oskaloosa, has been incorporated with capital of $13,000. F. D. Lanning is the president and C. E. Lanning, secretary-treasurer.

KANSAS

A special dispensation by the present board of District 14, United Mine Workers of America, upon assuming office the first of this year, granting relief from a $15 fine imposed upon miners of the district who refused to walk out during the general strike last summer, has resulted in **1,300 of the 2,000 men liable to the fine returning to the union**, Harry Burr, district secretary and treasurer, has announced. Twenty new locals have been chartered in the district this year, according to Mr. Burr. The dispensation ended March 1.

Representatives of the operators and miners of Kansas will meet in Kansas City some time before March 9 **to establish a machine scale** for Kansas, where none now exists.

The Sheridan Coal Co. of Pittsburg, the largest company in the Southwest district not in the Southwestern Interstate Coal Operators' Association, **has just signed a contract on working rules with the United Mine Workers of America.** The Sheridan company withdrew from the organization during the general strike and operated some of its mines under a co-operative arrangement with some of its miners.

KENTUCKY

The Western Kentucky Coal Operators and representatives of the United Mine Workers of District 23 will meet in Louisville March 12 **to negotiate a new wage scale**, it has just been announced in Louisville. The present scale, which expires April 1, calls for a maximum of $6.95 a day for inside men; 74 to 76c. a ton for machine-mined coal and $1.05 for picked coal. Lonnie Jackson, district president of the mine workers, said he expected no trouble in reaching an agreement.

The Hazard Coal Operators' Association is **investigating the possibilities of using radio** receiving and sending sets at Cincinnati, Lexington, Louisville, Hazard and other points with a network of receiving sets through the field to aid the operators in keeping posted on what is going on. Telephone service between the fields and markets has been far from satisfactory. A committee composed of W. E. Davis, of Lexington; James Bonnyman, of Cincinnati, and Prentice Burkingham, of Cincinnati, was named at a meeting in Lexington on Feb. 16, to look into the matter.

Two five-track tipples are now in process of construction at the mines of the **Gibraltar Coal Mining Co.** at Central City. The tipples are exact duplicates designed and to be erected by Allen & Garcia. They are equipped with shaker screens, loading booms and picking tables to make these coal preparation plants highly efficient and of ample capacity. The structures are to be of steel with corrugated zinc siding and roofs of the same material having areas of corrugated wire glass over the picking tables.

Captain Frank Horn, superintendent of the Coneva Coal Co., **was shot and killed** presumably by Monroe Kilborn and whisky runners at Kilborn's home near Hazard, Feb. 16. Kilborn, who had been discharged by the company, is alleged to have brought whisky into camp. Captain Horn went to Kilborn's home in connection with the liquor running, and is said to have been shot eight times. His gun was found by his body, and had not been discharged.

Reports from Hazard, Letcher and other eastern Kentucky counties are that congestion on railroads serving Kentucky is such that **many embargoes have been placed** and sidings in the fields are loaded with cars waiting to be turned over to Northern roads, resulting in movement from mines in the Elkhorn-Hazard districts being very slow. Movement of empties into the fields is very light and loading has dropped to a comparatively low basis.

The Illinois Central R.R. has started grading for its new eighteen-mile connection in western Kentucky from Central City to Madisonville, which will run through a rich coal district and open a number of new mines, at the same time giving shippers in the Madisonville section improved outlet.

Lonnie Jackson, president of United Mine Workers, District 23, western Kentucky, is **arranging for a conference** in Louisville on March 12 with western Kentucky coal operators relative to deciding **on a new wage scale**, the present two-year contract expiring April 1. During the big mine strike last spring western Kentucky continued operation under a two-year contract which contained a clause preventing a strike at that time. The present scale calls for a minimum of $6.95 a day for inside men; 74 to 76c. a ton for machine-mined coal and $1.05 for picked coal.

The state's $1,000 reward for the capture of the murderers of Captain Frank Horn, manager of the Coneva Coal Corporation, has been **collected by a relative of the two killers and will be used in their defense.** Ira Kilburn, the brother of one of the men and half-brother of the other, rode into Hazard Feb 26 with the two riding behind him. He formally surrendered them and collected the $1,000.

The world's production record for any coal mine is now claimed by the **United States Coal & Coke Co.** for its Lynch mine, in the Elkhorn seam at Lynch. The mine, which is a drift operation working 40 shortwall cutting machines and 24 locomotives, hauled out and loaded 12,820 tons one day in February.

Suit has been filed in Louisville by the W. A. Wickliffe Coal Co. against the Kentucky Wagon Mfg. Co. for $8,888.05, representing eight notes executed by the company in 1921 in payment of coal shipped to its plant at Louisville. The company has been reorganized as a part of the National Motors Corporation and has been involved in a number of suits of late.

Trial started at Henderson on Feb. 19 of Ollie Gibbons and Mrs. Gus Noffsinger, in connection with the killing there of Gus Noffsinger, manager of the Southland Coal Mining Co., in December. Mr. Noffsinger was killed with a hammer in his own yard.

R. C. Parsons, superintendent of transportation of the Louisville & Nashville R.R., will be **chairman of the new rating commission** to apportion cars to the various mines served by the L. & N. Who the other two will be has not as yet been decided, but they will be railroad men. The commission will make a personal inspection of all mines served by the road and will cover Kentucky, Tennessee, Illinois, Virginia and Alabama.

Nine miners and Albert Scott, assistant state mine inspector, were **injured in a gas explosion in the mine of the Madison Coal Corporation,** within two blocks of the business center of Central City, Feb. 23. Two of the men were injured seriously. Scott and the miners were making an inspection of the mine and were in an abandoned mine when one of the men is said to have lighted a match. The explosion followed. The men were able to get to the bottom of the shaft unaided. The mine was not damaged.

Alben W. Barkley, Representative from Paducah, who is after the Democratic nomination for governor, in a talk at Danville on Feb. 19 said he **favored production tax on all Kentucky coal** based on the **value at the mine.** He argued for exemption of real estate taxation except for school and road use, although he admitted that this was impossible at this time.

MINNESOTA

The Northwestern Coal Dock Operators' Association has filed with the United States Coal Commission an interesting statement of the coal situation as the members view it. They declare flatly that the entire cause of extreme prices on coal at all times has been due to the railroads failing to function adequately because of their lack of cars and of locomotives. The statement is from H. E. Smith, of St. Paul, as president of the dock association, and declares that there cannot be a coal shortage, except on account of a strike, for the reason that the mines are so overdeveloped that they can produce a great deal more coal than can be consumed.

The fight in Minneapolis and St. Paul over the award of the water power of the high dam in the Mississippi River to the Ford Motor Co. interests has resulted in some interesting reports as to Mr. Ford's intentions. The latest is that he **will build a railroad from the docks at Duluth and Superior to St. Paul,** for the purpose of hauling his own freight. The road is to be for freight only. Ford interests also have been negotiating for the purchase of a coal dock at Duluth.

MISSOURI

Two bills before the Missouri State Legislature are being opposed by the coal men of the state. One would require operators to provide a shower bath with hot and cold water for every ten men employed in a mine, and a wash basin for every three men. The other would levy 1c. on every ton of coal mined to support the state mine inspection department, instead of the two mills levy now in effect. Both bills have passed the House and are before the Senate. The bathhouse bill is especially obnoxious because of the inaccessibility of water to many mines of the state. Another bill of interest to coal men is one requiring an inspector for every mine in the state to examine the mine before the men are permitted to enter. An inspector is now required only at mines known to be gaseous.

A company has been formed at Glasgow to develop a coal mine on a tract of land about three miles from the city, and work on the project will start soon. A railway switch will be built to the mine so that the coal can be loaded at the pit and shipped out from there to the markets.

A conference of representatives of operators and miners of Missouri, in session in Kansas City since the end of the wage conference, Jan. 8, has adjourned **without reaching any agreement to revise the machine working conditions.** The matter has been checked up to individual operators and the miners in their employ, with the understanding that if they agree to any changes their decision shall be referred to the Southwest Mine Operators' Association for approval or disapproval.

NEW YORK

Plans for recapitalization of Burns Bros., approved by a special committee of directors in December, **were adopted** by the full board Feb. 28 and put in shape for presentation to the stockholders at their meeting at Jersey City, March 31. Ratification of the plan by the stockholders will give the company a capitalization of $10,000,000 in preferred stock and 500,000 shares of common stock. On the basis of present holdings there will be outstanding 80,944 shares of preferred and approximately 350,000 shares of common. The reorganization provides for the retirement of the total amount of $1,208,000 of 7 per cent cumulative preference stock at a figure of $120 plus accrued dividends and the retirement of $2,975,000 of the 7 per cent cumulative preferred stock. As Burns Bros. has no funded debt or outstanding notes, this makes the 80,944 shares of Class "A" common stock a first lien on the company's assets.

An executive conference, in which General Goethals, State Fuel Administrator, district administrators from all over the state, and John F. Bermingham, president of the Delaware, Lackawanna & Western Coal Co., and D. Fred Williams, vice president of the Hudson Coal Co., took part, was held at the office of the State Fuel Administration at 165 Broadway, New York City, March 1. The total number of emergency complaints investigated during February was 7,163, it was announced, and in 5,868 cases aid was given by the Fuel Administration. January's complaints totaled 4,495, with aid given in 3,275 cases.

W. S. Simms, who has been associated with the Gano Moore Coal Mining Co., the Crescent Fuel Co. and the Fort Dearborn Coal Co., has joined the forces of the **Cory Mann George Corporation.**

Michael Tuck, president of the Titan Fuel Corporation, 42 Broadway, has gone to St. Petersburg, Fla., for a month.

NORTH DAKOTA

The Center Coal Co. has been incorporated by H. O. Hagenston, of Aberdeen; S. L. Houser and Robert Plaggmeier, of Leith, its purpose being to develop lignite production at Leith. The company has been working its property for some time and now it is being shaped up for further development. Over $15,000 in new equipment has been installed this summer and the company is now selling between 400 and 500 tons in this city alone every month.

OHIO

The Merrimac Fuel Co., with M. F. McDermott as president, W. J. Quinn, vice-president; W. J. Schroyer, vice-president, and C. R. Thomas, as secretary and treasurer, has been incorporated under the laws of Ohio and will have headquarters at 817 Dixie Terminal Building, Cincinnati.

The following companies have been chartered: **The Slater Coal & Supply Co.,** Lorain; capital $50,000; George L. Slater, S. S. McFadden, F. J. McFadden, D. A. Cook and Mayme J. Ambrozio. **The American Export & Inland Coal Co.,** Cincinnati; capital $100,000; E. F. Heasley, Stuart R. Ducker, M. Wellman, R. Johnson and Arthur W. Gordon. **The Merrimac Fuel Co.,** Cincinnati; capital $50,000; W. J. Quinn, H. E. Joseph, Ray E. Manley, Mary Barrett and Fanny Sachs. **Sanders Run Coal Co.,** Pittsburgh, Pa.; capital $10,000; incorporators, J. W. Plitcher, E. Glick, Charles Briskin and Philip Pearlman, all of Pittsburgh.

The so-called illegal coal contracts which were entered into by Edward J. Shattuck, purchasing agent for a time under the administration of Governor Harry L. Davis, were called to mind recently when the **Ohio Legislature was asked to include $80,000 in the general appropriation bill to pay for coal** delivered to various state departments and institutions before the contracts were declared illegal. The recommendation for payment was made by the Sundry Claims Board. The Finance Committees of the Ohio Legislature will now take up the question if payment is to be included in the general appropriation measure.

OKLAHOMA

The Henryetta Chamber of Commerce is sending out hundreds of invitations to coal dealers in Oklahoma and Texas, inviting them to hold their annual March convention in Henryetta in connection with the third annual state coal exposition and King Koal Karnival.

PENNSYLVANIA

Shipments of coal are continuing to run considerably above past records for this time of the year, according to statements made by various railroads. The Delaware, Lackawanna & Western, which with the Philadelphia & Reading and the Lehigh Valley is one of the most important coal-carrying systems, reported that **in January the road handled 224,000 cars more coal than in January, 1922,** and 245,000 more than last December. The road has caught up with production and is able to make shipments as rapidly as the mines can produce the coal.

A conference was held recently at the offices of the Department of Mines at which Joseph J. Walsh, chief of the department, and Frank Hall, deputy, discussed with E. A. Holbrook, dean of the School of Mines, Pennsylvania State College, and J. W. Paul, Federal Bureau of Mines, methods of bringing the work of the state department into closer harmony with the latter organizations.

A resolution recommending to Governor Pinchot the advisability of the **creation of a permanent body that would have general power to supervise the distribution of coal** within the state was introduced on Feb. 27 in the House of Representatives at Harrisburg by Representative Richard D. Burns, Philadelphia. Under the rules it was laid over for printing before action was taken.

Companies throughout the state employing coal and iron police appointed by the Governor have been requested in a letter sent to them by Governor Pinchot to furnish detailed information regarding the men in their employ. Accompanying the letters were application forms designed to show the qualifications and previous record of men seeking appointment. The Governor's action grew out of his recent announcement that commissions to coal and iron police would not be issued indiscriminately.

Employees of the H. C. Frick Coke Co. and other subsidiaries of the United States Steel Corporation in the Connellsville region who are beneficiaries of the United States Steel and Carnegie Pension Fund received a total of $108,988.89, or almost 9 per cent of the grand total of $1,266,661.74, disbursed by this agency during 1922.

River dredgers of anthracite coal, who have been paying their state tax under protest and been considering a court contest to avoid payment, are almost universally **making returns to the state on the basis of 30c. a ton** on all coal salvaged. This cost on the coal wharves is considered entirely too low by Samuel S. Lewis, Auditor General, who probably will take prompt action. Coal dredging is carried on in only half a dozen counties, but from all of these come the uniform price. River coal is selling at $1.25 a ton and higher and the 30c. price as representing the cost is believed to be too low.

The Fowler bill to repeal the anthracite coal tax law of 1921 was reported out of committee in the House of Representatives at Harrisburg on Feb. 27 with an affirmative recommendation. A determined effort to have the tax law repealed is said to be under way. It is probable, however, that if the bill is to pass it will provide that the law remain on the statute books until Jan. 1, 1925. This amendment is expected soon. The bill passed the House Feb. 28 on first reading. When read by its title the repealer was passed quickly in its first stage toward becoming a law. Whatever fight is contemplated against the repealer will come on the second and third readings, but supporters of the measure assert that they will pass it despite the opposition. The present tax added approximately 12c. to the cost of a ton of coal.

Sealed proposals will be received at the U. S. Engineer's office, Philadelphia, until noon, March 22, and then opened, for approximately **15,000 tons of semi-bitumi-**

nous coal for use on the floating plant in the Philadelphia engineer district during the period April 1, 1923, March 31, 1924.

Gas flames raging for several minutes around a group of miners who were drilling a rock hole at the Kaska William colliery, near Pottsville, Feb. 21, resulted in **the death of four miners** and one is in a critical condition. The explosion was not a violent one and but little damage was done the interior of the mine. The dead are Victor Lessau and Michael Broatus, of New Philadelphia; Martin Collier, of Tuscarora, and Anthony Wybokis, of Port Carbon. Anthony Blazner, Edward Sedar and John Triel, of New Philadelphia, were burned and indications were that Blazner will die.

A strike of four thousand miners employed at Nanticoke and Glen Lyon by the Susquehanna Collieries Co., **was settled Feb. 22**, when the men went back to work. Despite the holiday, each of the collieries that had been tied up for a week had a normal force of men. The strike started Feb. 16.

Barnum breaker, at Avoca, one of the oldest operations of the Pennsylvania Coal Co., **was abandoned** Feb. 28. Suspension is due to the completion of a tunnel which makes it possible for the coal to be sent to No. 9 breaker, at Hughestown. The tunnel was put through by Eugene Sullivan, an Avoca rock contractor. An appreciable saving in cost of operation will be effected by the new arrangement. Within the next few months the mines of the Barnum colliery will be electrified.

Dr. Royal A. Meeker was appointed State Commissioner of labor and industry by Governor Pinchot on Feb. 26. Dr. Meeker has been chief of the scientific division, international labor office of the League of Nations, since August 1, 1920. He succeeds Dr. Clifford B. Connelley. The Senate has confirmed the appointment of Dr. Meeker.

UTAH

The State Securities' Commission has granted the **Pahvant Coal Co. permission to sell $600,000 worth of bonds**, proceeds to be used in developing coal lands in Carbon County, where the company owns 640 acres. C. A. Quigley, formerly well known in the automobile business, is president of the company, and W. N. Wetzell is to be the manager. The company is incorporated for $2,000,000. It is planned to have this property producing next winter.

James C. Davis, as **Director of Railroads, has filed suits** against four prominent local coal operating companies **to recover on freight charges alleged to be due from Dec. 1, 1918, to March 1, 1920**. The Spring Canyon Co. is sued for $1,359.09 said to be due for transporting 182 cars of coal from their mines at Storrs. The Independent Coal & Coke Co. is sued for $2,015.71 for 242 cars between the same dates. The Carbon Fuel Co. is sued for $336.81, and the Standard for $542.30. The plaintiff claims the money is due as additional charges.

Governor Charles R. Mabey has signed the bill relating to certification for mine bosses which required that none but American citizens should be permitted to act in that capacity, except in the case of persons who have applied for citizenship.

VIRGINIA

Directors of the Chesapeake & Ohio and other Van Sweringen lines, on a tour of inspection of their lines, stated that a **$3,000,000 coal pier for Newport News** would be one of the principal items in a program for expending $8,000,000 on expansion of facilities. The plans for this pier, it is understood, have already been drawn. It also is planned to order about 2,500 new freight cars, rebuild about 3,000 freight cars and order 19 new locomotives.

At the regular meeting of the stockholders of the **Empire Anthracite Co.**, at Pulaski, March 14, all stockholders will go on record as for or against the **proposition to sell the entire holdings.**

WEST VIRGINIA

Collection of the "check-off" is forbidden under the terms of Senate Bill 263, introduced in the West Virginia Legislature by Senator McClaren of McDowell, upon request. This measure provides that no persons, firm or corporation in West Virginia shall hereafter enter into any contract for the collection of or collect any moneys commonly known as the "check-off," due to employees, from employers, over their payrolls for any purpose whatsoever except fees for medical attention, rent, etc. Violation of the provisions mentioned is made a misdemeanor.

The Consolidation Coal Products Co., in which New York people are interested, will erect in Fairmont a small byproduct plant in which coke, gas and other coal byproducts will be manufactured. Machinery is ready to be installed as soon as the building is completed. There will be the usual retort for the treatment of coal, with the necessary mechanical and electrical driving machinery. The tar equipment will consist of two steel storage tanks of a capacity of 20,000 gallons each, one tar decanter with a capacity of 1,500 gallons and one tar pump tank with a capacity of 300 gallons.

Organization of the **Hancock Coal & Clay Co.** with a capital stock of $50,000, presages the development of coal and clay deposits in Hancock County. Headquarters of the company are to be at Weirton. The following are interested in the new company: M. George, George Bollers, James Potts, O. M. Hoffman and Louis Zokos, all of Weirton.

An agreement has been reached between some northern West Virginia coal operators and officials of District No. 17, United Mine Workers of America, on **a new wage scale**. The agreement negotiated represents an agreement among individual operators. There are a number of coal companies though not a party to any agreement, as for instance some of the companies operating in the Elkins region and also in other parts of the district. The new agreement is similar to the agreement which has been in effect since the settlement of the strike last summer, and is for another year. There are a few minor changes relating to working conditions. The minimum rate fixed is 60.7c. per ton for miners producing high coal in machine mines. Where working conditions are not so satisfactory the rate is as high as $1.00 per ton. Under the scale agreed upon day men will receive from $6.55 to $8.10 a day.

Miners and others interested will be afforded a short course in coal mining between June 11 and July 21, according to an announcement by Prof. A. C. Callen, head of the department of coal mining of West Virginia University. It is estimated that between 150 and 200 men will attend the short course. The course is intended to assist mining men to obtain certificates of competency as mine foremen or firebosses and to give the man with a certificate even a more thorough knowledge of coal mining.

The New River Co., the largest company operating in the New River field, has been successful in having set aside for sixty days the order of the Interstate Commerce Commission, recently made effective, limiting joint mines to a 100 per cent supply instead of a 150 per cent supply of cars. Suspension of the Interstate Commerce Commission regulations was covered in an order entered by the U. S. District Court for the Southern District of West Virginia early in February. Circuit Judge Edmund Waddell, Jr., and District Judge George W. McClintic signed the suspension order. Circuit Judge Charles A. Wood dissented.

The Supreme Court of West Virginia has been called upon to determine the ownership of coal rights in a tract of 110 acres of land in Monongalia County from which gas and oil is being taken, in the case of Blake Lemley Ramage against the South Penn Oil Co. The plaintiff contends that the right to mine coal never passed and that he owns the coal deposits. The lower court decreed the title to the coal land to be in the plaintiff.

The sale of an additional block of stock of the **Coal River Collieries Co.** will be used in order to permit **additional development of the property** of the company. The capital stock has been increased, according to an announcement made by Harry Leaberry, president, from $2,000,000 to $2,500,000. The stock is owned entirely by the members of the Brotherhood of Locomotive Engineers. The company owns a block of 10,000 acres of coal land on Coal River, where extensive improvements are being made and where the construction of a large steel twin tipple is now nearing completion.

Machinery rather than men will be relied upon to a great extent in a mine which is being opened by Paul Hardy and associates in the high-volatile territory served by the Norfolk & Western. The mine is expected ultimately to produce 2,500 tons of coal a day, which will be cut, loaded, hauled and dumped by machinery. Not more than 50 men at the most will be employed. As this may be the means of solving labor problems, coal men in the southern part of the state are watching the experiment with interest.

The Mellon interests of Pittsburgh **have acquired control of 27,000 acres of coal land in Boone County** not far from Madison on the Pond fork of Coal River and on the Coal River division of the Chesapeake & Ohio Ry. It was purchased from the Wharton estate, of Philadelphia, for a consideration said to approximate $2,700,000. Coal produced at the mines now owned by the Mellons will be used largely for by-product purposes.

Stockholders of the **Greenbrier Smokeless Coal Co.** at a meeting held in Lewisburg, Greenbrier County, late in February, elected the following directors: R. M. Bell, Mason Bell and W. E. Nelson, of Lewisburg; W. B. Hines, of White Sulphur; Edward Graff, of Macdonald, and A. Erskine Miller, of Staunton. A report made by general manager H. H. Blackburn disclosed rapid development of the property of the company in the new Greenbrier smokeless field, the mines of this company being among the first opened in the field.

House Bill No., 476, introduced in the House of Delegates by Representative Strother, of Welch, **proposes that the mine inspection year be made concurrent with the calendar year.** It would change the present law so that the chief of the department of mines would make his annual report to the Governor for the year ending Dec. 31, instead of June 30, and to file it not later than June 30. Each district mine inspector would be required to make his annual report in like manner. Another amendment proposed in the Strother bill would require that the operator or agent of every coal mine must mail or deliver to the chief of the department of mines in January instead of July a report for the preceding twelve months ending with December instead of June.

Another attempt will be made to organize the non-union coal fields of West Virginia, according to word reaching operators in Charleston. Percy Tetlow, mine union organizer, and a corps of assistants, are expected to enter the fields within the next thirty days. A fund of $1,500,000 is declared to have been collected for the purpose during the last few months when each union miner was assessed $2 a month in addition to regular union dues. It cost the miners $2,000,000 to try to organize West Virginia in its last attempt, it is said.

WISCONSIN

A bill which aims to keep water out of coke sold in Wisconsin has been introduced in the Legislature. It is asserted that coke has been sold 30 per cent of the weight of which represented water. A tolerance of 10 per cent moisture is to be allowed for coke. Any excess over that amount will have to be deducted if the bill becomes a law.

WYOMING

In January the **Owl Creek Coal Co.**, at Gebo, **mined over 2,000 tons per day** worked, according to **J. C. Rae**, general superintendent. Mr. Rae attended the meetings of the Rocky Mountain Coal Mining Institute in Denver, Colo. Feb. 26, 27, and 28. **Albert Griffin**, of the Owl Creek organization, also visited in Denver.

CANADA

COAL OUTPUT OF BRITISH COLUMBIA, JANUARY, 1923.

Mine	Tons
Vancouver Island District	
Western Fuel Corporation of Canada, Nanaimo	60,540
Canadian Collieries (D) Ltd., Cumberland	23,180
Canadian Collieries (D) Ltd., Extension	17,744
Canadian Collieries (D) Ltd., South Wellington	10,268
Granby Consolidated M. S. & P. Co., Cassidy	24,615
Nanoose Wellington Collieries, Lantzville Mine	10,438
Old Wellington Colliery	1,002
Total	147,787
Nicola-Princeton District	
Middlesboro Collieries, Middlesboro	7,236
Fleming Coal Co., Ltd., Merritt	1,984
Coalmont Collieries, Coalmont	14,919
Princeton Coal & Land Co., Princeton	2,218
Total	26,357
Crow's Nest Pass District	
Crow's Nest Pass Coal Co., Coal Creek	58,842
Crow's Nest Pass Coal Co., Michel	32,492
Corbin Coal & Coke Co., Corbin	5,587.32
Total	96,921.32
Grand Total, January	271,065.32

Initial steps were taken to form a **Canadian industrial research organization to solve the Canadian fuel problem** at a recent conference in Ottawa of representatives of the universities of the Dominion, of the scientific branches of the government and of the Canadian Manufacturers' Association.

The summary discharge of Sid McNeill, which resulted in a strike of 2,500 employees of the British Empire Steel Corporation, **was upheld** Feb. 21 at a hearing, agreed upon by strikers and company officials, in a strike settlement. The workers have returned to their posts and are bound by agreement to abide by the decision regarding McNeill.

William Sloan, Minister of mines, in an address at Nanaimo on Feb. 23 emphasized that the importation of **foreign fuel oil was undermining the coal-mining industry on Vancouver Island** and advocated an increased importation duty on fuel oil. Mr. Sloan stated that in 1910 the coal output of the province was 2,800,000 tons, compared with 2,595,000 tons in 1920 and 2,483,995 tons in 1921. In 1910 importation of fuel oil began to assume considerable proportions, and at the present time is replacing 90,000 tons of coal per month, or a volume equal to approximately three-quarters of the present monthly output. Mr. Sloan will leave soon for Ottawa, where he will bring to the notice of the Dominion Government the need for increasing the tariff on fuel oil, so far as British Columbia is concerned, at any rate.

The Herewood Mine, Western Fuel Corporation of Canada, Nanaimo, B. C., **has been closed down** and, it is understood, **is to be completely abandoned.** This property is situated about three miles from the City of Nanaimo. It was opened some 40 years ago and its initial operation was unique by reason of the fact that transportation was effected by means of an aerial tramway from the mine to Nanaimo Harbor. Over a considerable period it was shut down and was developed a second time by the New Vancouver Coal Co., which since has passed out of existence. Once more its workings were deserted, not becoming active again until 1916, when the Western Fuel Corp. took hold and so pushed work that during the war the Herewood became a considerable producer. It was at this time that it reached its peak in point of output, an average of 1,000 tons a day being mined and brought to the surface. In recent months the production has been steadily declining until finally it ran to only a few hundred tons a day.

Traffic News

Electrification of 80 miles of the Virginian Ry. through the coal fields in Virginia and West Virginia has been announced. The new process will extend from Pulaski, Va., to Elmo, W. Va., according to announcement. This will greatly facilitate movement of coal to Tidewater, where the Virginian's new pier, costing over $3,000,000, is now being built.

On account of accumulation an **embargo** has been placed by the **New York Central R.R.** against all shipments of coke consigned, reconsigned or intended for Hart & Crouse, Utica, N. Y.

Embargo 298, placed Feb. 21 by the **New York Central R.R.** against all freight for delivery to the Fonda, Johnstown & Gloversville Ry., has been **modified** to include in the exceptions bituminous coal consigned to the F. J. & G. R.R. for its own supply use.

Embargo 292, placed by the **New York Central R.R.** against all shipments of coal consigned to or intended for the Buffalo General Electric Co., Harriet, N. Y., has been **entirely cancelled.**

Embargo 420-D, placed by the New York Dock Ry. (Fulton, Baltic and Atlantic Terminals) Brooklyn, N. Y., against shipments of coal and coke consigned or intended for delivery to Patrick Reilly, D. Reilly and E. A. Tutein Co. is **entirely cancelled.**

Domestic coal handlers, steamboat concerns and others interested are preparing to make a stiff fight against the proposal of the Norfolk & Western Ry. and the Virginian Ry. **to discontinue the flat rate on coal for customers who require barging** to their plants. This is a practice which has operated at Norfolk for twenty-five years, and the railroads propose to discontinue it as of April 1. Under the proposed new arrangement the rate on coal delivered to any waterfront plant not connected by rail would be the same as the rate to any point in the harbor inside the Capes. The Chamber of Commerce and other commercial bodies are opposing the proposed revision of rates.

Amendment No. 1 to Service Order No. 38 was issued by the Interstate Commerce Commission Feb. 26. By its provisions Service Order No. 38 is vacated and set aside effective at midnight Feb. 26.

In a complaint filed with the Interstate Commerce Commission Jan. 31 by the **Colorado Fuel & Iron Co. against James C. Davis,** Director General of Railroads, and his successors, as agent, and the **Colorado & Wyoming Ry.,** the complainant asks in reparation for unlawful charges for freight on an electric locomotive the sum of $232.02 with interest.

Reports of several of the more prominent railroads show that during January the **Philadelphia & Reading Ry.** made an increase in net operating income for January, 1923, of $1,880,258 over the same month of the preceding year. **The Lehigh Valley** showed a deficit in January of $929,033, against a credit of $350,514 in January, 1922. The disappointing showing made by this road was due to maintenance of equipment expenditures $887,953 higher in January, 1923, than the year previous and transportation expenses $362,640 higher. **The New York, New Haven & Hartford** reported a net operating deficit of $780,587 in January, against net income of $892,565 in January, 1922. The January gross income amounted to $9,911,556, against $8,724,503. **The New York, Ontario & Western** reported a net operating deficit of $208,615, against a deficit of only $92,418 in the same month of 1922. **The Atchison, Topeka & Santa Fe** had January gross income of $19,217,191, against $14,606,364 the same month of the preceding year, and net income of $4,328,238, against $561,102 in January, 1922. **The Chicago Milwaukee & St. Paul** showed a substantial increase in both gross and net operating revenue for January. Gross revenue was $14,470,239, a gain of $3,597,992 over the same month in 1922, and net operating income, totaled $1,824,419 against a deficit of $466,786 in January, 1922. **The Central Railroad of New Jersey** reported total operating revenue in January of $4,364,572 against $5,969,907 in January of the preceding year, and net operating income of $117,139 against $205,076. **The Missouri, Kansas & Texas** reported net operating income of $519,321 in January, an increase of $255,527 over the corresponding month of the preceding year. **The Illinois Central** report for January showed a gross of $16,595,121, against $12,608,683 in 1922 and net operating income of $2,879,533 against $1,588,585. **The Erie** had a net operating income of $321,521, against $199,303 in 1922 and total revenue was $9,652,325 against $7,177,250. **The Southern Ry.** showed excellent January earnings. Operating revenue was $12,052,413 against $9,217,531 in the same month of the preceding year and net income after taxes, etc., was $2,196,430, compared with $736,196 the same month a year ago. **The Delaware & Hudson** reported a deficit of $400,000.

Senator Brookhart, of Iowa, head of a committee of the new progressive bloc charged with transportation legislation, in introducing a bill on Feb. 24 to repeal vital sections of the Esch-Cummins transportation act, **urged an extra session of the next Congress to consider railroad legislation.** Abolition of the Railroad Labor Board, transfer of its functions within six months to the Federal Board of Mediation, repeal of the 6 per cent. income guarantee of the law and drastic changes in railroad valuation are provided for in Senator Brookhart's bill. He said the measure if passed would "take seven billion dollars of water out of the valuation" of railroads. "The bill also stops the capitalization of unearned increment in property value," said Senator Brookhart, "and defines the adequate return so it will not exceed the interest rate on the bonded portion of the capital." Interlocking directorates and Interstate Commerce Commission jurisdiction over intrastate rates also are prohibited by the terms of the bill, Senator Brookhart promised to introduce another bill later "to stop excessive profiteering by subsidiary corporations."

The Interstate Commerce Commission has approved the application of the **Louisville & Nashville R.R. to issue $45,000,000 additional capital stock to be distributed as a stock dividend.** Approval was given on condition that certain holdings of stock of affiliated companies of the road shall not be disposed of without first procuring permission from the Interstate Commerce Commission and that no expenditures made prior to Oct. 1, 1922, shall be capitalized by issue of bonds or other securities to reimburse the treasury of the Louisville & Nashville. The increase is equal to 62.5 per cent. of the present outstanding stock of $72,000,000.

For the purpose of developing an area of virgin timber and New River type of coal, the **Chesapeake & Ohio** asked permission of the Interstate Commerce Commission March 2 **to build an extension of its Gauley branch** 10.6 miles beyond Bryce, W. Va. The territory to be served, the applicant said, was now inaccessible to railroad, notwithstanding the good timber and the high quality of coal.

Hearing before Harris Fleming, examiner for the Interstate Commerce Commission, was held in Newport News last week in an effort to arrive at some **adjustment of the Newport News freight rate on anthracite.** This rate is $4.30, gross, while the rate to Norfolk and Richmond is $3.40 gross. The Chesapeake & Ohio Ry. agreed to give Newport News the lower rate, but the Pennsylvania proposed a rate of $3.91, which was not agreeable to the Newport News dealers.

The Boston & Maine R.R. has put into effect a new schedule of discharging rates on coal and coke at Boston and at Salem, Mass. The increase was made in the face of strong opposition at a recent hearing before the wharf commission. New discharging rate on coal per gross ton, single deck vessels, is 35c.; other type vessels 45c. On coke the rate net, single deck vessels is 70c. a ton and on other type vessels 90c. Weighing charges on coal are placed at 4c. a gross ton with a minimum charge a car of $1.35; on coke 6c. a net ton with minimum of $1.35 a car. For services performed on holidays the rates are 50 per cent higher.

Obituary

Paul C. Voss, former salesman for the Harvey-Jellico Coal Co., Louisville, died at his home on Greenwood Avenue on Feb. 17 of a complication of diseases, after an illness of a year. He is survived by his parents, a brother and one sister.

E. H. Irwin, 63, sales manager of the Harrisburg Colliery Co., died at his home in Chicago, Ill., Feb. 20, from pneumonia. Mr. Irwin, who was well known in the midwestern coal trade, was born in Glendale, Ky. He began his career in the coal industry by long service for Hull & Co. in Louisville, Ky., New York and Chicago. Later he joined the O'Gara Coal Co., which operates in southern Illinois. He left the sales managership of that company to join the Harrisburg Colliery Co. in January, 1922. Funeral services were held in Chicago, Feb. 22 and the body was taken to Elizabethtown, Ky., for burial the following day. He is survived by his widow, one son and two brothers, W. B. Irwin, Riverside, Cal., and Judge J. L. Irwin, county judge of Hardin County, Kentucky.

Coming Meetings

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, **E. Marburg.** Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, **F. O.** Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, **S. N.** Clarkson, Cleveland, Ohio.

Indiana Bituminous Coal Operators' Association will hold its annual meeting March 14 at Terre Haute, Ind. Secretary, **P. H.** Penna, Terre Haute, Ind.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, **O. K. Davis,** 1 Hanover Square, New York City.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Massachusetts Lists the Gougers!

THE Legislature of Massachusetts has indulged in anthracite publicity. In an official document traders in anthracite from so-called "independent" sources are named for public censure, the hairline being drawn between "company" coal at $9.50 f.o.b. mines and "premium" product at prices above that magic figure.

With due allowance for politics and the public appetite for coal scandal the data assembled for the Legislature by the Massachusetts Commission on the Necessaries of Life may prove of value, although exception can be taken to some of the conclusions reached. It should be useful to have consumers told officially that from the resumption of mining to Jan. 31, 1923, the ratio of "independent" receipts in Massachusetts to those of "company" coal was but 14 to 86, taking $1.25 over the "company" price as the dividing point. Further, of the eighty-one "jobbers, wholesalers, brokers and dealers" listed as exacting more than $9.50 but two are reported selling in excess of 20,000 tons, and only four as selling more than 10,000 tons. To state it differently, but thirty-four have sold each more than 1,000 tons, and of these, eighteen are parties outside of Massachusetts.

For the good of the industry and in the interest of fair dealing the Legislature ought now to publish the names and tonnages of wholesalers who ship "company" coal. Neither politicians nor the press would be interested and doubtless the items would lack news value, but the complete figures would be enlightening. If lawmakers are to delve into the anthracite business let them favor the "fair-price" wholesalers with equal publicity, that the public may get a more accurate impression of a distribution that 86 per cent merits approbation.

It is reasoned, according to the Massachusetts commission, that "under the prevailing system of the Pennsylvania Fuel Commission for distributing anthracite this large amount of high-price coal has reduced the allotment to Massachusetts of a larger amount of lower-priced company coal. There is no apparent shortage of this high-priced coal." The trade may well question the implication of this statement. "Undoubtedly," naïvely continues the report, "our retail dealers intended by purchasing this coal to increase the amount of coal received by their communities. Their action, however, has apparently resulted only in raising the price of speculative coal and thus the price our householders must pay." This is a philosophy nothing short of artless. No reference to a strike that lasted from April 1 to Sept. 18!

We have no wish to condone speculative premiums on necessaries of life. Undoubtedly there are serious abuses, but by the Massachusetts list the tonnage shipped into that state at prices averaging more than $10.75 was relatively small. Vigilant as proved the war-time Federal Fuel Administration we have our doubts whether even the most meticulous policing would even then have prevented similar abuses in like proportion. It rather seems to us that time is wasted in recriminations over a situation the direct result of five months and a half of idleness in the anthracite region, and not yet a constructive suggestion!

"The Worst Conducted Industry"

SOME time ago Herbert Hoover remarked that the coal industry was the worst functioning of industries. Recently, we believe, he has been weakening in that notion, which was entirely unjustified, as indeed everyone knows. It is a seasonal industry, but there are many others more seasonal and many more that possess that quality in no less a degree.

Now comes John Hays Hammond with the statement that "This industry is the worst conducted, from an engineering point of view, that I have ever seen." The charge is a serious one to make against coal-mine executives, the more serious indeed that it applies to nearly all the more important leaders in industry. This sweeping charge includes Gary, Schwab, Rockefeller and Ford, all of whom are at the head of organizations owning and operating coal mines. It includes many of the heads of the great metal-mining companies, those who rule the destinies of the Phelps Dodge Corporation, the American Smelting & Refining Co., the United States Smelting, Refining & Mining Co., the Chino Copper Co., the Ray Consolidated Copper Co. and the Anaconda Copper Mining Co.

The railroads, the electric-light and power companies, the big byproduct and gas companies, the oil companies, the steel corporations other than those referred to, which are dominated by Gary, Rockefeller and Schwab, also own coal mines. Thus he has denounced the leaders of almost all industry except perhaps his own—that of mining gold. As one scans the situation one would be inclined to believe that the coal mines must be unusually well circumstanced in the matter of executive and engineering talent, because they have had the advantage of sidelights contributed by men from all the industries, for surely each man must contribute something from his especial environment.

No one knows just to what Mr. Hammond refers in his arraignment of the coal industry. That is locked in his bosom. Perhaps it is the eight-hour as against the sixteen- or twenty-four hour day. He has been prone to say that coal mines should operate without surcease every hour of the week. Most of us rejoice that the mines work only eight to ten hours. The world is the better that night is not turned into day. Many industries have seen fit, we are glad to say, to keep largely or wholly to the shorter working period, and in view of the repairs to be made, the roads to be graded and the need for the continuous development

of headings to maintain an eight-hour day, perhaps this method of operation is not such an unfortunate and unprofitable arrangement.

D. C. Ashmead has shown that in the anthracite region the shorter day is preferable economically to the double or triple shift. Coal mines, it is true, work more hours in Europe, but see how much lower is their tonnage per mine and per man. Furthermore, almost all our coal cutting and much of our pumping is done at night, thus lowering the peakload and saving machinery.

If Mr. Hammond refers to the payment by the ton and the fact that with such piece work the interest of the operator and the miner is not so co-ordinated that the former can afford to expend money to assist the latter in producing a large tonnage, there is truth in the statement, though most operators will reply with at least some degree of truth that day work at the face would remove any incentive from the miner to do a good day's work.

Everyone likes to run the mines and the railroads. Any day laborer—a dumper at the mines or a brakeman at the wheel—thinks he could do better than Clingerman or Loree. The average commuter and traveling salesman believes he could handle either mines or railroads better than any man brought up in the business. It is a national failing to declare that we could do another man's job better than he could, but when we try to undertake the work it soon becomes evident that after all the men we criticize know a little at least that we did not know and that the best work in mining or railroading is being done by men versed in the mining or railroading art.

Stream Pollution

MR. CRICHTON'S gloomy prognostications as to progressive stream pollution contained on pages 447-451 of this issue carry the conviction of the writer home to all who read them. Nevertheless some features in future operation promise relief from a difficult situation. One of these favorable features is that most of the workings hitherto have been made near the outcrop, and as mining progresses this shallow coal is approaching exhaustion.

After awhile the coal will be nearly all under heavier cover and the crevices to the surface will be smaller and will close more completely so as to shut off surface waters almost entirely. It is in shallow mines that complete collapse takes place and not in those that are deep. Many of the mines of the future will receive only, or almost only, ground waters; especially will that be true when the surface has completely subsided. On the other hand it well may be that after a few years we may undertake to strip coal along the crops, thus adding to the area of the shallow workings.

As a further reason for hoping that Mr. Crichton's prophecy will be fulfilled only in part is the fact that the mining of the thinner measures, now beginning to look practicable for working, does not produce as much surface disturbance as the mining of those that are thicker. It must be remembered, however, that the thinner they are the more rapid must be the excavation and that there are still not a few thin or dirty beds above those hitherto worked and these will be near the outcrop and have shallow cover. As time goes on these beds tend to be developed, and when they are, they will freely admit surface water and assist materially in aiding that water to reach lower levels.

Evidence also goes to show that not only the seam worked but seams above, still undeveloped, supply sulphurous material to the waters that pass through them and that what is leached from them now will not be present to be leached later. Consequently these upper seams will be less harmful when worked than those we are now working. As against this it must be remembered that the neutralizing bodies also are being removed, and this will tend in a degree to act as a balance to the loss of acidifying tendencies.

Mr. Crichton points out also that after many years old mines tend to give water that is not acidified. He also declares that the area mined is not a complete index of the water received by the underground workings, for, as he well says, the mines are fed by the rainfall of unmined areas as well as of those already mined. In consequence of this second fact the increase in the area draining into mines, new and old, will hereafter be less than in exact proportion to the areas extracted. Unfortunately we lack data of all kinds, especially as to the water entering mines of greater depth where one or more seams are worked, as to the acidity of the waters leaving such workings, as to the nature of water from strippings and as to the length of time after which a mine will cease to acidify the waters it receives.

It must be remembered that the acidity per ton of coal mined is not the main interest, but rather the number of grains of sulphuric acid per inch-acre of rainfall, the waters from which pass over the mine workings. If the water from the shaft mine is strongly acid it may nevertheless be in such small quantity that it will have less evil effect on the stream which it enters than the clearer water from the drift mine. The tendency with deep measures may well be to produce a highly acidulous water, but such a small volume of effluent as to overbalance the effect of greater acidity.

Some of our institutions are looking for subjects for study. They might do worse than consider this foundling that so far has had few who would give it parental attention. A study advantageously might be made of a deep shaft operation and of a shallow drift mine to determine which will result in the greater total of acidity, bearing in mind, however, in making a selection, how greatly the presence of limestones may modify that quality.

Two mines in the anthracite region side by side are of equal depth but have totally different waters. One, Pine Hill, has water much more acid than usual. The other, the Lytle Colliery, was some ten years ago using the water from the mine for boiler fuel and did not find it necessary to neutralize the acid. This shows the necessity for caution in accepting comparisons as typical.

The subject is a big one and, as Herbert Hoover says, we should know what we are doing before we legislate. Furthermore, we must remember that all those who are declaiming against this stream pollution are profiting indirectly by the operation of the mines by which the pollution is caused. They can ill afford to make mining unprofitable.

WORK AT WORK.—Secretary Work has ordered that his office door be kept open. The public will thus have a chance to see Work work if it is possible for Work to work while office seekers are trying to work Work.—*Boston Transcript.*



Mining Machines Save Spadra, Arkansas, Field from Extinction After Long Fight with Union

For Years Solid Shooting Made High Percentage of Screenings —Small Quantity of Lump Cut Working Time by Limiting Market—Machine Scale with 7-In. Differential Now Made

By H. Denman
Clarksville, Ark.

IN THIS age of machine mining it probably will seem strange to most *Coal Age* readers to hear of a field where conditions were favorable to the use of machines yet where a mighty struggle had to be waged within recent years to get them introduced. This struggle against prejudice was so severe in the Spadra field of Arkansas that the entire region was shut down for almost a year on account of it. Nearly four years of battle by the operators against the district and local organization of the United Mine Workers of America was necessary before a machine scale finally was provided. Local conferences and negotiations by the operators and the Southwestern Interstate Coal Operators' Association at Fort Smith, Ark., and at Kansas City, Mo., cost thousands of dollars and much time and effort. But the results may be worth the cost of the struggle.

The operators of the Spadra field appealed to the National Coal Commission appointed by President Wilson and to every official who they thought might help them get a scale, and finally, largely through the assistance of John P. White, representing John L. Lewis, president of the national organization, they were able late in the autumn of 1921 to secure a machine scale allowing them to install mining machines. Even then it would appear that a scale would not have been obtained if the production of an excessive quantity of slack coal under the solid-shooting system of mining and a strictly limited market for low-volatile slack had not compelled the Spadra operators to close down their mines from the autumn of 1920 until the autumn of the year following, when the scale was made. This long spell of idleness, due to market conditions, was a stronger argument for the machines than any talk the operators could make. The percentage of slack had reached startling proportions, so large, indeed, that it reduced the available lump for the domestic market to a seriously low point.

In order to make clear how such a situation could exist, it will be necessary to give a short description of the Spadra coal, the coal field and its markets. Both the district and the coal itself in many ways are unique.

The Spadra district is in Johnson County, Ark. It is only a part of a larger field extending from a point about 75 miles east of the western boundary of Arkansas across the western line of that state and for a distance of about 100 miles into Oklahoma, but the coal

Note—The headpiece of this article shows the breaker and headframe at No. 2 mine of the Fernwood Mining Co., near Clarksville, Ark.



MACHINE MINING MUCH INCREASED LUMP PERCENTAGE

Until recently in the little Spadra field of Arkansas solid shooting in hard coal blew a large proportion of the coal to slack, for which there was a poor market. Today the proportions are much more wholesome, increasing the volume of good marketable lump, thanks to special cutting machines which are a cross between shortwall and longwall. This shows a shot of machine-mined coal, a large percentage of which will afford domestic sizes.

in the Spadra district differs in character from that in the rest of the field. Generally speaking, the coal in the western end of the larger coal area is highly bituminous and high in volatile matter, whereas that in the eastern end is high in fixed carbon and closely approximates anthracite. The Spadra field lies in a basin located near the eastern end of the general Arkansas-Oklahoma coal field and is high enough in fixed carbon for the coal to be classed as semi-anthracite though it is prepared like the hard coals of Pennsylvania and marketed as Arkansas anthracite. Geologically, this coal is in the "Pennsylvanian" or Middle Carboniferous series, and the U. S. Geological Survey in commenting on the coal fields of the state remarks that "Coals of as good quality are not found elsewhere in the United States west of West Virginia."

The following is a typical analysis of Spadra coal sampled and analyzed by the U. S. Geological Survey:

ANALYSIS OF SEMI-ANTHRACITE FROM SPADRA FIELD—AIR-DRIED SAMPLE

Constituents	Per Cent
Moisture	1.03
Volatile matter	10.53
Fixed carbon	80.06
Ash	8.38
	100.00
Sulphur	2.31

The Spadra basin is about 12 miles long in an easterly and westerly direction and 10 miles across from the north to the south outcrop. The coal seam is about 40 in. thick with a band of slate near the center varying from a mere streak to several inches in thickness, the entire bed becoming thicker as the band rock thickens.

The dips are not steep and usually do not exceed 2 or 3 deg. The roof is good, the floor hard, and the mines have little water and not much gas. All the mines of any importance are shafts varying in depth from sixty to three hundred and sixty feet. From this description anyone would say that the natural conditions were favorable for machine mining, and the market conditions even more strongly favor it.

I have already stated that this coal is marketed as Arkansas anthracite, and although the geologists might not so classify it it will uphold the reputation of anthracite and perform the same service as if the prefix "semi" were not written before the word "anthracite." In preparing it for market it is first broken down in breakers or crushers and then carefully screened into five, and sometimes six, sizes, the larger grades being hand picked with much care. The sizes made are grate, egg, No. 4, chestnut, buckwheat (sometimes) and slack. The coal, excepting the slack and buckwheat, are used exclusively for domestic purposes in base burners and furnaces, and the principal market for the coal is in the North and Northwest. The coal burns like Pennsylvania anthracite and just as satisfactorily, but it is not so hard and makes a little more slack and fine coal in transportation and handling. It is smokeless, burns with little flame and maintains a fire for a long time with a strong, steady heat.

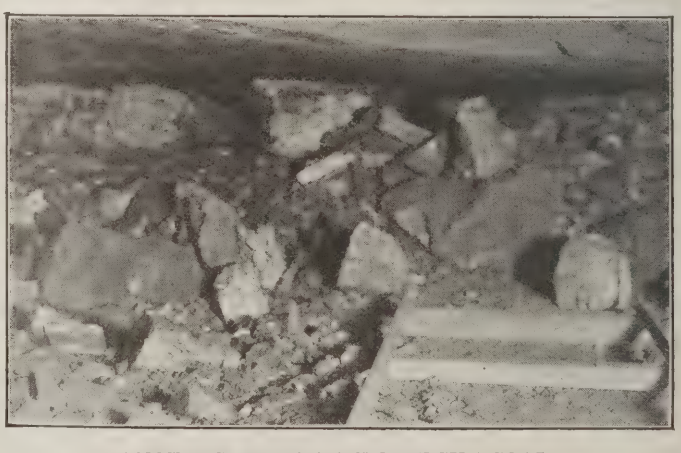
The slack, being low in volatile matter, non-coking and screened fine, though a high-grade fuel, is difficult to burn under the conditions existing at most of the steam plants in the Southwest. To get the most satisfactory results as a fuel it should be pulverized and blown into the furnace with a stream of air, the coal burning while in suspension. There are few of these plants, however, and they are expensive to install.

Zinc Smelteries Only Market for Slack

The consequence is that our only market for the slack and for most of the buckwheat is the zinc smelteries, where it is used as a flux in reducing certain grades of zinc ores. With this limited market for slack coal the demand for it is uncertain, depending on the condition of the zinc business. Since 1918 this business throughout the territory that Spadra supplies has not been active, and the demand for slack coal has been greatly restricted. This necessitated stocking coal every year, a portion or all of the slack mined during a part or all of the season being put into the storage pile when the demand for domestic grades of coal was active.

As the coal is used principally for domestic purposes the running time of the mines depends on the seasons, usually starting in the early summer and continuing till near the end of the year. If the mines cannot operate during that season they must lie idle until the one following.

In the past all the coal has been shot from the solid, making an excessive amount of fine coal and the sizes were so badly powder-shattered that they did not stand transporting and handling as coal of this character



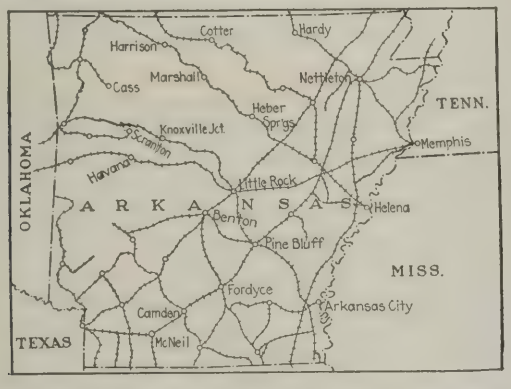
ANOTHER SHOT OF UNDERCUT COAL

As this coal was of a type not readily explosible as unfortunately is most coal in the Southwest, the demand that it be undercut before shooting was not on the grounds of greater safety but on the economic basis that without larger coal the Spadra field would be obliged to suspend operation.

should. As there is little danger that dust explosions will be caused by shots in this coal, charges that the shotfirer would not be permitted to shoot in any other coal bed were used in the Spadra mines to blast coal from the solid. All the coal close to the shots was ground to powder, and the slate band in the center of the bed was so badly shattered that it was almost physically impossible for the miner to separate it from the coal. Most of it, especially where the band was not thick, was loaded with the coal into the mine car.

It is needless to explain that this system of mining produced an excessive quantity of fine coal, for which there was little or no market for long periods at a time. As a consequence the price for the slack coal was low and that for the domestic sizes too high—several times that paid for slack. The operators tried stocking the slack, but such a large proportion of the output came under that head and under that of buckwheat that they found this a losing proposition and "quit it as a bad job."

Years ago this field paid its miners on a screen-coal basis, and this system produced a comparatively small



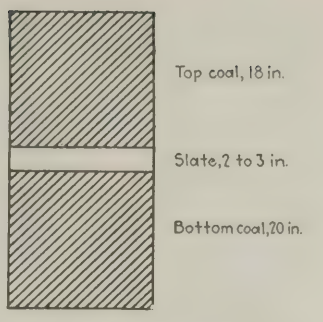
ARKANSAS AND ITS SEMI-ANTHRACITE FIELD

The coal area lies immediately north of Scranton, Ark., in an area so remote from the anthracite region of Pennsylvania that the demand for its product should be considerable.

proportion of fine coal, but through the efforts of the United Mine Workers the state Legislature passed a mine-run law, compelling all coal to be weighed before screening and paid for on a mine-run basis. This law was afterward repealed for Johnson County, but the operators were not able to get another scale for screen coal, so for years they had been obliged to see their coal blown to dust as a result of shooting the coal out of the solid.

Some of the Spadra operators early realized the advantage to be derived from the use of mining machines but there were others that did not believe they could be used with success, so at first the operators were not unanimous in demanding the right to use machines.

In 1918 the Fernwood Mining Co. requested the union through the Southwestern Interstate Coal Operators' Association to provide with a machine scale for a new mine it was then opening. Some of the other operators joined in making this demand for the field. Several conferences were held from place to place without success. Finally, however, early in 1919 the chief commissioner of the Southwestern Interstate Coal Operators' Association and a number of Spadra operators met the district president of the United Mine Workers of America and other union officials and an agreement was made under which a mining machine was to be given a 30 days' trial in one of the mines with a view to determining the practicability of machine mining and the proper basis for the establishment of a machine scale. A standard electric shortwall undercutting machine was furnished by a manufacturer for trial purposes, and the Collier-Dunlap mine was chosen for the test run.



SPADRA SEAM

Two hard and thin seams of coal with a thick binder is the kind of bed to require heavy shooting unless the material is first cut by machine.

Before beginning the test and while it was being conducted there was a constant squabble over details, such as what men should do the work, whether they should be paid by the ton or on a day-wage basis and many other points of difference. Though the test was to be run 30 days, it did not actually run half that length of time owing to the many points of difference that arose. Finally by mutual agreement the test was ended. Though the days during which the machines were operated were comparatively few, many months were consumed in the "test."

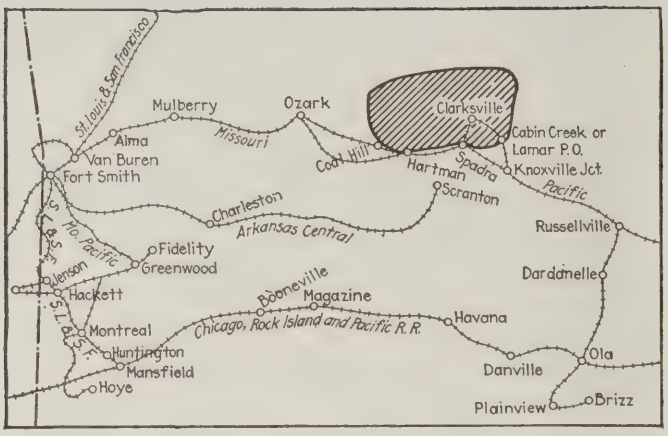
It was of little value, however, for the purpose of making a machine scale, for which it was primarily intended, as the disposition of the local union officials and the men loading after the machines was to do as little as possible, with the hope that they might establish thereby a favorable loading rate. Before this test most of the miners and some of the operators thought the mining machine entirely impracticable for this field, but the actual operation of the coal cutter convinced all the operators and many of the miners that the coal could be undercut successfully by machines and that they thereby would reduce the percentage of fine coal and obtain a cleaner and firmer product. This test was conducted in the spring of 1919.

The next step was to get together with the union officials and make a scale for machine work. Then followed conference after conference, absolutely without results. After trying every means we knew or anyone could suggest, the operators nearly despaired of getting a scale. In the meantime the slack situation had grown worse and some of the operators wanted a screened-coal scale for pick mining or anything that would help to solve the slack problem. They were unable to obtain a reasonable pick scale; in fact the miners did not seem willing to make any change except one that would afford them not only the wage they were receiving but an assurance of an increase in earnings.

In 1920 the market for slack improved and the Spadra mines were able to operate that year, though it was necessary at times to dump the finer sizes on the ground. Though the mines in 1920 were working, the operators' association kept up a continuous fight for a machine scale. During this year one of the operators obtained from the district president an agreement under which another type of machine was to be given a ninety-day trial, but no permanent agreement or scale was made.

With the opening of the coal season in the spring and early summer of 1921 the usual volume of orders was received for domestic sizes but no orders were entered for slack. As a result the operators renewed their demands for a machine scale more insistently and vigorously than before. This time the demand was from every operator, and the mines closed down.

During all these years the operators proposed scale



SPADRA FIELD AND IMMEDIATE SURROUNDINGS

Spadra lies not far from Fort Smith which is one of the leading junction points of the Southwest being served by the Missouri Pacific, the St. Louis & San Francisco, the Arkansas Central, the Fort Smith & Western, the Kansas City Southern and the Midland Valley.

after scale and made concession after concession and every reasonable change was made that it was thought would meet the views of the miners' officials, but it all seemed of no avail. The miners demanded a higher scale for machine mining than had been paid in shooting from the solid. In the matter of yardage especially the miners wanted a big increase in rates and the same rate for loading coal after the machines as was paid in solid shooting, thus leaving the cutting of the coal to be added to the solid-shooting rate.

After the summer was far advanced with no mines in the field operating, the miners' officials asked that negotiations be opened with a view to making a combination pick-mining machine rate, with the rate for cutting and loading hand-picked coal far higher than the solid-shooting rate we had been paying for mine-run coal. The operators declined to go into negotiation, insisting on their original and consistent demand for a machine scale on a mine-run basis based on the solid-shooting rate in effect with a differential of 7c. per ton which they had already conceded.

They looked on the suggestion to make a pick-machine scale as only a scheme to increase the mining rates and felt sure that after the machines were installed most of the miners would load mine-run machine coal, claiming it as hand-picked. Thus the rate would be much higher than for the coal obtained from solid shooting.

It also seemed to the operators that going to a hand-picked coal basis, in which the slack is left in the mines, would prevent largely the monetary advantage of introducing machines, for, though there would be an increase in the domestic sizes, there would be nothing received for slack, because on the hand-picked basis the rate was intended to be high enough to pay the loader for leaving the slack in the mine, and the figure was based on the percentage of slack he made on the solid-shooting system of mining. The mine owners considered also that leaving a large part of the product in the mine was a waste, contrary to good public policy.

As the summer passed with none of the mines in operation, the miners, too, commenced to ask why a machine scale could not be made, as the operators had repeatedly told them that they were ready at any time to make a fair machine scale. The matter had been presented many times to John L. Lewis, international president of the United Mine Workers of America, and finally he took action and appointed John P. White, ex-president of the United Mine Workers of America, as his personal representative to meet with the miners' and operators' representatives in Kansas City. After several conferences, due largely to the influence of Mr. White, a scale was finally adopted in September, 1921, nearly four years after the first demand for a machine scale had been made.

The old rate for mine-run solid-shot coal was $1.40½ per ton of 2,000 lb. with an increase for all coal mined from seams less than 2 ft. 9 in. in thickness. The new scale for machine work was as follows: Loaders, $1.13½, mine run; machine runners, 20c.; differential, 7c.; total $1.40½.

The operators had tried so long and so unsuccessfully to get a machine scale that most of them had nearly given up hope of ever getting one. When the scale was finally agreed to it came as a surprise. No one had found the courage to buy the mining machines and other equipment in advance of the scale except one company, which had purchased two machines on trial.

The season was so far advanced and it would take so long to procure and install the necessary equipment that only a few of the mines tried to operate in 1921 and those that did make the attempt ran only about ten days.

It is impossible to estimate the loss sustained by both the miners and operators by this long delay in making the scale. Both know, or should know, that they lost heavily on account of the protracted idleness and even more in the loss of patrons, who, due to the inability of the operators to furnish them coal in 1921, had been forced to use other kinds of fuel.

Now, however, all the principal mines of the field have installed machines. One mine uses shortwalls cutting along the bottom of the seam. In nine other mines the machines are a combination of shortwall and longwall. These work as shortwall cutters with the bar about on a level with the top of the machine body. This bar is supported by a sort of underframe. This places the cutter bar so that it can mine out the slate and band rock in the middle of the seam. Light shots bring down the upper and raise the lower bench. This plan greatly increases the percentage of lump, practically reversing the old proportion of the sizes. Machines also remove most of the band rock so that the cut is made in refuse material and not in good coal. As the result of their improvement in the regularity of the work and their better pay, even the miners are losing their former resentment.

The coal is cleaner, more of it is marketable, and it is expected that the running time each year will be much greater than it ever was before now that more lump coal is produced. Machines finally came when it seemed that the operators must have them or quit business. Perhaps they saved the field.

DEMONSTRATIONS OF THE EXPLOSIBILITY of machine coal cuttings have recently been made at the Pittsburgh, Pa., experiment station of the U. S. Bureau of Mines for the chief of the mining division of West Virginia. The explosibility of starch and aluminum dust was also recently demonstrated. A general program for the scientific study of the propagation of coal dust explosions, which has been given consideration, includes a study of the time factor in the combustion of coal-dust particles, and the method for determining pressure; also a study of the influence of ionization in the propagation of a dust explosion.

Refuse from Picking Table Crushed, Cleaned and Used In Boiler Furnaces at Graham, Ky.

Tipple Refuse Too Poor to Use for Raising Steam Passes Through Crusher and Over Reciprocating Table and Makes Salable Fuel at Cost of Less Than a Dollar a Ton

By Charles M. Means*
Pittsburgh, Pa.

THE relatively high cost of producing coal has introduced new and varied problems and warrants resorting to expedients that were impracticable a few years ago. The bituminous-coal industry is destined to follow the practice of the anthracite field in reclaiming valuable fuel from refuse piles and from the material separated from the product of the mine in course of its preparation for the market.

At the plant of the W. G. Duncan Coal Co. about 80 tons of refuse is separated every working day from the coal delivered to the tipple. This refuse contains so much impurity that without being cleaned it cannot be used for fuel in any known design of furnace. Consequently until recently it was the practice to remove this material to a waste pile at a cost of about 25c. per ton. The following analysis of the refuse shows that it contains much good coal that would burn if the impurities were in part removed:

CRUSHED REFUSE FROM PICKING TABLES

	Per Cent		
Moisture	5.50	B.t.u. per lb.	9,960
Ash	21.95	Sulphur, per cent	12.02
Volatile matter	32.87		
Fixed carbon	39.68		
	100.00		

Refuse Washing Plant

The coal from the picking tables is crushed and transported by the derrick to a bin, from which it is fed to a reciprocating table, where the coal is cleaned. The clean coal goes to the boilers or even to the market, and the waste, about 30 tons a day, is taken by trucks or railroad cars and dumped.





Concentrating Table

The refuse is classified into clean coal, slate and sulphur. The clean coal has the ash reduced from 22 per cent to 6½ per cent. The sulphur content, which ran 12 per cent, falls to 3½ per cent. The sulphur and slate at present both fall into a common bin and are dumped to waste together.

After an investigation it was decided that an attempt should be made to clean the refuse so that it could be used in a power plant owned by the same company and located near by. For its preparation a hammer-type crusher and a concentrating table were installed. A guyed derrick was erected and furnished with a clam-

*Consulting engineer.

shell bucket. This derrick removes the crushed tipple refuse from the crusher to a bin over the concentrating table and the coal from the washed-coal bin below that table to an elevated bin from which it is taken to the boilers. It is used also for transferring the refuse of the reciprocating table to trucks or railroad cars for disposal.

The refuse is delivered from the tipple to a bin over the crusher, to which latter it is fed as required. After the coal has passed through the crusher it falls into a bin beneath it. It is then removed by the derrick to another bin at the concentrating table, where it is fed onto the table and the separation of the coal from its impurities is made. The bone and sulphur fall into one bin, and the coal falls into another.

Derrick Always Ready to Place Coal as Needed

The coal is picked up by the clamshell and placed in an elevated bin and loaded by gravity into industrial cars and delivered to the power plant. However, if more of the cleaned product is being made than the power plant requires, it is stored in a pile, to be picked up when the mine is not in operation or at some time when the supply of refuse from the tipple is insufficient to meet the needs of the boiler furnace. The moisture left in the coal after its preparation is not excessive and has no deterrent effect on its use in the stoking equipment.

The analysis of the coal thus saved from the tipple refuse is as follows:

CLEAN COAL PREPARED FROM TIPPLE REFUSE

	Per Cent		
Moisture	7.40	B.t.u. per lb.	12,362
Ash	6.57	Sulphur, per cent	3.63
Volatile matter	38.68		
Fixed carbon	47.33		
	100.00		

The results attained in the burning of this product have always been as good as and perhaps better than are obtained from the combustion of the regular screenings from the mine. Some of the coal thus recovered has been shipped on regular orders for screenings, and no complaints have been received from any of those to whom such shipments have been made.

Sulphur Recoverable When Occasion Requires

The sulphur thrown off by the table goes into the same bin as the bone and shale but at a different point. It will be a simple matter to recover the sulphur separately and in a sufficiently pure state for the manufacture of chemicals. At the present time the market for this material is such that the separation of the sulphur hardly is warranted.

For the various operations two men are required, one at the derrick and one at the concentrating table and washer. The labor cost is 75c. per ton of recovered coal, the power cost about 5c. and the overhead about 10c., making a total cost of about 90c. per ton of coal recovered. In other words, the separated clean coal costs only about 65c. per ton more than the cost of disposing of it as refuse, the final result being that on an average 50 tons of commercial coal is recovered per day at a relatively low cost.

This equipment has been in use about two years and the results have proved uniformly successful under various operating conditions. It is reasonable to suppose that plants of this character can be installed at many mines throughout the bituminous fields and operated at a real profit.

Basic Average Figures on Anthracite Industry Made Available

By R. V. Norris

IN ITS foreword, entitled "The Vital Need—Information," *Coal Age* of Feb. 8 said: "Industry and the world at large require facts for safety. It is the function of the engineer to supply these facts."

In the series of articles by Mr. Ashmead on "Anthracite Mining Conditions," started by him in the Feb. 22 issue of *Coal Age*, a long stride is made in furnishing in available form basic average figures applying to the industry.

Mr. Ashmead has reduced to easily studied diagrams the figures as to thickness and depth of beds, boiler equipment, transportation and, most important of all, labor output in tonnage from analysis at five-year periods, from 1872 to 1922, of the very complete reports of the Inspectors of Mines of Pennsylvania.

From these diagrams can be traced the changes in the industry through half a century of progress. As would be expected, the average thickness of coal worked shows a general decrease, and of depth of workings an increase, modified in some sections by extensive strippings and second mining of old surface workings. The rather startling increase of two and one-third times in the tons produced per mule does not indicate that the hay burner has become two and one-third times as efficient but that he probably handles less than one-third of the output now compared with his monopoly in 1872.

In the labor efficiency a marked increase in tons per day per outside man reflects the improvement in machinery, particularly in the introduction of mechanical picking, replacing boys in the breakers. The reduction in efficiency of inside employees probably is partly due to conditions and partly to actual decreased effort.

Similar articles have been prepared treating each of the mining districts in the same general manner, so that the series gives a very complete history and analysis of practice, showing the fluctuations and changes of half a century of experience.

The value of the investigation lies not only in making available valuable data previously buried in a mass of reports but in showing the tendencies for the future and in giving a basis of comparison for different operations by showing the average conditions and requirements of each region in clear and easily studied form.

These curves can and should be used by all operators to check up their own production results by comparison with their regional averages, modified by comparison of their conditions with the regional curves of depth and bed thickness. The curves will be found of great value in studying property values and particularly in forecasting the results of future changing conditions.

This work of Mr. Ashmead shows what can be done in making readily available huge accumulations of statistics, and points to a valuable service which the government should do in making its collections of data available for practical use. With the way thus blazed by private enterprise the work should be continued and extended.

Additions, removals and changes in the permissible list of explosives from March 15 to Dec. 31, 1922 are given in Serial 2,430, by S. P. Powell, explosives engineer, which was issued recently by the U. S. Bureau of Mines. The list supplements that contained in Technical Paper 307, issued in March, 1922.

Administration of Laws Regulating Conditions in Mines*

Best Results Obtained by Appointing Inspectors Through Rigid Examination, Then Giving Them Real Authority and Reasonably Secure Tenure of Office—Supplementary Regulations Should Be Alterable to Suit Changing Conditions

By E. A. Holbrook†

OUR present mining laws and codes and their administration are a growth and evolution from the older mining customs and laws of Great Britain. Today, of the coal mining codes of the various states, the Pennsylvania bituminous code is the most complete and has been the framework for the provisions and administration practices of the codes of many other states. Pennsylvania has no mining code covering ore mines and quarries, and no code to regulate petroleum and natural gas production.

The best results in administration of mining codes have been gained by appointing inspectors through rigid examination, then giving them real authority and reasonably secure tenure of office. In any mining code, instead of a collection of detailed laws whose change is difficult, it is desirable to have a body of law, supplemented by regulations which may be altered by conference of all concerned, without legislative action.

The administrative relationships of the workmen's compensation insurance inspection and merit-rating work to the state mine inspection service are supplementary and may, in a state where mining is a great industry, be operated to advantage separately without conflict or duplication.

Time to Legislate on Coal Conservation

The time has come to consider introducing into mining codes factors affecting conservation in mining the irreplaceable resources, especially coal, to be administered under the public or state department. A great state department should contain specialists to investigate and advise in the varied engineering technical problems increasingly encountered in the administration of the mining codes.

In no way can greater help come in the administration of our mining codes than by the more systematic and general training and education of the masses of the men in the industry in the elements of mining science and art that are vital to their safety and advancement, and in upbuilding the industry.

A complete State Department of Mines should administer at least the following bureaus: (1) Coal-mine inspection; (2) ore mines and quarries inspection; (3) petroleum and natural-gas production inspection; (4) mineral conservation; (5) miners' compensation insurance; (6) miners' instruction and training; (7) mine engineering and research.

The subject as first suggested was "A Code of Standard Practices in the Administration of Mine Inspection Laws." I prefer the present title, for, due to the great diversity of state mining laws in this country and more particularly the coal-mining laws, codes or regulations as they exist in twenty-nine states today, no one man is qualified to recommend a best definite detailed code to cover the great differences in practices and administration occasioned by the multitude of different conditions underground.

The more one deals with the American coal industry, the more one becomes impressed with its vastness and complexity and realizes that facts and physical conditions important in one district or state often are of minor importance in another. In general, coal-mining codes vary from state to state, not only in completeness and effectiveness but in substance and in operation.

New Laws Should Be Outcome of Conference

Thus before devising acceptable codes of procedure or altering practices dealing with mine-inspection laws it is wise to bring together for extended discussion men in the industry with wide general experience, others familiar intensively with special local conditions, specialists in modern underground machinery and appliances, the miners and the operators as most directly concerned, the experienced inspectors and the representatives of the public. Modern mining codes based on these considerations have been put in operation within recent years in Great Britain and in several of our states.

Get clearly in mind that from the earliest days mining has been considered an industry apart and by itself, its people a group distinct from the general worker in many thoughts and habits, and that it was practically the first industry generally to have codes, regulations and inspection, especially as concerns the safety, health and working conditions of the employee and his relations to the employer. When men go underground, new and unfamiliar hazards appear, new problems concerned with the conservation of life and properties arise. One man's actions may endanger the life of every man underground in the mine.

New Conditions Call for New Legislation

Our modern coal-mining laws and codes are built mostly on older ones which had their beginnings several hundred years ago in the coal-mining districts of England. Here, as men dug deeper into the earth, local rules and customs developed as safeguards to property and life underground which after a time became in effect the common laws of mines. At first these laws dealt with property rights and had little regard for protection of life. It was not until 1850 that the laws providing for government inspection of mines were passed. In 1872 many of these common customs and laws were absorbed into a general coal mines act applicable to all of Great Britain, but with individual districts still able to regulate for special local conditions. Many amendments and additions have been made since, necessitated by the revolution in mining brought about by the introduction of modern machinery, and tending strongly in administrative features toward greater centralization of and increase in authority, duties and independence of the Central Department

*An investigation made for the Director of the U. S. Bureau of Mines and published with his consent.

†Dean of the School of Mines, Pennsylvania State College; formerly assistant director of the U. S. Bureau of Mines.

of Mines; and laying increasing emphasis on the fitness of inspectors and administrators of the laws, through competitive examinations for appointments to such positions.

In Germany the history of the origin and development of coal-mining codes has been similar excepting for a fundamental difference in administration policy —i.e., in Germany and other Continental countries a mine manager may not undertake any new action or work whatsoever without the approval of the government department, whereas in England the theory has been that an individual operating a mine could continue to use his own initiative and judgment in mine development and operation so long as he observed the minimum requirements of the law as found in the codes and regulations.

In this country, largely because our first miners came from the mines of Great Britain, we have developed our codes and their administration on the English theory and groundwork. The first state laws here governing coal-mine operation and inspection were passed for the anthracite district of Pennsylvania in 1869 after efforts extending over more than ten years, and were broadened by acts of 1870 and 1871. Ohio in 1874 passed the first acts providing for state inspection and regulation of bituminous coal mines. Next, in 1877, Pennsylvania enacted laws governing mine operations and providing for state inspection for the bituminous-coal region. This bituminous code, together with its many amendments and revisions, has been the basis for practically all the coal mining codes in the rest of the twenty-nine states where coal mining is an industry. Especially noteworthy in Pennsylvania have been the revisions of the code to meet the needs brought about by modern conditions of working and the introduction underground of new appliances. For example, the use of electricity, which as it develops brings new and unknown hazards underground, is more extensively covered by the Pennsylvania bituminous code than by that of any other state.

A Mining Code Must Contain Much Detail

While the length of a state mining code is not a safe measure of its value yet, other things being equal, it may give a measure of scope, attention to details and diversity of conditions to be administered. Thus the Pennsylvania bituminous law heads the list with about 43,000 words, followed in turn by Ohio with about 40,000, Illinois 36,500, and the other states in decreasing sequence. The new federal Bureau of Mines regulations to govern operations on the public domain coal lands of the West and to properly conserve the coal therein have about 19,000 words, but in part fit into and supplement the codes of the various states in which this mining is conducted, and are therefore not detailed as to many methods and duties generally considered in state codes.

The essential object sought in the American codes is the safety and health of the miner, with minor emphasis on protection of property. I venture to emphasize that the time has come to give more attention to economic factors in coal-mining codes, having the object in view of compelling more systematic and modern methods of mining coal in order to extract the largest possible percentages of the coal before abandonment of the mine. It is true that operators of some mines now extract all the coal possible and that others will follow when it becomes profitable to do so, yet should not the decision as to whether or not certain coal should be mined or lost be from the standpoint of conservation of an irreplaceable resource rather than from the economic profit viewpoint, and a matter to be entrusted to the public administrators of our mining codes? It would mean true conservation of our resource, hand in hand with our present efforts at conservation of life.

The administration of coal-mining codes is universally in the hands of a chief inspector, having greater or less power and responsibility, according to the state. He generally is appointed by the Governor of the state, without examination for fitness and upon his general record and reputation as a mining man, although a few states make definite technical qualifications a prerequisite. The chief is assisted by deputy or district inspectors, whose duties, powers, qualifications and fitness vary widely in the various states. Since the test of a law is its enforcement, the choice and methods of appointment of a state inspection service whose duties are entirely those of administration and enforcement of the laws are equally important with the provisions of the code itself.

Pennsylvania and Illinois Inspectorates

Following English custom, Pennsylvania was the first state to appoint inspectors based on examination for fitness. Later, as the number of inspectors increased greatly, the inspection service was brought under a State Bureau of Mines (1897) and then, with prophetic vision for the necessity of a greater service to handle the greatest and most specialized of the industries, a Department of Mines was created (1903). The Pennsylvania mine-inspector examinations have, as the industry developed, been made more severe, and are generally acknowledged as being of advanced high grade and models for the examinations of many other states. In Illinois the first mine inspections were made by county surveyors who were politically elected officers. Afterward in 1883, a state inspection service modeled on the Pennsylvania laws was enacted, without, however, doing away with the county designated mine inspectors. Some counties still have their own appointed inspectors, who, however, act as deputies to the state inspectors.

In 1901 for the anthracite districts of Pennsylvania the method of electing district inspectors from a list of those who had obtained certificates of fitness was put into operation. Recently (1921) the return was made to the appointive system after examination. The elective system of selection of inspectors has not been adopted generally, although in Oklahoma, following a provision inserted in the state Constitution in 1907, the chief state inspector and the district inspectors are elected as a part of the regular party ticket. In Kansas for a time the chief inspector was elected by elected delegates of miners, but since 1913 the appointment has come under a Commissioner of Labor and Industry.

For the country in general coal mining would today be a better and a safer industry were inspectors in every state chosen as for the bituminous region of Pennsylvania, through strict examination in principles and practice of mining, at a salary sufficient to attract high-grade men, and freed from any influence save those listed in the laws and that of their superior officer, and expectant of holding office until retired by natural causes. A high grade of inspection service should exist in all districts of the country and be backed up by putting "more teeth in the laws," by giving increased author-

ity to the inspection service and by pensioning its members when they can no longer perform the arduous duties exacted by the work.

It is encouraging to record that, even in the case of the chief, usually appointed by the Governor of a state, there has been a more marked tendency during the past few years to depend on merit for continuation in office. In one case recently a state Governor reappointed a chief inspector who had been appointed first by the preceding Governor of opposite political party. Maryland even provides for a permanent man to head the department who is appointed by the Governor from a list of five persons who have passed strict civil service examination for competency. British Columbia elects a Minister of Mines who has under him a complete organization whose members are removable only through cause. To my mind, a better mine-inspection service may be built up through continuity in office of men able to build and maintain firm policies through a considerable term of years rather than through the frequent changes taking place in some states. I am totally unable to see how matters that concern the life or death of a miner should concern politics.

Some Boards Group Mine with Other Safety

During the past few years the great new factor in the administration of mine-inspection and safety work has been the coming of workmen's compensation insurance for miners, its influence on mine safety and the relationships of the industrial commissions administering the compensation insurance and inspection to the administration of the established departments of mines and related inspection service. Thus, in Wisconsin, California, Utah, Ohio and in several other states in which mining is of minor importance the State Mining Bureau or Mines Inspection Service no longer constitute major departments reporting direct to the Governor but have been merged into a major department known as the Industrial Accident Commission or Bureau of Labor and Industry or by similar name, which generally combines mines, factories and other state inspection, together with the enforcement of the various workmen's compensation acts. On the other hand, Colorado, Illinois and Maryland in revising their state departments within recent years have kept their mine-inspection departments practically independent, although combining many forms of inspectional work.

The workmen's compensation insurance inspection is related to coal-mine inspection and mine safety as follows:

Attempts were made at first to insure mines, either through state funds or private companies by a straight tonnage tax or by a tax based on the payroll. This, while applicable for states having only a few mines of similar character, did not make allowance for the wide variations in hazards, as for example, between a small mine with safe natural conditions and a large badly operated mine with gas, a bad roof and possibly other natural and moral hazards. It was as if the same fire-insurance premium rate should be assessed on a fireproof structure and a wooden shack. Consequently the system of merit rating of coal mines for safety standards for purposes of equitably assessing compensation-insurance premiums was worked out by the Mining Department of the Associated Insurance Companies in co-operation with the U. S. Bureau of Mines, and the system has been adopted as the most equitable for coal-mining insurance. All known mine hazards are listed and charged for with allowance or deductions for their non-existence or elimination at the mine in question. Thus for the first time the direct cost of a mine with low safety standards is brought home to the operator. The system has proved a real safety incentive.

Considerable discussion has taken place as to the administrative relations of this compensation-insurance inspection work to the regular work of state inspection in a Department of Mines, and so as to the advisability of grouping it with the regular state mining department inspection work. Undoubtedly, in states where mining is a minor industry, requiring at most two or three inspectors, some form of amalgamation or co-operation with state accident compensation departments is feasible. Another good point is the argument that those who pass on safety are in the best position to pass on accidents.

One of the difficulties of the regular state mining codes is that generally they are laws enacted by the Legislature, and their change or repeal as mining conditions change often is a difficult matter. On the other hand, the states of California and Utah, with mine inspection grouped with the state accident or industrial commissions, have, instead of fixed mining law codes, a body of regulations arrived at after consultation of all interested parties, and they are fairly easy to change when new conditions arise. This desirable feature, however, need not be limited to states where the mine-inspection service is affiliated with the accident commission. Without regard to the organization of a State Mining Department, it is difficult to understand why, in a highly developed and specialized art like mining, courts and legislatures should have to be educated to the needs of the industry before changes in codes can be made. A real danger in amalgamation is that of having mining policies passed upon by men who are primarily not mining men.

Merit Rating Spurs Operator Only to Safety

A study of the question in any state where coal mining is one of the important industries shows that the functions of the state mining inspection service and the inspection of mines for insurance merit rating are supplementary rather than duplicating or overlapping. The insurance inspection is an incentive to the operator only to lessen his individual hazards by economic persuasion. It follows a regular schedule, has no police power and is special work for a special purpose. It is an added incentive to increase safety above the minimum standard rather than a basic one affecting all interests. Its basis is the business of insurance. On the other hand, the regular inspection service must enforce a code of mining requirements for safety based not on economic factors but on the relationship of human society in underground hazards and conditions. Its edicts must bind miner as well as operator. Its inspectors must have real police power. Their technical knowledge must govern and decide many points not involved in the compensation work. They must spend much time on the technical side of the work, in interpreting and applying all codes and regulations with justice. They are in fact the sheriffs of the mines, often with the added power of judge and jury. In addition there is still a gap in compensation inspection through the large companies electing to carry their own risks.

Before long state mine-inspection services should have a new duty to perform, that of conserving those

resources of coal which so much in the past have been wasted by careless mining, owing largely to economic factors beyond the inspectors' control at present. For the benefit of the coming generations, should not laws require the extraction of a maximum percentage of the coal resource before abandonment of a mine? A simple statement and yet its enforcement means building a new code of mining laws and a new conception of the individual right to mine, yet one which must come, even before it is profitable to take such care.

It is pertinent that other states with ore, mineral and clay mines and quarries comparable with Pennsylvania have special mine inspection services to serve them. Pennsylvania has none. Also California and other Western states have found it in public interest to provide state agencies to regulate petroleum and natural-gas production, technology and conservation.

You all know that Pennsylvania is the great coal-mining state of the Union, producing last year about 40 per cent of the tonnage of the country and the value of which was about one-half of the value of all of our coal. Pennsylvania alone produces more coal than any foreign country excepting Great Britain, and is scarcely behind her. Yet the technical side of the coal industry in Great Britain is recognized by a major department in the home office of the British Government with a Secretary of Mines. Surely in Pennsylvania with the technical mining problems, the enforcement of the laws and the industry itself becoming more important each day and requiring at present 55 inspectors, it is vital to maintain and build up a still greater Department of Mines.

Departments of Mines Should Have Experts

Under modern mining conditions a large state department of mines is called upon to decide complicated engineering and technical questions involving standards of electrical, mechanical and chemical appliances, of passing upon highly specialized machinery and eliminating its hazards. Problems increasingly arise calling for investigation and research in general and of local conditions involving mine gases, ventilation, mine supports and other special and often unknown factors. For this work the department should have at its command specially trained men with a knowledge of engineering and research in the mines.

I believe the greatest help in the administration of our mining codes must in the future come from more intensive instruction and education of the masses of men engaged in the industry. In Pennsylvania alone coal mining commands an army of nearly 400,000 men. Tens of thousands of new men are enrolled each year and in increasing numbers. This expansion of our coal industry has caused a scarcity of men trained in those elements in the science and art of mining which is rightly required by the Pennsylvania laws before a man may be a mine official or an inspector.

The introduction of machinery, the added dangers from gas and dust as our mines grow larger and deeper and the coming necessity of preventing waste of our great non-replaceable resource all demand more trained officials and miners. Practical men are needed, but the time necessary for them to become competent workmen and officials can be greatly shortened by instruction such as is common in most foreign coal-mining countries. This training to interest the men must in turn be given by practical mining men. It is useless to make mining codes and regulations which are beyond the grasp of the mass of people they affect. Looking to the future, administration of our improved and broadened laws and codes for increased safety and efficiency should first require that to every man and boy in the mines a place and way must be offered where he can, if he chooses, acquire under practical and trained men the knowledge necessary to safeguard himself and his fellow workers and to advance himself without limit in the various positions of responsibility in the industry.

Finally, to make complete any great state department by including in it all the related services mentioned in this paper, and to form a plan for building up and administering a service which must grow and expand, I recommend a central Department of Mines to include at least the following bureaus: (1) Bureau of Coal Mine Inspection, (2) Bureau of Ore Mines and Quarries Inspection, (3) Bureau of Petroleum and Natural Gas Inspection, (4) Bureau of Mineral Conservation, (5) Bureau of Mine Compensation Insurance, (6) Bureau of Miners Instruction and Training, (7) Bureau of Mine Engineering and Research.

Thirty-four States Have Fuel Directors

Of the forty-eight states in the Union all but fourteen have State Fuel Administrators or another official appointed by state authority to regulate the distribution of coal during the present emergency. In one of these fourteen states, Connecticut, the Administrator, T. W. Russell, recently sent his resignation to Governor Templeton.

The states having Administraters, with their names and addresses, follow:

State Fuel Administrators

Alabama—William A. Darden, State Fuel Administrator, Montgomery.
Delaware—Leon Walker, Chairman, Delaware Coal Commission, 1020 Church Street, Wilmington.
District of Columbia—Walter C. Allen, Executive Secretary, Public Utilities Commission, Washington.
Florida—Florida Railroad Commission, Tallahassee.
Georgia—James T. Boifeuillet, Commissioner, Georgia Public Service Commission, Atlanta.
Illinois—Robert M. Medill, State Fuel Administrator, Chicago.
Indiana—J. W. McCardle, Chairman, State Distribution Committee, Indianapolis.
Iowa—Charles Webster, State Fuel Administrator, Des Moines.
Kansas—Court of Industrial Relations, Topeka.
Kentucky—J. Sherman Cooper, Chairman, Kentucky Railway Commission, Frankfort.
Louisiana—John G. O'Kelly, Fuel Distributor for Louisiana, Baton Rouge.
Maine—Andrew P. Lane, State Fuel Administrator, Augusta.
Maryland — William Milnes Maloy, Chairman, Public Service Commission, Baltimore.
Massachusetts—James J. Phelan, Massachusetts Emergency Fuel Administrator, State House, Boston.
Michigan—William W. Potter, State Fuel Administrator, Lansing.
Minnesota—Ivan Bowen, State Fuel Administrator, St. Paul.
Mississippi—Mississippi Railroad Commission, Jackson.
Missouri—Hugh McIndoe, Chairman, Missouri Coal Distribution Commission, Jefferson City.
Nebraska—H. G. Taylor, Chairman, Nebraska State Railway, Commission, Capitol Building, Lincoln.
New Hampshire—Charles M. Floyd, State Fuel Administrator, Manchester.
New Jersey—Wm. J. Grier, State Fuel Commission, Trenton.
New York—General George W. Goethals, New York State Fuel Commission, 165 Broadway, New York City.
North Carolina—R. O. Self, Director, State Fuel Commission, Raleigh.
North Dakota—Frank Milhollan, Fuel Director and Distributor, Bismarck.
Ohio—George T. Poor, Chairman, Public Utilities Commission of Ohio, Columbus.
Pennsylvania—William D. B. Ainey, Chairman, Pennsylvania Fuel Commission, Harrisburg.
Rhode Island—George H. Webb, State Fuel Administrator, Providence.
South Carolina—Frank W. Shealy, Chairman, Railroad Commission, Columbia.
South Dakota—J. J. Murphy, State Fuel Administrator, Pierre.
Tennessee—Wilbur A. Nelson, Chairman, Tennessee Coal Commission, Nashville.
Vermont—Hugh J. M. Jones, State Fuel Administrator, Montpelier.
Virginia—Major Alexander Forward, State Fuel Administrator, Richmond.
West Virginia—J. Walter Barnes, State Fuel Commissioner, Charleston.
Wisconsin—P. H. Pressentin, Chairman, State Coal Committee, Madison.

The states besides Connecticut that have no Fuel Administrator are: Arizona, Arkansas, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah and Wyoming.

What Shall Be Done About the Growing Evil of the Pollution of Streams by Mine Drainage?*

Review of Proposed Laws—Neutralization of Waters Discharged Into Ohio and Its Tributaries Would Require Even Today a Million Tons of Lime Yearly—New Mines Increase Acidity—Actions in Law Courts

By Andrew B. Crichton
Johnstown, Pa.

NO MORE important question has come before the coal industry in the past decade than the prevention of stream pollution by mine drainage; especially in Pennsylvania, where large areas of coal land have been developed. It may be thought that the problems of labor or lack of transportation outweigh in importance that of stream pollution. We can see possible remedies for labor and transportation problems but there is no known satisfactory solution of the mine-drainage problem. The subject has been given little serious attention, for until recently it has been little understood; but in the past year it was brought to the attention of the coal-mining industry by the introduction in Congress of several bills designed to prevent discharge of acid waters from mines or other sources into navigable streams or their tributaries.

The first legislation proposed was the Appleby bill, H. R. 7,369, designed particularly to prevent the oil pollution of coastal waters. It contained the following provisions, which the coal men regarded as applicable to the coal industry:

> It shall be unlawful to throw . . . any refuse matter of any kind . . . into any navigable waters of the United States or into any tributaries of any navigable waters from which the same shall float or be washed into such navigable waters.

The chemical, steel, paper and other manufacturing industries, as well as the mining industry, objected to this clause, the mine operators contending that it would prevent the discharge of waste or mine drainage into any waters of the United States, for all streams or tributaries finally reach navigable waters.

The next bill introduced was that of Congressman Briggs, H. R. 7,430, an amendment to Sec. 13 of the Pollution Act of March 3, 1899. The original act referred chiefly to oil and oil refuse, but it provided also "that no material of any kind should be deposited on the bank of a navigable water or tributary which might reach the waters and interfere with or obstruct navigation." This last provision could be said to apply to mine refuse, which would produce highly acid drainage.

The Rosenbloom bill, H. R. 8,733, also an amendment to the act of March 3, 1899, provides that it shall not be lawful to deposit or discharge from "any source whatever any free acid or acid waste, or anything that may become acid after being deposited into navigable waters or tributaries of the United States." Under this bill army engineers may prohibit the discharge or may regulate the entrance of wastes or may require the treatment of such discharge to destroy its acidity. This bill aims at the mine drainage entering the Ohio River and its tributaries.

The first draft was proposed by Major General Lansing H. Beach, chief engineer, United States Army. General Beach, in his report, states that the treatment of acid mine waters is so simple and inexpensive a matter that he believes there will be no opposition on the part of the owners of mines concerned. He suggests that lime be deposited in a small box, to be built at each mine opening, through which the mine water would flow, thus neutralizing the acid.

J. T. Travers, supervisor of streams, fish and game division, State of Ohio, in the same report states that the equipment will cost about $65 for each opening and the supplies from 75c. to $1 per day. It developed, however, at the hearing held in Washington that the Travers system was applicable only to manufacturing plants discharging 3,000 to 7,000 gallons per day.

Mr. Travers thinks that coal-mine drainage is not so bad as that from manufacturing operations and that it would be comparatively simple and inexpensive to treat mine drainage. He apparently has not considered seriously the statements of mining engineers as to the enormous quantities of acid mine water daily flowing from the coal mines of the country. There would be no opposition to treatment in this manner if the problem were as simple and inexpensive as indicated in the foregoing paragraphs.

Ohio Receives 2½ Million Tons of Acid

The Chemical Alliance, in a report made at the request of the chief engineers of the United States Army, stated that 6,500 tons of sulphuric acid is discharged into the Ohio River and its tributaries every day, or 2,357,500 tons per annum, or nearly half as much as is now produced in the United States. Neutralizing this amount of acid would require 3,250 tons of lime per day, or 1,170,000 tons per annum.

Charles Dorrance, vice-president of the Hudson Coal Co., whose thirty mines produce 9,000,000 tons of anthracite annually, has stated that these mines pumped 15 tons of water for each ton of coal produced and that neutralization of the water of the anthracite region, basing the estimate on the cost to this company, would require an initial expenditure for installation of $39,000,000 and that the annual operating expense would be about $18,000,000.

Mr. Dorrance estimated that the mine drainage from the fields of the anthracite region was 700,000 gallons per day; and that neutralization would add to the consumer's bill about 50c. per ton. P. C. Madeira, of the Anthracite Coal Operators' Association, estimated that an average of 18 tons of water was hoisted or pumped for each ton of coal.

The act of 1899 placed the matter in the hands of the army engineers, but at the Congressional hearing the question was referred to the Department of Commerce for investigation and report; thus at the start jurisdiction is rather confused. In Pennsylvania Governor Pin-

*Article entitled "Mine-Drainage Stream Pollution," presented at the February meeting of the American Institute of Mining and Metallurgical Engineers, held in New York City.

chot has promised legislation to prevent stream pollution. Various Congressional candidates have based their claim for election on this issue.

The problem of pollution is squarely before the industry. It is important, it is serious, and the difficulties of the situation should be understood by the country, and more reliable data should be obtained on which to base proper legislation. Otherwise laws will be enacted that will become a burden to industries and the people as a whole. Already stream pollution has been a cause of inconvenience and expense to both mining companies and to the public. Until rather recently stream pollution has been a mining-community problem. If a water supply was destroyed through mine drainage it was customary to go farther afield for a fresh supply.

Unable to Purify Water Satisfactorily

Attempts have been made and much money spent in the building of treatment plants, which have been unsatisfactory and later have been abandoned. Many communities have had their water systems polluted and have gone farther up stream, at great expense, for fresh supplies. Johnstown, Latrobe and McKeesport have had to abandon their original sources of supply. Barnesboro, Altoona, Connellsville and many other Pennsylvania towns have acid water during certain periods of the year and eventually must seek new sources.

Nearly all the important streams of central and western Pennsylvania which were used twenty years ago for water supply are now seriously contaminated. Pittsburgh, in the center of one of the greatest mining and manufacturing districts of the world, is a particularly glaring example of a city suffering from contaminated waters. As industry expands there is a constantly growing demand for pure water for both domestic and industrial purposes; at the same time the extensive development of coal mines in the vicinity produces more and more mine drainage. During a large part of the year the quantity of water drained from the mines is small compared to the quantity of pure water flowing into the streams above Pittsburgh, and the acid water is so diluted as to render it harmless. This period grows shorter and the period of contamination longer.

The headwaters of some of the streams lie beyond the coal measures, but practically all these areas have been developed and little more fresh water can be obtained from such points. Western Pennsylvania has been developed from the standpoint of mining without regard to future water supplies.

Sulphur Water Strongest in Dry Season

Areas underlaid by coal measures that have been developed and partly or completely mined have little runoff except in wet weather. The broken ground allows easy penetration of surface water, which is later pumped out or drawn from the mine carrying much acid with it. The drought of last summer emphasized the seriousness of the problem in the Pittsburgh district.

The state and individuals have spent much money to solve the problem, but without success. It seems time for wise and careful governmental action. Secretary Hoover suggests a careful investigation of the entire problem before the passage of any legislation whatever, but this must not be deferred too long or there will be litigation between the mining interests and those of the water works.

In the past the interests of the mining industry have been regarded as paramount; but while coal is a necessity, water is necessary for the industrial centers where the coal is used. Both are vital to the welfare and prosperity of the nation.

Mining has maintained its superior position to industry and the water supply of the latter partly through the decision of the Supreme Court in the Sanderson case, in 1886, which gave the Pennsylvania Coal Co. authority to conduct its work without interference by the plaintiff, who obtained his water below the exit of the mine and which maintained that the inconvenience to the plaintiff was not so serious as the closing of the mine would have been. At the same time, however, the Court pointed out that the case "may arise in which such pollution may become a nuisance, and public interest, as involved in the general health and well-being of the community, may require the abatement of the nuisance."

An important case involving stream pollution is now pending in the Court of Equity, Fayette County, Pennsylvania. In this suit the plaintiffs are the Mountain Water Supply Co., the Dunbar Water Supply Co. and the Pennsylvania R.R. About thirty operating coal companies are made the defendants.

The Pennsylvania R.R. about forty years ago gave up its water supply at Portage because of mine-drainage pollution. Several million dollars were spent to provide an adequate supply for the future needs of the company, and Indian Creek basin was developed to supply the southwestern portion of this system. The drainage area of this development is 110 square miles, half of which is underlaid by commercial coal measures, none of which were developed at that time. Since then, however, railroads have tapped this section, mines have been opened and the water supply polluted. This has rendered the situation serious. Careful study has been given to all factors entering into the problem: methods of mining, thickness of seams, drawing of pillars, pitch of the measures, the relation and quantity of water pumped to production of coal, the relation of rainfall to underground water, etc.

Old Mines Produce as Much Acid as New

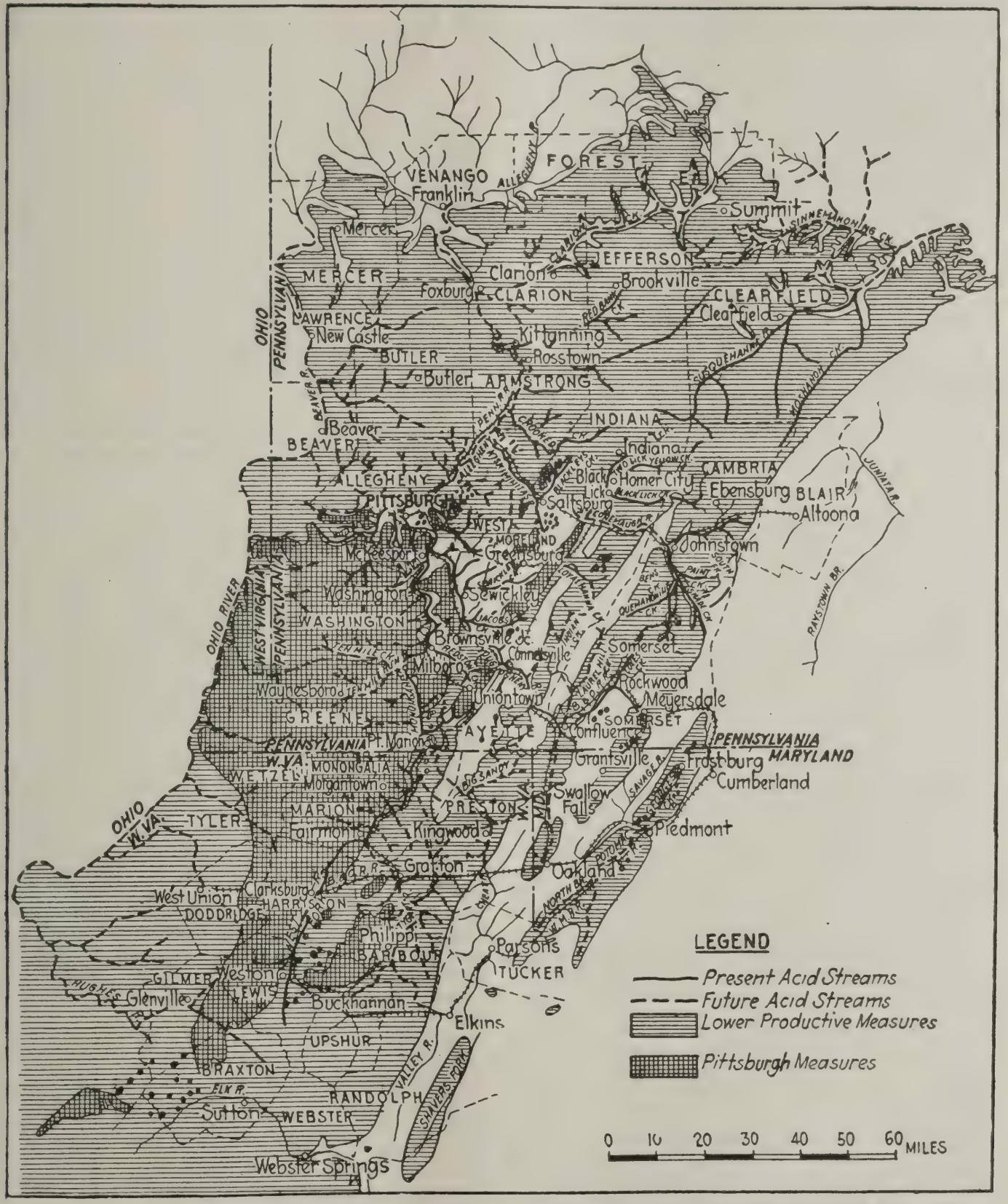
It developed that percolation of water bore no relation to the quantity of coal produced but a direct relation to the extent of development. It depends directly on the extent of the surface that has been disturbed and on the decrease in the run-off owing to the ground thus broken, because for each acre of coal mined much more than an acre of surface becomes disturbed and subject to increased penetration by surface waters.

The records of 170 mines in central Pennsylvania showed that for each acre worked out, 100 to 10,000 gallons of mine water is discharged per day, the average being about 1,100 gallons. In other districts of the state the average was not far from this amount. Shallow workings produced much more than the deeper workings. Many mines produced their maximum only when the pillars were drawn and when, as a result, the surface subsided.

Except in shallow workings, mine drainage flows are quite constant. They do not vary much with rainfall, consequently in time of drought the percentage of acid in the streams is materially increased. In one area, where about half the coal had been removed and where the average depth was about 500 ft. and the rainfall 3,300 gallons per acre per day, it was found that 27 per cent of this water percolated into the mine and was pumped out as acid water. The minimum flow was only 17 per cent less than the average of the year. These

figures are not far from the average percolation in other districts where records have been carefully kept.

The quality of mine drainage is quite as important as the quantity. In practically all the coal mines the mine waters contain sulphuric acid. Of over 300 mines examined in central Pennsylvania in only four was the mine water free from acidity, and in these the absence of acid probably was due to the fact that limestone was in contact with the coal seams. While nearly all seams of coal contain iron pyrites, in the thin seams of central



BITUMINOUS-COAL REGIONS IN PENNSYLVANIA AND NORTHERN WEST VIRGINIA WITH REFERENCE TO PRESENT AND FUTURE STREAM POLLUTION BY MINE WATER

The streams that are already acid are marked in solid lines and those which are expected to become acid with time in broken lines. It will be seen that Mr. Crichton has little hope for any of the streams in the coal area. He paints a gloomy picture of the industrial future and of the social discomfort that will arise from the gradual acidification of the streams.

and western Pennsylvania there is a bone coal carrying a high percentage of sulphur at the top of the main seam, a large portion of which is thrown into the gob, though large quantities are hauled outside and dumped in the valleys. This refuse material, both outside and inside of the mine, oxidizes rapidly and furnishes a large quantity of acid. The sulphuric acid forms salts as it comes into contact with the soluble minerals present and these salts in turn, on exposure, are precipitated, forming insoluble coatings which permit the free acid and salts to flow farther down the stream.

Some mines in the Pittsburgh seam in the Greensburg district of Pennsylvania show free sulphuric acid as in Table II.

The average total acidity at sixty mines of the H. C. Frick Coke Co. was 100 gr. per U. S. gallon. Analyses of the waters of some of the polluted streams in Pennsylvania at much above minimum flows, are given in Table III.

In treating acid water the custom is to neutralize it with lime (converting it into hard water—that is, converting the acid into calcium and magnesium sulphates) then adding soda ash to soften it. The quantity of foreign matter in solution is about the same as before softening. It is the total quantity of sulphates rather than the free acid which governs the treatment.

Twelve Grains of Acid the Working Limit

Water with 4 gr. of sulphates per gallon requires treatment of the same kind, and when pollution exceeds 12 gr. per gallon the amount of soda ash required causes foaming. Treated water is not free from harmful effects, the presence of salts still causing pitting. The human system could stand more than 12 gr. of sulphates per gallon, but a water cannot be said to be healthful if it is contaminated to this extent.

Basing an estimate on the area of coal mined throughout western Pennsylvania, Maryland and West Virginia tributary to the headwaters of the Ohio River and using the average percolation of such mine areas, it is estimated that there is an excess of 5 gr. per gallon of sulphate in the river water which requires softening before using. To this, however, must be added the acid derived from refuse dumps.

In this district over 7,000 square miles are underlaid with coal, only 400 of which have as yet been mined. If the mining of 400 square miles produces water of the foregoing character, what must be in store for the rivers when ten or twenty times this area has been mined? In the past the acid waters have been largely neutralized by the natural alkalinity of the fresh waters, but once the acid exceeds the neutral point the depreciation in the quality of the water will be markedly increased and out of proportion to the area of coal development. The illustration shows the coal fields of western Pennsylvania and parts of Maryland and West Virginia; it also shows the part underlaid with coal; in solid lines the streams now acid and in dotted lines streams that probably will become acid with continued mining.

TABLE II—FREE SULPHURIC ACID IN MINE WATERS FROM PITTSBURGH SEAM

	Grains Per Gallon
Keystone shaft	98.42
Sewickley	61.74
Greensburg Nos. 2 and 3	121.68
Seabord shaft	137.68
Claridge	169.40
Salem	91.20
Crows Nest	123.96

TABLE III—ANALYSES OF POLLUTED STREAMS

	Sulphuric Anhydride SO_2	Sulphuric Anhydride, Acid Sulphate	Free Sulphuric Acid, H_2SO_4
West Branch Susquehanna River at Moss Creek	44.40	5.90	10.60
Quemahoning at Dam	4.20	0.40	0.50
Conemaugh at Portage	35.23	6.80	12.40
Conemaugh at South Fork	24.25	5.40	9.70
Shade Creek at Mouth	4.72	1.00	1.40
Paint Creek at Mouth	37.70	7.40	14.10
Red Stone Creek at Mouth	32.89	6.77	9.33
Jacobs Creek at Mouth	19.49	3.83	8.03
Sewickley Creek at Hunker	40.27	9.80	16.33
Turtle Creek at Wilmerding	48.40	16.33	8.75

In addition to the acid of the mines large quantities enter the rivers from various industrial plants. If all this impurity were neutralized with lime the amount of sludge resulting would be very large and the arrangements necessary to keep it from the streams would be no small item of expense.

With this general statement of the problem what are the suggested remedies? Water-softening plants will help postpone the evil day, but the step from 4 gr. of sulphate to 12 gr., where softening is no longer effective, is short, and other remedies must be sought.

What shall be done with abandoned mines that are constantly throwing quantities of acid drainage into the streams? In time all the pyrite may be exhausted, and the water again may become pure. One case has been reported where the mine ceased to produce acid water after it had been abandoned twenty-five years. It does not appear as if we could wait for time to purify the water. Sealing the abandoned mines has been suggested, but this is impracticable in fractured ground. Where the ground can be thoroughly sealed, keeping out air and keeping the pyrite under water, oxidation will certainly be diminished. This plan holds some hope. It has been suggested that mine drainage be conducted from the mines in non-destructible pipes to points on water courses, below which the water is not used for manufacturing purposes. As a practical proposition this is difficult, because the drainage deposits sediment that would tend to clog any system of piping

TABLE I—TYPICAL ANALYSES OF MINE WATERS, GRAINS PER U. S. GALLON, BY E. C. TRAX

	Miller Shaft	Puritan Shaft	Sonman Shaft	Berwind No. 35	Yellow Run Shaft	Morrellville	Argyle	Blair	Howard	Rogers	Oneida
Total solids	266.01	330.18	276.50	146.42	135.33	608.82	135.88	266.17	218.54	175.53	329.48
Probable incrustants	190.15	247.59	200.67	96.26	75.84	368.13	70.59	85.85	.....	.....	.....
Suspended matter	7.29	9.92	3.21	10.50	8.75	1.20	4.14	.....	.....	.....	.....
Iron oxide	21.56	40.10	29.37	9.22	10.10	128.11	10.27	.....	27.32	28.88	55.19
Aluminum oxide	12.90	6.73	9.14	3.38	4.38	38.21	3.73	.....	5.43	11.45	8.72
Calcium oxide	30.55	27.17	20.90	16.47	9.60	20.76	13.13	7.14	29.47	11.40	27.62
Magnesium oxide	9.05	16.25	12.01	9.77	5.66	15.63	4.79	5.57	12.73	5.49	15.33
Sulphuric anhydride, SO_3	129.40	157.52	130.84	72.74	57.50	295.64	70.93	141.89	85.79	55.17	111.95
Sulphuric anhydride (acid sulfate)	20.82	37.33	37.68	10.04	11.67	87.06	21.88	16.47	.....	.....	.....
Free sulphuric acid, H_2SO_4	34.42	61.25	45.50	23.62	28.00	247.06	26.47	115.00	25.04	41.53	50.31
Chlorine	0.70	0.82	0.58	0.47	0.76	2.27	2.70	0.29	.....	.....	.....
Treatment Required, Pounds per 1,000 Gal.											
Lime	7.30	13.06	10.79	5.31	5.00	34.95	5.80	.....	.....	.....	.....
Soda ash	19.52	29.20	23.78	13.01	11.01	68.90	14.18	.....	.....	.....	.....

that could be used. An open drainage or a concrete duct would offer a better medium than any piping.

In the West barium has been used quite successfully to soften water, but its cost is excessive and water so treated is not suitable for domestic purposes. Evaporation is the only really satisfactory method of converting contaminated waters into something that can be used, but the cost is prohibitive.

The building of large storage reservoirs for impounding fresh water for the purpose of dilution has been proposed, but this would be expensive and of only temporary benefit. In the past the problem has been solved by going farther up stream to unpolluted sources, but in many instances no such sources are now available. The water companies have asked that coal mining cease in certain areas, and this the courts still have under advisement. It is certain that coal-mine development cannot be carried on without destroying the water of the immediate vicinity. It would, therefore, seem that about the only means of conserving the water supply is to stop coal mining in those little-developed areas which still contain an ample supply of fresh water. This cannot well be done as between individuals.

The State Board of Health in Pennsylvania reports ninety-six water companies with acid-pollution problems. This problem is connected and might well be considered with the matter of the overdevelopment of the coal industry. The coal industry is not to blame for this condition; it is simply a development of that industry. The public must either suffer the inconvenience or meet the cost of combating it.

We cannot learn from Europe how this problem may be handled because on that continent the coal mines do not have a similar problem. In Great Britain many of the mines use their water for boiler purposes and without treatment. In Yorkshire mine drainage is used as a source of domestic supply. In Great Britain the mines are being worked at depths varying from 1,000 to 4,000 ft. and they have relatively little water; in some of them water must be taken underground in order to lay dust. British coal mines are not acid producing because the coal is low in sulphur and often is in contact with limestone. In France the mines do not produce acid water, probably because an overlying bed of chalk extends from the surface to a depth of 300 ft.

With less than one-tenth of the coal of western Pennsylvania worked out, with continued mining, as at present conducted, and new development constantly being started, it is apparent what the results to the streams will be in a comparatively short time. The mine-drainage steam-pollution problem is serious. Its extent is not fully realized by the industry or the public. Secretary Hoover's suggestion that the question be carefully investigated in order to determine possible remedies and legislative enactment is wise and should be heartily approved and receive the co-operation of the coal industry.

Compare Coal Analyses of 25 Laboratories*

By A. C. Fieldner,† H. M. Cooper‡ and F. D. Osgood§

A STUDY of results obtained in analyzing similar samples of coal and coke by twenty-five laboratories throughout the country was recently conducted by the U. S. Bureau of Mines in comparison with results obtained in the bureau's coal laboratory at Pittsburgh, the purpose of this work being primarily to obtain a comparison of the methods of coal analysis used by the laboratories of the American Gas Association. Therefore, four standard samples of coal and one of coke were prepared in the Bureau of Mines coal laboratory at Pittsburgh, and portions were sent to each laboratory. At the same time, a like number of standard samples were submitted to twelve commercial laboratories not affiliated with the association, for the purpose of comparing their analyses with the results obtained by the U. S. Bureau of Mines and the American Gas Association. The comparison is based on the average of twenty-four analyses by the Bureau of Mines on each kind of coal, and the accompanying curves show the deviation from this average analysis, together with deviations from the check limits of the American Society for Testing Materials.

The laboratories co-operating in this standardization work are as follows:

AMERICAN GAS ASSOCIATION LABORATORIES

The Barrett Co., New York.
Boston Consolidated Gas Co., Boston, Mass.
Brooklyn Union Gas Co., Brooklyn, N. Y.
Camden Coke Co., Camden, N. J.
Chemical Service Laboratories, West Conshohocken, Pa.
Consolidated Gas Co. of New York, New York.
Henry L. Doherty & Co., New York.
Koppers Co. Laboratories, Pittsburgh, Pa.
Milwaukee Gas Light Co., Milwaukee, Wisconsin.
New England Fuel & Transportation Co., Boston, Mass.
Peoples Gas Light & Coke Co., Chicago, Ill.
Charles H. Tenney & Co., Boston, Mass.
United Gas Improvement Co., Philadelphia, Pa.

COMMERCIAL LABORATORIES NOT AFFILIATED WITH AMERICAN GAS ASSOCIATION

Perry Barker, Boston, Mass.
Commercial Testing & Engr. Co., Chicago, Ill.
Consolidation Coal Co., Fairmont, W. Va.
D. J. Demorest, Ohio State University, Columbus, Ohio.
O. L. Kowalke, University of Wisconsin, Madison, Wisconsin.
Arthur D. Little Company, Boston, Mass.
S. W. Parr, University of Illinois, Urbana, Ill.
Pittsburgh Testing Laboratory, Pittsburgh, Pa.
H. C. Porter, Philadelphia, Pa.
Public Service Electric Co., Newark, N. J.
U. S. Testing Co., New York City.
Warner Laboratories, Cresson, Pa.

The samples were carefully prepared by H. M. Cooper, chemist in charge of the Bureau of Mines coal laboratory at Pittsburgh, assisted by F. D. Osgood and W. H. Miller. The series consisted of twenty-four bottle samples each of an anthracite coal, a byproduct coke, a semi-bituminous Pocahontas coal, a low-sulphur low-ash Elkhorn Kentucky coal and a high-sulphur high-ash

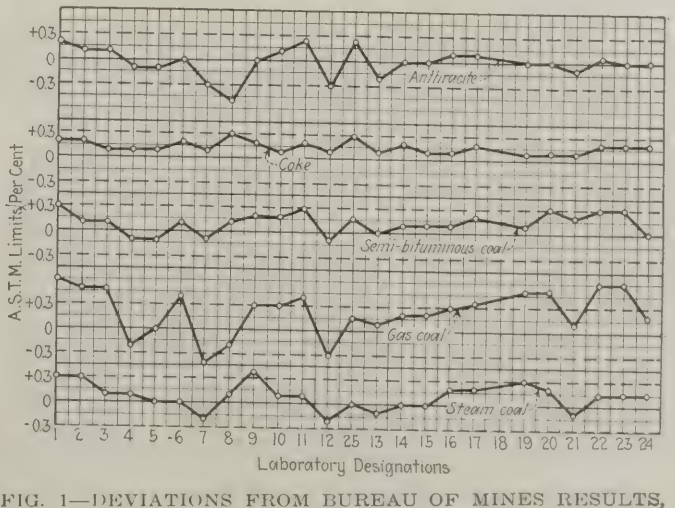


FIG. 1—DEVIATIONS FROM BUREAU OF MINES RESULTS, MOISTURE, AS RECEIVED

*Report submitted by A. C. Fieldner, chairman of Subcommittee on Analysis of Coal and Coke, American Gas Association, published in the *American Gas Association Monthly*, January, 1923.

†Superintendent, Pittsburgh experiment station, U. S. Bureau of Mines. ‡Chemist, U. S. Bureau of Mines. §Assistant chemist, U. S. Bureau of Mines.

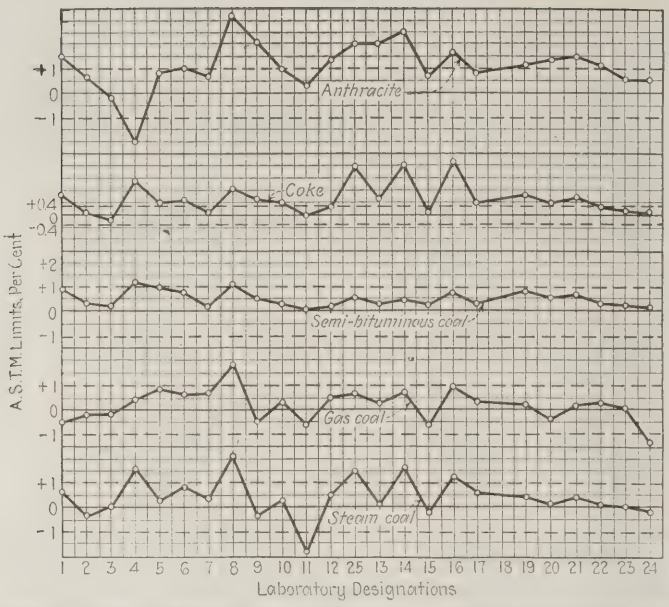


FIG. 2—DEVIATIONS FROM BUREAU OF MINES RESULTS. VOLATILE MATTER, AS RECEIVED

Pennsylvania steam coal. Laboratory No. 8 split its samples into equal parts, giving one part to laboratory No. 25 and retaining the other part.

In order that the samples would be as nearly representative as possible, the gross sample of approximately 10 lb. was thoroughly air-dried, then ground in the ball mill and passed through a 60-mesh standard sieve, after which it was mixed on a rubber cloth and quartered in the usual manner. Approximately an aliquot portion was taken from each quarter for each bottle sample.

Each bottle sample was then analyzed separately by the Bureau of Mines and transmitted to the various laboratories for analysis. The Gas Association laboratories were advised that care should be taken in determining the B.t.u. and ash content of the anthracite and coke samples on account of the tendency of incomplete combustion. They were also advised that if comparable results were to be obtained, the American Society for Testing Materials methods must be strictly followed in determining the volatile matter. These methods, as published in the *Gas Chemists' Handbook*, were not used in all the laboratories, however.

Curves showing the moisture variations are presented in Fig. 1. As a whole, the moisture determinations on the samples show good work on the part of the chemists, only 13 out of 120 determinations being outside of the check limits, and 10 of these are on the gas coal. Apparently considerable trouble was experienced with gas coal, where only 19 of the 24 laboratories are above the zero line, and 4 below and 1 checking.

Noting this tendency, the moisture was redetermined by the Bureau of Mines chemists on five additional samples of each class of coals and coke, which were held in reserve. There was no indication from these results obtained that the moisture content had changed after standing for two months. The general tendency of all determinations was to be above zero line, 85 being above, 19 below, and 16 an absolute check. The common copper drying oven and majority of electric ovens are not adapted for this determination, owing to irregular temperature and lack of proper air circulation.

Curves showing variations in the volatile-matter determinations are presented in Fig. 2. A great improvement is shown in the volatile-matter determination over the results shown in previous co-operative work. As was expected, the results on the anthracite and semi-bituminous coals and the coke sample fall above the zero line, with the exception of three determinations. The gas and steam coals are found to be on both sides of the line, 35 being above and 13 below.

Out of a total of 120 determinations, 40 do not check;

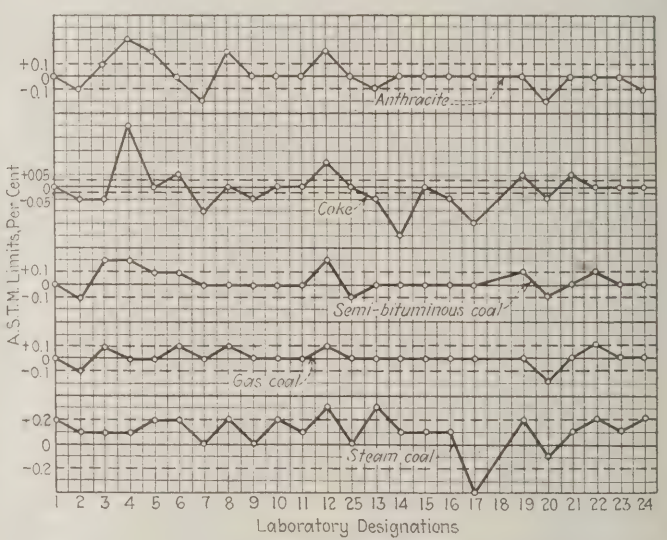


FIG. 1—DEVIATIONS FROM BUREAU OF MINES RESULTS. SULPHUR, AS RECEIVED

37 of the latter are above the limit line, and 26 of the 37 are on the anthracite and coke, which is conclusive proof that greater care is required on low-volatile materials such as anthracite and coke.

Laboratories 2, 9, and 25 reported the preheating of the sample at 105 deg. C. before making the determination of volatile matter and laboratory 21 reported the use of 20 drops of alcohol in making this determination on the coke sample. On studying the results of these laboratories it is found that this procedure did not give them any more consistent results, and past experience has not shown such modifications to be necessary. The results showing the greatest variation can be traced to the use of large crucibles with flat or loose-fitting covers.

Curves showing ash variation are presented in Fig. 3. The ash determinations show exceptionally good work on the part of the chemists, as only 5 out of 120 determinations are outside of the checking limits. Three of these results are on the coke, one on the

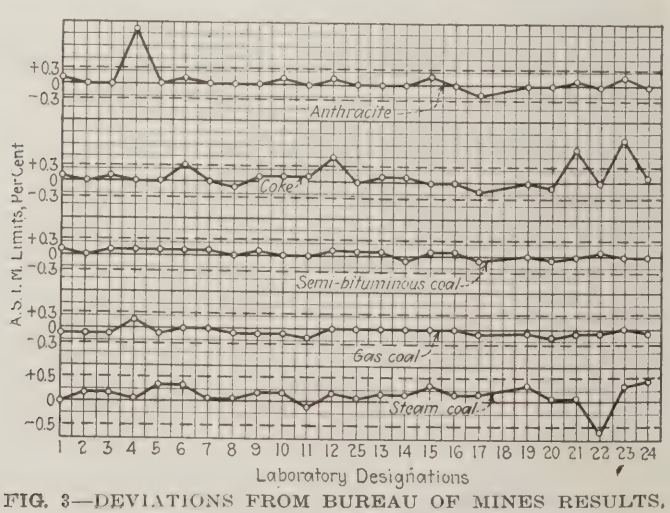


FIG. 3—DEVIATIONS FROM BUREAU OF MINES RESULTS, ASH, AS RECEIVED

anthracite, and the fifth on the steam coal. The first four probably are due to incomplete combustion, as the results are very high, and the other was ashed at a temperature of 1,000 to 1,050 deg. C., which result is low.

Curves showing sulphur variations are presented in Fig. 4. With the chemical knowledge available on sulphur one would naturally expect closer agreement of the results than is indicated by the curves, but out of the total of 120 results, 27 are outside of the checking limits. Sulphur from gas burners probably is responsible for some of the high results.

Should the checking limits on coke be increased from 0.05 to 0.1 per cent, nine of the results that fall outside of the limits would then be within the A.S.T.M. limits.

Curves showing the variations in the B.t.u. determination are presented in Fig. 5. The results obtained on the determination of heating value are very satisfactory. Much closer results were obtained on the whole series than in the previous series; 38 determinations out of 110 do not check, of which 12 are on coke, and the remainder about evenly divided between the other four classes. The widest variations are due to nickel-lined bombs and incomplete combustion, especially in the anthracite and coke samples. Evidently the warning, calling to the attention of each of the gas Association laboratories the difficulties that might be expected with these samples were not observed by some of the chemists.

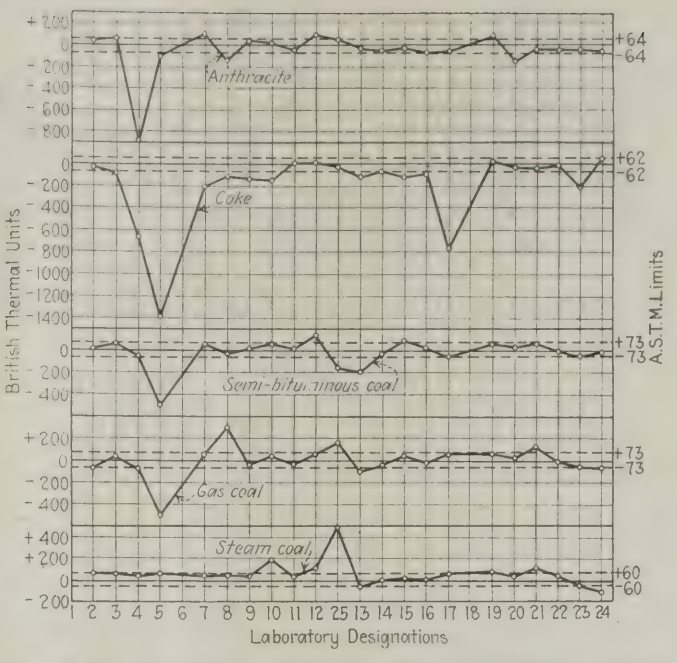


FIG. 5—DEVIATIONS FROM BUREAU OF MINES RESULTS, BRITISH THERMAL UNITS

Standardization Factors Must Be Correct

It is noted that some of the laboratories failed to make the proper corrections for acidity, sulphur, thermometer, etc. The operator can only hope to obtain the best results when these corrections are correctly applied and his standardization factors are absolutely correct. Nickel linings have no place in calorimetry and if reliable information is expected they must be discarded.

The results obtained indicate a closer application of the A.S.T.M. methods outlined in the *Gas Chemists' Handbook* than in previous comparisons. It is essential that all of the laboratories of the Gas Association as well as other coal laboratories use the standard methods in their coal work to insure accurate analysis of the fuel. Attention is called to the following points:

(1) Dry air must be circulated through the moisture oven at a sufficient rate to change the volume of the oven three to four times per minute.

(2) The best results are obtained for the determination of volatile matter when a 10-c.c. capsule-type crucible with a well-fitting cover is used. The electric furnace is superior to the Meeker burner for consistent work.

(3) The use of open burners is likely to give high results with manufactured gas in the sulphur determination. Sulphur determined from bomb washing will invariably run low, varying in proportion to the amount of sulphur present.

(4) More attention should be given to the proper application of corrections for acidity, radiation and sulphur in the calorimeter determination. The calorimeter bomb should have an inner surface of platinum, gold, porcelain enamel or other material not attacked by nitric or sulphuric acids or other products of combustion.

Nickel linings should not be used if results checking within A.S.T.M. limits are desired.

LABORATORY METHODS USED

	Moisture		Volatile Matter					Ash		Sulphur		Calorimeter	
				Furnaces Temp., Deg. C.		Platinum Crucible							
Laboratory	Standard Method	Air Was Dried	Times Rewnewed (Or Volume Passed) Per Minute	Meeker Burner	Electric Muffle	Vertical Electric Tube	Capacity (c.c.)	Type of Cover	Temp., Deg. C.	Eschka	Bomb Washing	Peroxide	Type of Bomb	Lining
1	X	X	2	X-950	.....	.....	20	Flat	750	..	..	X	.....	.....
2	X	X	2 to 3	X-950	.....	.....	10	Flat	(c)	X	..	..	Parr	Illium
3	No	No	2 cu.ft.	.....	.....	X-940	(d)	Capsule	750	..	..	X	Parr	Illium
4	X	...	..	X-950	.....	.....	..	Flat	.....	X (a)	..	..	Emerson	Nickel
5	No	No	..	950	.....	.....	10	Capsule	890*	X (a)	..	..	Emerson	Nickel
6	No	X	1	.....	.....	X-950	10	Capsule	750	X	..	..	.....	.....
7	No	X	1-2 cu.ft.	.....	X-950	.....	10	Capsule	750	X	..	..	Emerson	Nickel
8	X	X	2	.....	.....	X-950	20	Flat	750	X	..	..	Emerson	Gold (b)
9	X	X	1 liter	.....	X-950	.....	(f)	Porc.	750	X	..	..	Parr	Illium
10	No	No	None	.....	X-750	.....	10	Capsule	750	..	..	X	Emerson	Nickel
11	No	No	(c)	X-950	.....	.....	(e)	Capsule	750	..	..	X	Parr	Illium
12	X	X	2 to 4	.....	.....	X-950	10	Capsule	750	..	..	X	Parr	Illium
13	No	No	..	X-950	.....	.....	25	Capsule	950	..	..	X	Parr	Elec. (b)
14	...	...	..	.....	.....	(No | report)	.....	.....	...	..	..	.....	.....
15	No	...	..	X-950	.....	.....	15	Capsule	800	X	..	..	Emerson	Gold
16	X	X	1½	X-1,000	.....	.....	...	.....	915	X	..	..	Parr	Illium
17	No	...	..	.....	.....	X-950	20	Capsule	700	..	X	...	Parr	Illium
18	...	...	..	.....	.....	(No | report)	.....	.....	...	..	..	.....	.....
19	X	X	2½	X-965	.....	.....	10	Capsule	800	X	..	..	Emerson	Gold
20	X	X	3	X-950	.....	.....	10	Capsule	750	..	X	..	Parr	Illium (b)
21	...	No	..	X-970	.....	.....	16	Capsule	775	X	..	..	Emerson	Nickel
22	No	X	¼	X-950	.....	.....	10	Capsule	1,000	..	..	X	Parr	Illium (b)
23	X	X	2 to 3	.....	X-950	.....	10	Capsule	765	..	X	..	Parr	Illium (b)
24	No	...	..	.....	.....	X-950	10	Capsule	750	X	..	..	Emerson	Platinum
25	No	No	3	X-940	.....	.....	15	Flat	940	X	..	..	Emerson	Nickel

X = Standard methods. * 4 Meeker burner muffle; glazed SiO_2 capsule. (a) Burned off over gas burners. (b) Adiabatic calorimeter outfit. (c) Not measured. (d) Illium, 11 c.c. (e) Illium, 10 c.c. (f) Porcelain, 10 c.c.



Problems of Operating Men

Edited by James T. Beard



Should the Fireboss Be Blamed or Did His Lamp Fail?

Knowledge of Conditions Not Applied in Practice —Fireboss Killed When Removing Gas—Lamp Had Become Heated Causing It to Pass Flame

IN reading the interesting letter of W. H. Moore, *Coal Age*, Jan. 25, p. 184, we are reminded again of human fallibility, in respect to safety-first on the part of men holding the most responsible positions in coal mines. Mr. Moore, however, does not appear to blame his fireboss, but attributes the accident to the failure of the bonneted Wolf double-gauze lamp the fireboss carried.

The letter gives the account of the Wakesiah explosion that cost the lives of the fireboss and a pumpman. The extent to which the writer of the letter blames the dead fireboss is found in the words with which he prefaces his remarks. He states: "Notwithstanding all knowledge of the principles and conditions affecting the use of safety lamps in practice, . . . that a safety lamp is not safe under all conditions."

Bureau of Mines Investigated Safety Lamps

Attributing the cause to the failure of the lamp, Mr. Moore closes his letter with an appeal for further investigation of the action of safety lamps in explosive mixtures. He seems to forget or, perhaps, he has never seen the bulletin issued by the Federal Bureau of Mines, giving in great detail the series of experiments performed by the bureau on safety lamps under all conditions. These experiments were the most recent ones then performed under true mine conditions and have since been supplemented by the experiments of Prof. H. B. Wheeler, in England. What more, then, is to be done than to follow out in practice the lines laid down by these experimenters?

It is unnecessary to rehearse the account of this sad occurrence at the Wakesiah mine, which Mr. Moore has given in full detail in his letter. From the account given by him as manager of the mine, it appears that the lamp carried by the fireboss was found to be properly assembled and in perfect condition, following the explosion in the mine.

Lamp Failed Because of Overheating

However, the later examination of the interior of the gauzes showed that they had been exposed to intense heat, which was not apparent on the outside of the gauze. The conclusion seemed inevitable that the lamp had been used for illuminating purposes too long and had become heated, which caused the flame to pass through the gauze and ignite the gas outside of the lamp.

One of the lessons to be learned from this account is the need of applying what knowledge we have regarding the action and use of safety lamps, in our daily practice in the mine, and shelve for a time the possibility of a bonneted double-gauze Wolf safety lamp failing when properly used.

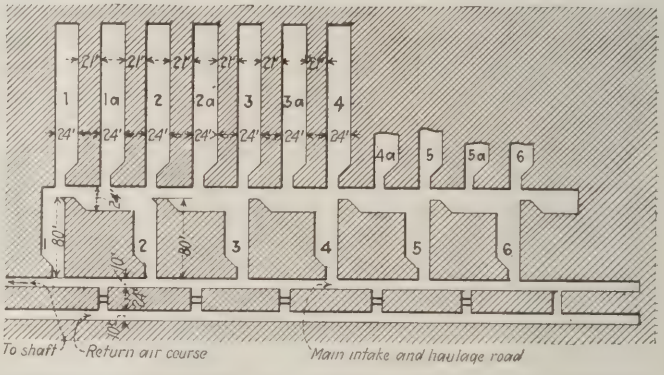
James Ashworth,
St. Augustine, Fla. Consulting Engineer.

Modified Double-Room Method

Plan suited to avert possible squeeze—Rooms driven on 90-ft. centers connected at face by cross-rooms—Intermediate rooms turned off cross-rooms—Advantage of the system.

REFERRING to the inquiry of Robert Holt, *Coal Age*, Feb. 1, p. 226, who asks for an expression of opinion as to whether there will be less liability to development of squeeze if the drawing back of the pillars, in a panel of thirty rooms, be delayed until the panel is complete when all the pillars can be drawn back together. Or, would it be better to draw back each pillar as the rooms reached the limit?

Judging from the information given and in the light of my own experience in working the Miller seam,



METHOD PROPOSED TO AVOID DANGER OF SQUEEZE

unless the rooms are driven quite narrow and wide pillars are left for the support of the roof, there is strong probability that a squeeze will result from the extraction of the coal in the rooms. The pillars will be crushed so that a comparatively small percentage of pillar coal can be recovered with safety.

Under this depth of cover, 250 ft., and with the conditions that prevail characteristically in the Miller seam, I would recommend trying the system of driving the first rooms turned off the entry on 90-ft. centers and connecting these by cross-rooms turned at a distance of 90 ft. from the entry and driven parallel thereto as indicated in my sketch. Other rooms are then turned off these cross-rooms, midway between the first set of rooms.

There is thus formed a system of advancing rooms, each 24 ft. wide with 21-pillars between them, as shown in the figure. The first rooms, turned on 90-ft. centers, are numbered 1, 2, 3, etc., while the intermediate rooms turned off the cross-rooms are numbered 1 *a*, 2 *a*, 3 *a*,

etc. This arrangement affords solid blocks of coal, approximately 80 ft. square, as entry stumps, which amply protect the entry and permit the drawing back of pillars, as quickly as each block of rooms is finished.

In the figure, I have shown rooms driven up in blocks of seven rooms, each. Care must be taken, however, to work a sufficient number of rooms in a block to give an area large enough to allow the roof to break readily. The breakline should be kept as straight as possible to avoid undue crushing on any of the pillars.

After the miners and their helpers have become familiar with this system, they will begin to appreciate its advantages. The work is easily handled; there is little danger of squeeze or creep occurring and a minimum of rock to handle by reason of that fact. The system will be found to guarantee a maximum recovery of coal. The expense for yardage is also reduced to a minimum. FRANK PARDOE.

Washington, Pa.

Certain Details in Humidifying

Shaft bottom and portion of main haulage road must not be neglected—Radiator system expensive to install and maintain—Direct method of applying steam better.

THE question of humidifying a mine ventilated on the exhaust system has proved an interesting one to the readers of *Coal Age*, judging from the references made to the manner of overcoming the annoyance of introducing steam into the intake which is also the haulage road in the exhaust system of ventilation. These references appeared in the issues of Dec. 21, p. 1000 and Dec. 28, p. 1043.

There are a few points, however, bearing on these methods of humidifying the mine air to which attention may well be called. In the first place, the plan of introducing the steam into the intake at a point a considerable distance inby leaves the shaft bottom and a portion of the main haulage road dry and dusty, and they receive no benefit from the steam introduced at the point beyond.

In this regard, let me say that this portion of the mine should not be neglected. I would suggest that a branch pipe be laid through the crosscut at the shaft bottom by which a portion of the steam can be conducted into the haulage road at that point, every night when the presence of the steam would not be as objectionable as during the day when the mine is running.

DAMPENING AT INTERVALS INJURIOUS TO ROOF

This should be done every night without exception and not at more or less frequent intervals when it is thought the place needs to be dampened. Nothing is more injurious to a slate roof than a constant change from a dry to a wet condition, which would result if the operation was only performed at intervals. The same injurious effect will be produced on the timbers, causing their more rapid decay.

Speaking of warming the air by the use of radiators, this plan may prove efficient when the air volume is small. The use of radiators to heat large volumes of air entering the mine will prove both expensive and cumbersome. The action of the steam on the air through the radiator walls is too slow and better results are obtained by direct contact as when the steam is blown into the air through an expanding nozzle.

My experience proves that blowing the steam into the air by a nozzle pointing in the direction in which the current is moving accomplishes the double object of warming and humidifying the air in one process and the air is cleared in less than one half the distance required by the use of radiators and bafflers or curtains.

It is important that the nozzle should be tapered outward properly to produce the best results by expanding the steam to the atmospheric pressure as it issues from the nozzle. A better distribution of the steam in the air is thus obtained.

COST OF RADIATOR SYSTEM EXCESSIVE

Such a nozzle is easily made and at little expense. It only needs to be screwed into the end of the pipe line when needed to be used. At other times, it should be put away in a dry place where it can be found when needed again.

On the other hand, the first cost of a radiator system far exceeds that of a nozzle. Moreover, unless the radiators and pipes are taken apart on the approach of the summer season and stored away in a dry place, they will be in no condition for use the following winter. Even the use of galvanized pipes gives little better results, as corrosion eats away the metal where the pipes are threaded. Iron pipes last a little longer than steel. Brass, of course, is better but too expensive.

Where live steam is used, the automatic regulation of the flow of steam from the pipe line, by means of a thermostat, will be found a great money saver, as live steam is expensive. In winter, it is nothing unusual for the temperature of the air to vary from 20 deg. or lower during the night to 40 or 50 deg. at midday. It is clear that much less steam is required to saturate the air at times under these changes of temperature. MINING ENGINEER.

———, W. Va.

Sealing Abandoned Areas Safest Practice

Arguments for and against sealing off abandoned areas—Conditions must determine question of sealing—Need of constructive suggestions—How seals should be built.

RECENT disastrous explosions have focused much attention on the hazards of the mining game. It would add greatly to the peace of mind and future happiness of those whose lot is to toil underground, if a satisfactory plan could be worked out to guard against the menace of gas in mines.

During the past few months, writers of *Coal Age* have dwelt much on this subject. Strong arguments have been offered to show that worked-out areas should never be sealed, but should be ventilated in a manner that will keep them free from dangerous accumulations of gas. On the other hand, many have argued in favor of sealing off such areas.

SEALING ABANDONED PLACES SAFEST PRACTICE

The subject of sealing abandoned places is an important one in the mining of coal. It is worthy of serious and broadminded consideration. Doubtless one's experience will largely modify his views. My own, in mines generating large quantities of gas, has led me to favor the sealing off of abandoned areas as being the safest practice.

However, I frankly admit that the question must be determined very largely by the general conditions exist-

ing underground, particularly the nature of the roof and floor of the seam. These conditions will often forecast the probability of the occurrence of squeeze, which has an important bearing on the matter of sealing.

Even so, it hardly seems commendable to leave extensive areas open for the free circulation of air, when a shorter and more direct route can be had by sealing off such places. The question has been discussed at length by other writers and little can be said, except what would be mere repetition and help not a whit in deciding the matter.

We need suggestions that are constructive and have regard to the best methods of building the seals, should this be decided on as necessary. While I know many will prefer to ventilate areas that have been worked out and are standing, my own conviction is that such territories should be sealed.

Essential Points in Building of Seals

Assuming then that seals are to be built, allow me to suggest a few essential points in their construction. First, it is absolutely imperative that solid bottom be found before the wall is started. Cracks in the bottom must be dug out, until solid formation is reached. I have known instances where the ditch had to be dug 8 or 10-ft. deep.

Hitches must then be cut 2 ft. into the solid rib coal and the equally solid roof above. These cuts should be started at a width of 2½ ft. and offset at the back of the cut, say 8 in. deep, the offset having a width equal to two cement blocks. This manner of cutting into the rib allows the builder ready access to the corners, where the greatest care must be exercised to see that every crevice is filled.

The ditch in the floor is filled with a good cement concrete, fluid enough to flow into every nook and crevice. Time is given for the concrete to set well before starting the wall, which is built up of a double thickness of concrete blocks, carefully laid in cement and tightly sealed along each rib and at the roof. A 2-in. pipe with a screw-cap must be built into the wall near the top of the seal, as a means of enabling the testing of the condition of the gas-charged air behind the seal.

Well Built Seals to Be Constantly Watched

After the seal has been completed, it must be watched, from day to day, to observe whether any settlement has taken place. If cracks develop these must be carefully plastered. In one instance that I recall, a gob fire had started in an accumulation of fine coal and slack piled with some timber near a gas wall that sealed an opening.

This wall was 40 ft. from the airway and leaking gas. The latter would accumulate and every few minutes flame would shoot across the entry in an alarming manner. This continued and, at intervals, there was heard a resounding zoom, as one explosion followed another. It is easy to imagine the feelings of those who had to contend with this danger and to realize that the situation had to be handled with much care.

In the building of seals in the manner described, ordinarily little trouble was experienced during the first year. However, owing to subsidence or squeeze occurring inside the wall, the utmost vigilance was required the second year, as the accumulated gases would be forced through the seals under high pressure. Then, let me say, woe betide that community should someone in charge sleep at the switch.

May I add, in closing, that none but thoroughly experienced and trustworthy men should be charged with the examination of a mine, each morning—examiners who will put the lives of others ahead of their own. We must remember that the night may bring to the home the blackened remains of a husband, father or brother who went out in the morning happy in the thought that he could provide the necessaries of life for those depending on him. Such a thought should suffice to stimulate every man to the greatest vigilance in the desire to avert disaster and lower the accident rate in our mines, which has been growing.

Panama, Ill. Alexander Bennett.

Inquiries Of General Interest

Flow of Water in Pipes

Explaining formula for calculating the flow of water in a given pipe, under a given head. Three factors determine total head producing the flow.

Having occasion, recently, to refer to my old friend, *Trautwine's Handbook for Engineers,* in search of a formula for calculating the amount of water that will flow through a given pipe, in a certain time and under a given head, I was puzzled to understand the formula given, which read as follows:

$$h = \frac{fl}{d} \times \frac{v^2}{2g} + \frac{1.5v^2}{2g}$$

Kindly explain this formula and say why the first two terms are multiplied together instead of being added, as is the last term and as it seems to me they should be. Also, show the same formula expressed in terms of the diameter (d) of the pipe; and the flow of water (G) in gallons per minute. Student.

Windsor, Pa.

The formula given is either wrong or copied wrongly. The first sign in the second number should be a plus sign like the last. The three terms should express, respectively, the friction head, velocity head and entrance head. But the entrance head, due to the water entering is always assumed to be one-half the velocity head, which would make the coefficient of the last term 0.5, instead of 1.5 as given above.

The corrected formula expressed in terms of d and G, asked by the correspondent, assuming a coefficient of friction for mining practice $f = 0.01$, is as follows:

$$h = \frac{lG^2}{800d^5} + 0.0026\,\frac{G^2}{d^4} + 0.0013\,\frac{G^2}{d^4}$$

$$= \frac{G^2}{d^4}\left(\frac{l + 3.12d}{800d}\right)$$

Or, solving for G, gives for the flow of water in gallons per minute, under the head h,

$$G = d^2\sqrt{\frac{800dh}{l + 3.12d}}$$

When the diameter of the pipe in inches is less than its length in hundreds of feet the second term in the denominator can be dropped with only slight error.

Examination Questions Answered

Miscellaneous Mine Examination Questions

(Answered by Request)

QUESTION—*In a mine subject to sudden outbursts of gas, what precautions would you take to prevent loss of life? What warnings usually precede outbursts of gas?*

ANSWER—When working a seam of coal subject to outbursts of gas, it is well to drive the places narrow, in the first winning, and give plenty of time for the gas to drain off before drawing back the pillars. Another precaution that may assist in relieving the situation is to drill numerous holes into the ribs and faces of the coal for the purpose of draining the gas on that portion of the seam. Where the cover is not too great, large boreholes can be sunk from the surface, at points in advance of the working faces in the mine.

Outbursts of gas are often preceded by ominous sounds that the miners call "bumps." These sounds are caused by the settlement and readjustment of the strata, resulting from the working of the gas toward the opening driven in the seam.

QUESTION—*In a mine the quantity of air measured in the return is 165,000 cu.ft. per min. (a) The return current contains 3 per cent of firedamp (marsh gas), what quantity of gas is given off in this mine? (b) What is the least decrease in the quantity of air that will render the return air explosive? (c) What increase of gas will (likewise) render the return air explosive?*

ANSWER—(a) The volume of gas in the return current is $0.03 \times 165{,}000 = 4{,}950$ cu.ft. per min.

(b) Assuming the lower explosive point of this gas is reached when the proportion of gas to air is 1 : 13, the quantity of air in circulation to produce that condition would be $13 \times 4{,}950 = 64{,}350$ cu.ft. of air. Then, the volume of air entering the mine is 165,000 — 4,950 = 160,050 cu.ft. per min. In order to reach the lower explosive limit of the gas, this volume must be decreased 160,050 — 64,350 = 95,700 cu.ft. per min.

(c) In order to produce the same condition by an increase of gas, the volume of gas generated must be $160{,}050 \div 13 = 12{,}311$ cu.ft. per min. This would call for an increase of 12,311 — 4,950 = 7,361 cu.ft. per min.

QUESTION—*What is the weight of 250 cu.ft. of marsh gas, barometer 30 in., temperature 65 deg. F.?*

ANSWER—Taking the specific gravity of marsh gas as 0.559, referred to air the same temperature and pressure, the weight of 1 cu.ft. of marsh gas, at a given temperature and pressure is

$$0.559 \frac{1{,}3273 \times 30}{460 + 65} = 0.0424 \text{ lb.}$$

The weight of 250 cu.ft. of this gas would then be $250 \times 0.0424 = 10.6$ lb.

QUESTION—*Explain the action of the Burrell gas detector.*

ANSWER—This instrument consists of a small brass tube connected at the bottom with a gage glass. At the top of the brass tube is arranged the combustion space containing a wire bridge that can be made incandescent by the current from a small electric battery. In use, water fills both the brass tube and the glass gage up to the level of the zero of the scale. By blowing gently into the rubber tube attached to the top of the glass gage, the water in the gage is depressed and rises to fill the combustion space at the top of the brass tube and is held at that level by pinching the rubber tube. The instrument is now raised to the point where a test is to be made for gas. Releasing the rubber tube draws the gas into the combustion space as the water level in that tube falls. The valve through which the air enters is now closed and the electric current turned on for a minute and a half, in which time all the gas that may be present in the air is consumed. The instrument is then shaken to cool the air remaining in the tube, after which its volume is measured on the graduated scale, which is calibrated to show the percentage of gas present.

QUESTION—*If the quantity of air passing into a mine is 75,000 cu.ft. per min., at a temperature of 50 deg. F. and the quantity measured in the return is 82,000 cu.ft. per min., at a temperature of 75 deg. F., what quantity of the increase is due to expansion from the increase in temperature and what quantity is due to the gases given off in the mine, neglecting barometric conditions?*

ANSWER—Disregarding any change in barometric pressure, the volume of air varies as the absolute temperature. Then, calling the increase volume due to the rise in temperature from 50 deg. to 75 deg. F., we have

$$75{,}000 \frac{460 + 75}{460 + 50} = \frac{75{,}000 \times 535}{510} = 78.676 \text{ cu.ft.}$$

The increase due to expansion is, therefore, 78,676 — 75,000 = 3,676 cu.ft.

Finally, the total increase as measured in the return being 82,000 — 75,000 = 7,000 cu.ft., the increase due to the gases given off in the mine is 7,000 — 3,676 = 3,324 cu.ft.

QUESTION—*Is it possible to have an explosion in a mine where the safety lamp gives no indication of firedamp?*

ANSWER—Yes. A mine generating much fine dust, particularly if the coal is highly inflammable, is liable to an explosion occurring by the ignition of the dust suspended in the air current and exposed to the flame of a blownout shot or any flame of sufficient volume of intensity. Although it is not necessary that any gas should be present, the explosion is more liable to occur if a small percentage of gas is present that gives no indication on the flame of a safety lamp. Under these conditions, every precaution should be taken to avoid the accumulation of fine dust at the working face and on the roads and traveling ways, and every means should be used to prevent the suspension of the dust in the mine air.

QUESTION—*In an air current 6 x 8 ft., in sections, and 5,500 ft. long, what is the velocity of the air current when the water gage stands at 2 inches?*

ANSWER—The sectional area and rubbing surface of this airway are respectively, $a = 6 \times 8 = 48$ sq.ft.; $s = 2(6 + 8)5{,}500 = 154{,}000$ sq.ft. The pressure due to a 2 in. water gage is $2 \times 5.2 = 10.4$ lb. per sq.ft.

Finally, substituting the given values in the formula for the velocity of an air current, we have

$$v = \sqrt{\frac{pa}{ks}} = \sqrt{\frac{10.4 \times 48}{0.00000002 \times 154{,}000}} = 402.6 \text{ ft. per min.}$$

Will Illinois Operators Consolidate? And What About Frank Farrington?

Consolidation of the three operators' associations of Illinois is again being discussed hopefully by at least one group of operating interests within that state. The matter got a good deal of consideration in January immediately after the national settlement with the United Mine Workers and was frankly urged by a few men as a measure to strengthen the operators' position in labor relations as well as to spare the officers of the present associations the expensive and tiresome consumption of time from their personal business.

"Is Frank Farrington the man to be labor commissioner for such a united association?" is a question which comes up immediately in these discussions. "I should say not," one group of operators invariably replies. But there are others not so positive. Various other men are suggested as the logical candidates for such an important work, though it is difficult for anyone to suggest a man sufficiently gifted with "super-diplomacy" to draw together all the interests in that turbulent state and satisfy even a bare majority.

It is openly declared by men in the 5th and 9th District Operators' Association that the whole scheme would be nothing but a maneuver to put the mastery of the state in the hands of the operators of the southern Illinois field on a tonnage voting basis. The response is that southern Illinois has no such designs because the voting basis might be shifted to that of membership instead of tonnage, thus putting the power in the hands of the other regions of the state as opposed to the southern field.

In spite of the stirring up of waters just now it is well known that a serious effort will be made to draw together as much of the state as possible into a single operators' labor organization even if it means only the consolidation of the Central Illinois Operators' Association with the stronger Illinois Operators' Association, made up largely of operators in the great southern field of the state.

French Charge Germans with Bad Faith in Matter of Coke Supplies

The necessity of buying British coke at high prices has caused the Société des Coke de Hauts-Fourneaux, the pooling agency for the sale of metallurgical coke to French blast furnaces, to cancel as of Feb. 15 the price fixed for February delivery (Franco-German frontier basis) of 110 fr. up to 40 or 50 per cent of the capacity of consumption of the furnaces and 155 fr. beyond that. The new prices decided upon are 150 fr. and 200 fr. respectively. This action was made necessary by the inadequacy of coke supplies from Germany for the French blast furnaces and is one of the grievances of France against that country.

M. Robert Pinot, vice-president of the Comité des Forges de France, in a recent interview laid stress on the fact that one of the last notes of the German Government explicitly declared that "Germany was ready to supply French metallurgists with all the coke they needed, provided only they paid for it direct to Germany." It is contended by French metallurgists that there could have been no plainer confession of Germany's bad faith in this matter.

Would Require Certificate of Competence For Bituminous-Coal Miners

A bill introduced in the Pennsylvania House of Representatives by Representative James T. Heffran, Washington County, provides that there shall be established in each of the inspection districts in the bituminous-coal region of the state, a miners' examining board to consist of nine miners who shall be appointed by the Governor as soon as the measure becomes a law and every two years thereafter. These boards shall examine all persons desiring to qualify as miners. Each member of the board shall be a miner with at least five years' practical experience. Upon his appointment he will serve for two years and his compensation will be $7.50 a day for each day served in connection with the work of the board.

The dates for the meetings of the board shall be advertised in two newspapers in each district and monthly meetings are provided for. These meetings will be public and any person desiring to become a bituminous-coal miner shall be examined as to his fitness for the work. Certificates of competency will be issued to all those who pass the examinations. The certificate will entitle a miner to work in any other district in the bituminous field, provided he is registered in the district to which he removes.

Each applicant must have had at least two years' experience as a miner and he must answer in the English language at least twelve questions pertaining to the requirements of a practical miner. The fee of each applicant is fixed at $2 while a registration fee of 25c. will be charged where a miner moves from one district to another.

No person will be permitted to work as a bituminous miner after Jan. 1, next, without having obtained a certificate, unless he is actually engaged in mining at the time the bill becomes a law, when he will be entitled to registration without examination upon producing satisfactory proof that he has been employed in any bituminous mine for a period of two years.

Rocky Mountain Coal Men in Winter Meet

The winter meeting of the Rocky Mountain Coal Mining Institute, held in Denver, Colo., Feb. 26, 27 and 28, was the most successful in years from the standpoint of attendance, entertainment and technical data presented. More than one hundred members registered, mostly from the states of Colorado, Utah, Wyoming and New Mexico.

An organization meeting was held Monday morning at the call of President F. W. Whiteside. The afternoon session was devoted to the reading of papers by A. L. Jones, district engineer for the General Electric Co., on "Electrical Problems in the Coal Mine," and by C. E. Drennan, electrical engineer for Hendrie & Bolthoff Manufacturing & Supply Co., entitled, "Why Alternating Current?" Both papers were of considerable interest and were thoroughly discussed. Extracts from papers and discussions of the whole program will be found in later issues of *Coal Age*.

Two hundred and fifty members and their ladies assembled in the banquet room of the Albany Hotel early in the evening for the banquet and "high jinx." Harry F. Nash, vice-president of the Oakdale and the Alamo coal companies, as toastmaster, introduced the speaker of the evening, George Sanford Holmes, of the *Denver Times*. The "high jinx," a fictitious meeting of the "Fact-Finding Commission," was put on by certain members of the Institute and was roundly applauded. A dance was enjoyed afterward.

On Tuesday morning F. A. Young, chief engineer of the St. Louis, Rocky Mountain & Pacific Co., presented an unusually interesting paper, "Air Cleaning of Coal at Brilliant, N. M." This was followed by "Pulverized Fuel," written by T. H. O'Brien, general manager of the Inspiration Consolidated Copper Co., but read by the secretary in Mr. O'Brien's absence.

In the afternoon Charles M. Schloss read the paper prepared by D. Harrington, supervising mining engineer of the U. S. Bureau of Mines; James C. Rae, general superintendent of the Owl Creek Coal Co., and himself, entitled, "Mining the Pitching Vein at Gebo, Wyo." The paper included the showing of moving pictures taken of this unusual operation. This was followed by moving pictures of rock drilling. Tuesday evening many members of the Institute went to the Orpheum Theater.

The Wednesday meeting was devoted to several short discussions and to the unanimous election of the following officers: President, George B. Pryde, general superintendent, Union Pacific Coal Co., Rock Springs, Wyo.; vice-president from Colorado, W. S. Getchell, superintendent, Walsen Mine, Colorado Fuel & Iron Co., Walsenburg; vice-president from New Mexico, W. D. Brennan, general manager, Phelps Dodge Corporation, Dawson; vice-president from Utah, Frank N. Cameron, general manager, Utah Fuel Co., Salt Lake City; vice-president from Wyoming, E. S. Brooks, vice-president and general manager, Union Pacific Coal Co., Rock Springs; secretary-treasurer, Benedict Shubart, Lindrooth, Shubart & Co., Denver, Colo.

Bituminous Coal Stocks Gain 2,000,000 Tons in Month; Higher Consumption Rate Lowers Days' Supply

Commercial consumers had in storage on Feb. 1, 1923, according to a survey undertaken by the Bureau of the Census and the U. S. Geological Survey, under authority of the Federal Fuel Distributor, approximately 38,000,000 tons of soft coal. This was 2,000,000 tons more than the stocks on Jan. 1, 1923, and represents a total increase of 16,000,000 tons since Sept. 1, 1922, when mining was resumed in the union fields that had been affected by the strike. Strictly comparable records are not available, but from the data at hand it is obvious that stocks on Feb. 1 must have been less than on the corresponding date in years for which statistics on stocks exist.

Measured in tons, stocks increased 5.5 per cent between Jan. 1 and Feb. 1. Measured in terms of days' supply, there was a decrease of 7.7 per cent, due to the increase in the rate of consumption in January. Assuming that the stocks were evenly divided, the supply on Feb. 1 was sufficient to last 24 days, against 26 days on Jan. 1. Such assumption may be made only for comparative purposes, however, as stocks are never evenly divided.

The trend of production has been downward during February and it is doubtful if stocks have increased perceptibly, if indeed there has not been a decrease.

Stocks on the Lake docks, classed as coal in transit, were 2,355,511 tons. Reports from a group of producers show that 730,000 tons of soft coal were in storage at the mines or at points between the mines and consuming centers.

Reports from byproduct coke plants indicate that there is no longer a surplus quantity of coke in storage. On Feb. 1 there were 146,000 tons on hand, which represented only a normal working supply.

Stocks of anthracite in the yards of retail dealers on Feb. 1 were 13 per cent less than on Jan. 1. The quantity of anthracite on the Lake docks was 68 per cent less than on the first of the year.

ESTIMATED TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL IN THE UNITED STATES *a*

(Net Tons)

Oct. 1, 1916	27,000,000	Aug. 1, 1921	41,100,000
Oct. 1, 1917	28,100,000	Nov. 1, 1921	48,500,000
July 15, 1918	39,700,000	Jan. 1, 1922	48,000,000*b*
Oct. 1, 1918	59,000,000	March 1, 1922	52,500,000*b*
Day of the Armistice	63,000,000	April 1, 1922	
Jan. 1, 1919	57,900,000	At least	63,000,000*bc*
April 1, 1919	40,400,000	Sept. 1, 1922	22,000,000*b*
March 1, 1920	24,000,000	Oct. 1, 1922	26,000,000*b*
June 1, 1920	20,000,000	Nov. 1, 1922	32,000,000*b*
Jan. 1, 1921	45,800,000	Jan. 1, 1923	36,000,000*b*
April 1, 1921	39,500,000	Feb. 1, 1923	38,000,000*b*

(*a*) The figures for 1918 in this table are based upon an actual count. Beginning April 1, 1919, the figures are estimates based upon reports from a selected list of 5,000 consumers whose stocks in 1918 bore a known relation to the known total stocks. (*b*) Subject to revision. (*c*) No canvass of consumers was made on this date. The total stock was estimated from the stock on March 1, ascertained by questionnaire.

From the foregoing table and the graphic presentation of the same data in Fig. 1 it is seen that coal flowed into storage during January at approximately the same rate as in the last two months of 1922. To those who have been watching the current statistics of production, it may seem surprising that only 2,000,000 tons were added to stocks in January, when production was nearly 4,000,000 tons more than in December. As a matter of fact, an appreciable part of the January production had not reached its destination on Feb. 1, and it could not therefore be taken into account in reckoning stocks. The most important factor which tended to keep stocks from reaching a higher level was a sharp increase in the rate of consumption. It is estimated that consumption plus exports during January was approximately 47,400,000 tons, or at the rate of about 10,700,000 tons per seven-day week.

Fig. 3 shows graphically the variation in stocks in each state. The map shows the days' supply held at general industrial establishments excluding steel and byproduct coke plants. This is the largest group of consumers and the one that shows best the distribution of stocks. Changes in activity in this group are quickly reflected in the coal market, and likewise changes in the coal market soon become apparent in the reserve stocks of industrials.

Taking the country as a whole, the stocks held by general industrials were sufficient to last 36 days. This was a decrease of 4 days from the supply on Jan. 1, 1923. Comparison with dates during preceding winter seasons for which records are available shows that on Feb. 1, 1923, stocks were lower than on any date except March 1, 1920. In six states only, Connecticut, Rhode Island, Louisiana, Oklahoma, Washington and the Northern Peninsula of Michigan, would the supply have lasted 60 days or more. In 15 states the supply was sufficient for less than 30 days.

Reports from the electric utilities indicated a slow accumulation of reserve coal, and the supply on Feb. 1 was sufficient to last 35 days. This was lower than the quantity usually on hand during the winter months.

As usual, the coal-gas plants had stocks much larger than any other class of consumers. On Feb. 1 such plants had on the average a 63-day supply, or more than two and a half times the average for all consumers combined. In ten states where coal gas is manufactured the plants had at least a 60-day supply.

Incomplete returns from byproduct coke and steel plants indicated an increase of about 10 per cent in the tonnage on hand. Owing to the increase in the rate of consumption, however, the days' supply—22 days—was the same as on Jan. 1. Steadily increasing activity in the steel industry has been responsible for a rapid increase in stocks of coal at byproduct coke and steel plants since the end of the miners' strike on Sept. 1, 1922. It is estimated that the total quantity on hand on Feb. 1 was no less than 112 per cent greater than on Sept. 1. The total stocks held by these two important classes of consumers has now reached a level where it compares favorably with the supply on dates when stocks were largest. The supply on hand Feb. 1 was 16 per cent less than on Jan. 1, 1922, 20 per cent less than on March 1, 1922, and 29 per cent less than on Jan. 1, 1919, when stocks at such plants were at the highest level recorded during the period over which stock statistics extend.

Estimates of railroad-fuel stocks, based on reports submitted by the American Railway Association, place the total quantity held by the railroads in stockpiles, cars and chutes on Feb. 1 at 7,573,000 tons, a supply sufficient for 18 days. In comparison with Jan. 1 this was an increase of 12 per cent.

Outside anthracite-burning territory the situation was

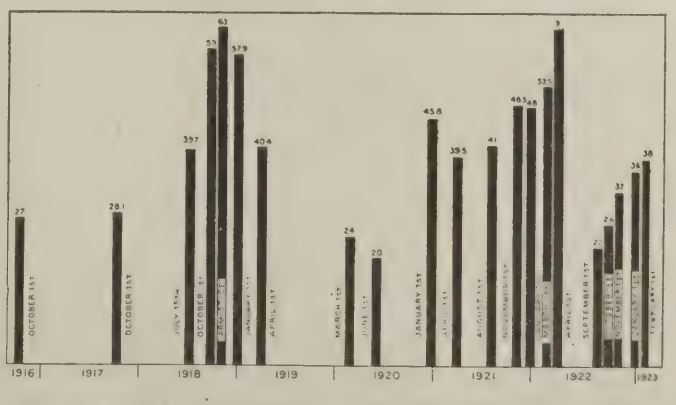


FIG. 1—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO FEB. 1, 1923

Figures represent million net tons and include coal in hands of railroads, industrial consumers, public utilities and retailers. Coal for steamship fuel, on Lake docks, and in transit is not included. Figures for 1922 and 1923 are subject to revision.

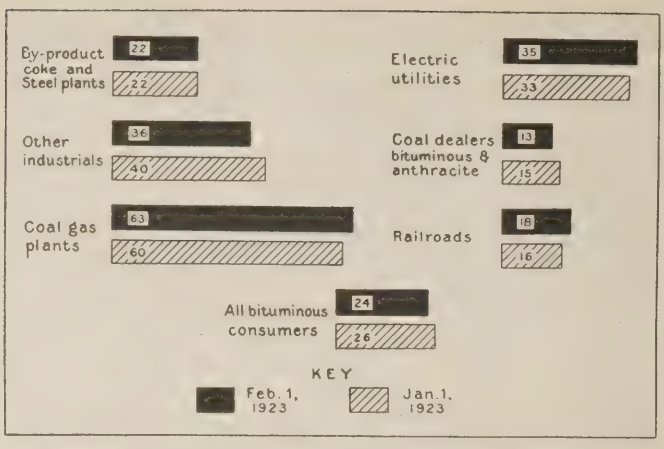


FIG. 2—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON FEB. 1, 1923, AND JAN. 1, 1923

At the rate soft coal was burned in January, 1923, the stocks on hand Feb. 1 were sufficient to last 24 days. The stocks on Jan. 1 were sufficient to last 26 days at the rate of consumption in November and December, 1922. Thus, owing to the increase in the rate of consumption during January, the larger stocks on Feb. 1 were sufficient for 2 days less time than the stocks on Jan. 1.

as follows: Stocks increased perceptibly in the Middle Atlantic States and in the coal-producing states north of Tennessee and west to Utah. In New England and in the Southern and Gulf States stocks decreased. Despite the increases in many states. in only six was the supply sufficient to last 30 days or more.

It is estimated that during January there was an increase of at least 1,500,000 tons in the tonnage moving to consumers, and which was not accounted for in their reports.

Drafts on the stocks of bituminous coal on the commercial docks of Lakes Superior and Michigan totaled 760,152 tons. There were no receipts and the tonnage on hand declined from 3,129,206 tons on Jan. 1 to 2,369,054 tons on Feb. 1. In comparison with the stocks on the corresponding date a year ago there was a decrease of 61 per cent. These figures do not include coal on private docks of industrial consumers, which is included in consumers' supply.

The quantity of unbilled coal in cars at the mines increased from 73,000 tons on Jan. 1 to approximately 165,000 tons on Feb. 1. Thus it is seen that the coal already mined and awaiting purchasers no longer forms an appreciable part of the reserve.

The accumulation of cars at gateways and terminals increased in January, but the quantity at such points—65,000 tons—was much smaller than during the period of acute traffic congestion following the miners' strike during the past summer.

Reports from an incomplete list of producers equipped to store show that 730,000 tons were in storage on Feb. 1 at the mines, against 770,000 tons held by the same producers on Jan. 1. The number of producers who store is small, but the quantity in storage at times may be considerable.

Reports received from 20 byproduct coke plants stated that the quantity now on hand from day to day represents merely a normal working supply. On Feb. 1, 1923, these plants had on hand 145,839 tons of coke. On Jan. 1 the same plants had 212,261 tons and on March 1, 1922, when the accumulation was largest, the quantity of unsold coke was 870,000 tons. A large part of the surplus found its way to householders as a substitute for anthracite.

Owing to the large deficit in anthracite production in 1922, caused by the 23-weeks miners' strike, consumers of this fuel have turned to bituminous coal as a substitute. It is necessary therefore to reckon the supply of the retailers in anthracite-consuming territory in terms of anthracite and bituminous combined.

There are no available statistics on householders' stocks but in view of the fact that householders had but little opportunity to lay in supplies during the summer and that shipments since September have been on the basis of 60 per cent of shipments in 1921, it seems highly improbable that householders now have any considerable supply.

January deliveries of anthracite by retailers exceeded receipts and stocks declined to the lowest point on record, excepting only Sept. 1 and Oct. 1, 1922. Stocks in the yards of 371 dealers were nearly 13 per cent less on Feb. 1, 1923, than on Jan. 1, and they were a bare third and even a quarter of those during preceding winter seasons. On the average retailers' stocks of anthracite were sufficient to last 8 days, whereas the supply on March 1, 1920, a month later in the season, were sufficient for 21 days, and on March 1, 1922, for 28 days.

The production of anthracite continued at a high rate during February, but severe winter weather has prevailed in the anthracite consuming area, and it hardly seems probable that the reserve is now any larger than on Feb. 1.

DAY'S SUPPLY OF BITUMINOUS COAL IN HANDS OF VARIOUS CLASSES OF CONSUMERS IN THE UNITED STATES, NOVEMBER, 1918, TO FEB. 1, 1923 (*a*)

(Figures represent number of days supply would last at current rate of consumption at time of stock-taking)

	Nov. 11, 1918	Jan. 1, 1919	Mar. 1, 1920	Jan. 1, 1921	Apr. 1, 1921	Jan. 1, 1922	Mar. 1, 1922	Sept. 1, 1922	Oct. 1, 1922	Nov. 1, 1922	Jan. 1 (*b*) 1923	Feb. 1 (*b*) 1923
Byproduct coke plants	35	32	15	29	28	42	39	11	14	18	22	22
Steel plants	45	42	9	42	38	48	48	12	17	21		
Other industrials	71	65	27	64	47	51	56	32	33	39	40	36
Coal gas plants	85	81	31	55	66	89	82	34	38	55	60	63
Electric utilities	49	49	21	44	48	51	54	26	30	32	33	35
Coal dealers, bituminous	37	39	13	30	26	33	23	11	18	21	18	15
Railroads	31	32	11	23	24	35	42	13	15	13	16	18
Total bituminous	45	42	18	39	36	41	43	17*c*	21*c*	23*c*	26*c*	24*c*

(*a*) The figures in this table are estimates based on incomplete data. (*b*) See text for rate consumption at which these figures were calculated. (*c*) Subject to revision.

ANTHRACITE IN YARDS OF A SELECTED LIST OF RETAIL COAL DEALERS (*a*)

Date	Net Tons	Days' Supply (*b*)	Date	Net Tons	Days' Supply (*b*)
1919—Jan. 1	902,950	36	1922—Sept. 1	138,399	5*c*
Apr. 1	846,731	31	Oct. 1	276,480	7*c*
1920—Mar. 1	709,552	21	Nov. 1	448.944	11
1921—Jan. 1	687,851	24	1923—Jan. 1	402,407	11
1922—Jan. 1	1,295,806	44	Feb. 1	351,083	8
Mar. 1	1,075,319	28			

(*a*) Based on statements from 371 identical dealers who reported on each date. (*b*) Calculated at current rate of delivery to consumers, which varies. (*c*) Calculated at rate of delivery in September, 1921.

According to the reports received from retailers the rate of delivery of bituminous coal in the anthracite consuming territory during January was 20 per cent larger than in November and December, 1922, during which period such deliveries were 40 per cent larger than in the corresponding period of 1921. This may be accepted as a broad measure of the extent to which bituminous coal has been used to fill the gap in anthracite production.

Despite the substitution of bituminous coal for anthracite, total stocks of all coal, anthracite and bituminous, in the

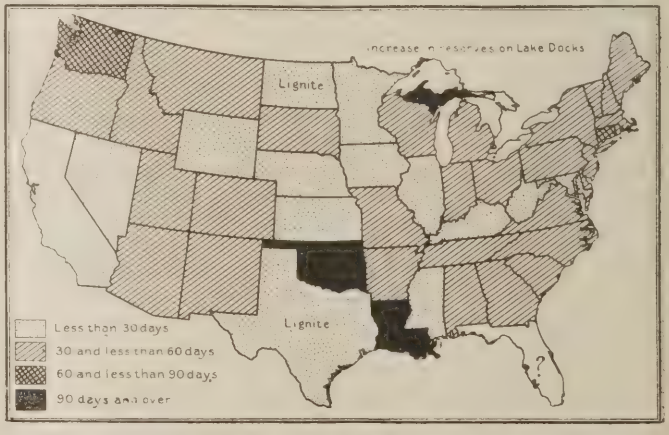


FIG. 3—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON FEB. 1, 1923

At the rate of consumption prevailing in January, stocks at industrial plants other than steel and byproduct coke would last on the average 36 days. How the supply varied from state to state is shown in the diagram. The darker the shading the heavier were the stocks. Any change in business activity affecting coal consumption would be reflected in the days' supply. Based on reports from 2,172 plants.

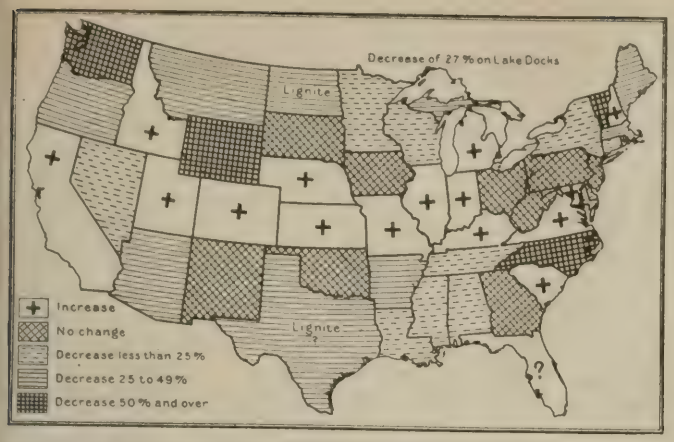


FIG. 4—HOW RETAILERS' STOCKS OF ALL COAL, ANTHRACITE AND BITUMINOUS, ON FEB. 1, 1923, COMPARED WITH THOSE ON JAN. 1, 1923

Stocks of bituminous coal in retail yards on Feb. 1 were 3 per cent less than on Jan. 1. Stocks of anthracite were 13 per cent less than on New Year's Day. The total stocks of retailers, including both hard and soft coal, decreased 6 per cent during January. The map shows the decline to have been most severe in the North Atlantic states, the Northwest territory served from the Lake docks, and in the South and Southwest. In the belt of states from Virginia and the Southern Peninsula of Michigan to Utah stocks in the hands of retailers increased.

retail yards of the anthracite territory was considerably below normal. On Jan. 1, 1923, the total reserve supply was nearly 50 per cent less than on Jan. 1, 1922. Stocks continued to decline in January, and on Feb. 1 the total coal held by retailers was nearly 7 per cent less than on Jan. 1, 1923. Over the country as a whole, retailers' total stocks were 6 per cent less on Feb. 1 than on Jan. 1. From the map in Fig. 4 it is seen that stocks declined in nearly every state in the anthracite-consuming territory. The most notable exception was the Southern Peninsula of Michigan, where increased receipts of bituminous coal were responsible for a 9 per cent increase in total stocks.

Stocks of anthracite on the Upper Lake Docks, as reported by the Northwestern Coal Dock Operators' Association, stood at 57,636 tons on Feb. 1, against 177,644 tons on Jan. 1, 1923. Stocks of anthracite on the Lake docks were less than 6 per cent of those on Feb. 1 a year ago.

Jan. 1, 1922	1,331,507	Jan. 1, 1923	177,644
Feb. 1, 1922	1,030,170	Feb. 1, 1923	57,636

Lack of complete information makes it impossible to state the quantity of coal in the storage yards of producers. The demand has been such, however, that it seems improbable that any considerable quantity was added to stocks, in which event the quantity was practically negligible.

Permanent Injunction in Maynard Case May Have Far-Reaching Effect

The entire coal industry of the United States may be affected by the decision handed down by Justice Bailey, in the Supreme Court in the District of Columbia, making permanent an injunction restraining the Federal Trade Commission from requiring the Maynard Coal Co., of Columbus, Ohio, to submit monthly reports on the cost of coal production. The case had been pending in the court for three years. A temporary injunction was first granted.

The suit was brought by the National Coal Association, using the name of the Maynard Coal Co., according to George H. Barker, vice-president of the company. Mr. Barker stated that the action was filed on the ground that information sought was a duplication of reports submitted to other government departments, one of them the Treasury Department, and that to file reports on special blanks required by the Trade Commission would involve unnecessary expense in the accounting division of every coal company in the country.

Mr. Barker stated that he was unable to say whether Justice Bailey, in his decision, would relieve all other coal companies from the necessity of submitting monthly reports.

Heavy Premium Paid in Massachusetts for "Independent" Anthracite, Report Says

Retail coal dealers in Massachusetts paid over $800,000 premiums in excess of "company" prices for anthracite during the period between Oct. 1, 1922, and Jan. 1, 1923, declares a report of the Special Commission on Necessaries of Life filed with the Legislature of that state.

The commission makes public a list of Massachusetts jobbers and outside jobbers who, it asserts, charged more than $9.50 per ton for coal. Massachusetts jobbers, the report shows, sold to the retail dealers of the state 154,491 tons of coal at prices ranging from $9.65 to $14.50 per ton while outside jobbers sold 85,390 tons at prices ranging from $10 to $14.50 per ton.

Declaring that "there was considerable criticism" when the Federal Fuel Administration during the war allowed all "independent" producers a maximum premium of 75c. a ton over the price of "company" coal, its purpose being to stimulate production, the commission in its report says: "In the present emergency the premium on spot 'independent' coal is as high as $6.25 a ton over the price of 'company' coal."

Some jobbers informed the commission that they handled only a few cars of the high-priced coal as an accommodation to regular customers. Some stated that their margin of profit was only 25c. per ton, while others made no qualifying statement in regard to their dealings.

Commenting on the plan of distribution the commission's report says: "Under the prevailing system of the Pennsylvania Fuel Commission for distributing anthracite this large amount of high-priced coal has reduced the allotment to Massachusetts of a larger amount of lower-priced coal. There is no apparent shortage of this high-priced coal. Undoubtedly our retail dealers intended by purchasing this coal to increase the amount of coal received by their communities. Their action, however, apparently has resulted in raising the price of speculative coal and thus the price our householders must pay."

Arista Disaster Laid to Blown-out Shot

The coroner's jury investigating the explosion on Friday, March 2, at the Arista mine of the Weyanoke Coal & Coke Co., in Mercer County, West Virginia, in which ten lost their lives and twenty-eight others were injured, found that it was due to a blown-out shot, unlawfully loaded, unlawfully tamped or not tamped at all, in the working place of James B. McCloud, who was among those killed. There were no eye-witnesses at the inquest, as all the men in the immediate vicinity of where the explosion had occurred were killed, and hence the mine department had only supposition upon which to proceed. The hole in the working place of McCloud which caused the explosion and three sticks of dynamite found in McCloud's powder box were a part of the evidence upon which witnesses based their testimony. The opinion entertained by mine inspectors, as told to the coroner's jury, was that the dynamite had exploded first, shaking the walls of the mine and raising the dust, and that the powder had then become ignited, blowing out the drillhole and setting fire to the dust.

Fuel Situation Improved in Northeast; To Report Stocks April 1 and June 1

Federal Fuel Distributor Wadleigh reported on March 11 that there has been some improvement in the fuel situation in New England and northern New York. Largely due to motive power trouble, there still is room for great improvement in the railway service. Difficulties continue in New England harbors and a number of applications for service orders intended to give priority to the discharge of coal cargoes have been filed. Mr. Wadleigh stated that it is the present plan to issue another stock report on April 1 and still another on June 1.



E. J. Gealy Joins Staff of Coal Age

E. J. Gealy, recently assistant electrical engineer for the Lehigh Valley Coal Co. and supervisor of the Wilkes-Barre branch of the Pennsylvania State College Extension School, has joined the editorial staff of *Coal Age*.

Mr. Gealy was born in Scranton and is a graduate of Pennsylvania State College, where he studied electrical engineering with respect to its application to the coal-mining industry, receiving the degree of B. S. on graduation.

Following his graduation Mr. Gealy was employed by the D., L. & W., now the Glen Alden Coal Co., of Scranton. Several years later he received an advanced degree in electrical engineering covered by a thesis on "The Alternating-Current Induction Motor as Applied to Mine Hoists."

Within the past five years Mr. Gealy has been a teacher on the staff of the Y. M. C. A. Mining Institute at Wilkes-Barre as well as the Pennsylvania State College Engineering School, of which he has been supervisor for the past three years. Six years ago he entered the employ of Lehigh Valley Coal Co., where his work covered every phase of electrical mining development, including layouts, construction and maintenance for haulage systems, locomotives, hoists, pumps, fans, substations, power plans, power lines, breaker drives, washery drives and compressor drives.

Mr. Gealy also had charge of the layout of the first automatic substation in the anthracite field, located at Drifton.

I. R. T. Asks Approval on Bids for Coal On Basis of $3.89 per Net Ton at Mine

The Interborough Rapid Transit Co., New York City, will get its coal supply for this year on a base price of $7.50 per gross ton at the power houses, or a mine price of about $3.89 per net ton at the mines, if the Transit Commission of New York approves of the proposed agreement.

The contract provides that the 800,000 gross tons to be furnished by the companies to whom it is apportioned shall be Pennsylvania low-volatile bituminous coal, navy standard, as heretofore supplied. Of the tonnage the Berwind-White Coal Mining Co. is to furnish 444,000 tons; Consolidation Coal Co., 296,000 tons and the Logan Coal Co., a Philadelphia organization with mines at Dunlo, Pa., 60,000 tons.

The proposed contract contains a sliding-scale provision for any increase or decrease in freight rates or miners' pay and the contractors also agree to give the transit company the benefit of lower prices if they make contracts for coal of the same grade at lower prices to other consumers at New York harbor, or if they sell without contracts any such coal at lower prices they agree to furnish the transit company with an equal amount under contracts at such prices.

The committee of the Board of Directors of the Interborough Rapid Transit Co. that drew up the contract believes that these provisions, "which are unusual in contracts of this kind, insure a lower cost per heat unit than could be obtained by any other method, in view of existing conditions."

Referring to the investigation recently made by a committee representing New York City, of which David Hirshfield, Commissioner of Accounts, was chairman, into conditions at the mines of the Berwind-White Coal Mining Co. the committee's report says:

"We have not overlooked certain matters relating to labor disputes and alleged mining conditions at the Berwind-White mines. We have looked into these matters not only in the interest of the Interborough company but out of courtesy to the city administration, which has given attention to the subject. We are not able, however, to convince ourselves that these matters should be permitted to swerve our business judgment as to what is best for the public, the city and our own company. All things considered, we believe that we have taken the only prudent course open to us in the circumstances."

The committee says that during the coming year it will give consideration to the use of oil for fuel and also to the acquisition of storage facilities and additional equipment, so that, if deemed advisable, coal may be purchased in open competition.

The committee that drew up the proposed contract, after considerable study of the fuel situation, was composed of Abel E. Blackmar, former Chief Justice of the Appellate Division, Supreme Court, Second Department, Kings County, who represents the public on the Board of Directors; Thomas I. Parkinson, vice-president of the Equitable Life Assurance Co., and Samuel W. Reyburn, of Lord & Taylor. Before it is accepted by the Interborough Co. the contract must be passed upon by the Transit Commission.

Second Herrin Trial Reviews Massacre; More Politics in the Case

The second Herrin trial now progressing at Marion, Ill., has developed little evidence concerning the slaughter of 22 non-union strip miners near Herrin, Ill., last June that was not brought out in the first trial which ended six weeks ago in acquittal for the prisoners—union miners in a solidly unionized community. Hugh Willis, union board member and one of the five defendants charged with the murder of a Polish guard at the besieged strip mine of the Southern Illinois Coal Co., has again and again been charged by witnesses with inciting the mob to the slaughter after the non-union men had surrendered to the mob. The bloody details of the killing have been reviewed in various ways and the testimony of state's witnesses plods steadily along while the Williamson County populace pays little attention to the case and none of the observers feels that a conviction is possible.

Some of the witnesses for the state, who testified clearly and damningly against the mine-union defendants at the first trial, have been put back on the stand during the past week, but too often they have "forgotten" so much about the case that their evidence has not been weighty and the prosecutors have dismissed them with disgust.

While the trial droned along the state appropriation of $75,000 to finance the prosecution, which passed the Legislature late in February, had to be rescued from the dust at the bottom of a drawer in Governor Small's desk. Somebody pointed out in a Senate session that the Governor's allotted ten days to sign or return the bill had elapsed, that nothing had happened and that the bill might die from inaction. So a committee waited to His Excellency.

"Do you mind if we take this bill to the Secretary of State now that you have decided not to sign it?" asked the chairman of the committee.

"I don't care anything about it," said the Governor. "Take it along."

So they took it along, while a Senator remarked that he was informed by old-time state officials that never before had a Governor proceeded in such a manner regarding a bill.

Assured of Funds to Complete Its Investigation, Coal Commission Speeds Up Work

By Paul Wooton
Washington Correspondent of *Coal Age*

With the removal of uncertainty with regard to its appropriation and in fact its very existence, the President's Coal Commission is bustling with increased activity. The statistical force has been expanded and tabulation of information contained on the questionnaires has been speeded up decidedly. During the week ended March 10 a material increase in the rate of tabulation was achieved. The returns also are coming in in greater numbers.

A large number of the questionnaires were filled out prior to the enactment of the law providing special penalties for false returns. It is probable that the commission will send out some form of statement to be signed by the persons making those returns which will certify that the questionnaire is resubmitted as correct. This action will not be taken with any idea that incorrect returns have been made but on the belief that the conclusions of the commission will have more weight with the public if it is known that they are based on sworn statements. As a matter of fact, it is probable that the original act fixed full legal responsibility for the correctness of returns. Certainly were the commission to entertain any doubt as to the correctness of any return, it could have compelled verification, even if it were necessary to bring all the books of the company to Washington. In that connection, however, Commissioner Smith points out that the club provided was too big to use.

New questionnaires now are being prepared to cover certain phases of distribution. The American Wholesale Coal Association and the Retail Coal Merchants Association are being consulted in connection with the preparation of these schedules.

The field investigations in connection with wholesale and retail practices in the larger cities are now being completed. The work is practically complete in Buffalo, Chicago, Columbus, Detroit, Indianapolis, St. Louis, Minneapolis and St. Paul. The survey of the Northwest docks also is practically complete.

Commissioner Smith announced on March 10 that C. E. Lesher, who is in charge of the engineering phases of the commission's investigation, is strengthening his force and will speed up that important part of the fact finding. Through an arrangement with the Bureau of Mines, George T. Halderman has been added to the engineering staff. Mr. Halderman is a coal-mining engineer with diplomas from Pennsylvania State College and the University of Pittsburgh. Prior to accepting service with the Bureau of Mines he was employed by the Lehigh Valley Coal Co., the Peabody Coal Co., the Colorado-Utah Coal Co. and other producers.

When Commissioner Smith was informed that all of the retailers were not prepared to "swallow" the commission's plan for encouraging storage during the summer of domestic fuel, he remarked that such plans as that proposed by the Connecticut company and the modifications of that plan likely to be adopted by other large employers could be made unnecessary were retail dealers willing to work out some plan of their own to stimulate summer storage of household fuel. It is understood that the Retail Coal Merchants Association will call a meeting in the near future to consider the whole subject of storage.

The commission cannot be accused of setting the scene for its report, Dr. Smith pointed out, since, by doing all in its power to encourage storage and to prevent any shortage next autumn, a situation has been created whereby the public will not be concerned about coal at the time the commission's report will be issued. It can clearly be foreseen that Sept. 22 will not be a highly propitious time to obtain for the report the maximum amount of public attention. Nevertheless Dr. Smith believes that there has been a widespread absorption of knowledge concerning coal during the past few years.

It is the plan of the commission to make available to the conferees on anthracite wage scales all information that will be of service to them at the earliest possible time.

Dr. Smith spent most of the week of March 5 in New York and Philadelphia, where he conferred with a number of persons interested in the coal investigation.

Washington Mines May All Be Open Shop

A request for a reduction of $1.50 in the day-wage scale of union coal miners in Washington State having been refused at a joint conference at Seattle, March 5, and adjournment taken *sine die*, indications point to the five remaining union companies going on an open-shop basis.

The present situation in the Washington coal-mining district began to develop with the refusal of the international union to authorize the Allport commission recommendations determined under instructions by the Bituminous Coal Commission award of March 10, 1920, and concurred in by John P. White, minority member of the commission. This award provided approximately 14 per cent above the 1919 scale award, but it was nevertheless repudiated and a demand made for an advance of $1.50 in the day-wage scale, effective Aug. 16, 1920.

This increase was paid until March, 1921, commercial mines continuing to operate on account of the urgent necessity for railway fuel, but then the State Director of Labor and Industries, to break the deadlock, reconvened the Allport commission and a modified scale was indorsed by the state union. Official concurrence by the international union was again withheld, and as result all but five companies became open shop on the basis of the Allport rates, the five remaining companies, including railroad mines, seeking continuation of relations with the union until the U. S. Coal Commission could determine the facts and make recommendations.

M. H. Taylor, of Pittsburgh Coal Co., Dies

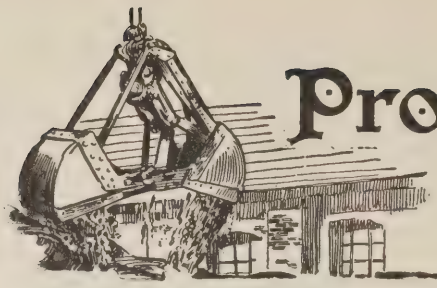
Matthew H. Taylor, chairman of the Board of Directors of the Pittsburgh Coal Co. since 1907, died in Atlantic City on March 7. He was 75 years old. Mr. Taylor was born in Huntingdon, Pa., a son of Judge Taylor. Early in life he moved to Erie, Pa., where he became identified with the W. L. Scott coal interests and at the time of his death was a trustee of the W. L. Scott estate.

Besides being chairman of the Board of Directors of the Pittsburgh Coal Co. Mr. Taylor was vice-president of the Erie & Pittsburgh Railroad Co., president of the Montour Railroad Co. and a director of the Second National Bank of Erie.

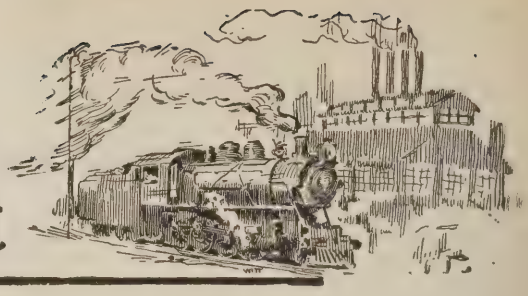
Industrial Activity Pronounced in January

Late figures on January business conditions, according to the survey of current business, reprinted from Commerce Reports, continue to show pronounced activity throughout the industries. Although the building-material industry shows the most activity, there has been a noticeable advance in activity in almost all lines, with production figures close to or exceeding the 1920 peaks. Additional high production records since early in 1920 were made in January by copper, glass bottles, clay fire brick, silica brick, and enamel sanitary ware.

The cost of living figures show a slight decline in spite of the rising tendency of wholesale prices. Prices received by farmers for crops and live stock also advanced, notwithstanding declines in wholesale prices of agricultural products.



Production and the Market



Weekly Review

No surprise was occasioned in the coal trade by the government stock report, issued late last week, showing a gain during January of 2,000,000 tons of soft coal in the hands of consumers, thus indicating a total of 38,000,000 tons on Feb. 1. It is conceded that almost an equal amount was lost during February, for consumption was at a higher rate than in January and production at a lower rate. February output of soft coal was 42,130,000 tons, a drop of 16 per cent in average daily production. Consumption and exports during January are estimated by the government at 10,700,000 tons per week.

Demand for soft coal in the East is fast being relieved of retail-dealer orders, a fact partly accounting for the softness of the market. *Coal Age* Index of spot prices of bituminous coal at the mines dropped 11 points to 268 on March 12, the corresponding average price being $3.24.

Export Demand Strong

The only feature of the week is the gradual development of export demand. Interest, of course, lies in the inquiries for Germany, France, and other continental European countries. Some orders have been closed and vessels have been chartered. The immediate effect has been a gain in movement to the West Indies and other nearby offshore markets. A sharp demand last week advanced Pocahontas at Hampton Roads by $1 per ton and high-volatile Kanawha gas coals were up to $6@ $6.25 f.o.b. Hampton Roads on March 10. Altogether it was estimated that upward of 250,000 tons of coal had been engaged for shipment to foreign countries and that 25 vessels had been chartered.

In the Midwest the domestic market has been affected by the season. The volume of domestic coals has fallen off, with indications of a further slump in prices. There is enough coal in the Northwest to keep the market calm on almost every kind of coal. Industrial conditions have improved sufficiently around the upper Lakes to move considerable coal off the docks, leaving little except fuel under contract. Of the 1,200,000 tons on the Duluth-Superior docks, most of it is screenings. Quotations for southern Illinois and Standard coals remained on about the same basis, while nearly every other grade, excepting Pocahontas and New River took a drop.

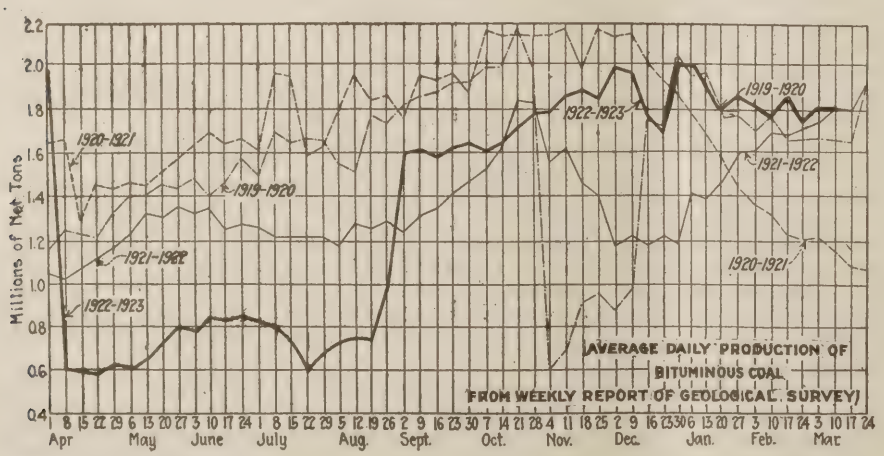
Eastern Situation Quiet

In the East there is less complaint about car shortage, which has not changed materially from last week. Coal stocks are equal to requirements and consumers in some sections appear to be eating into their reserve supplies. In New England manufacturers are endeavoring to maintain their 60- and 90-day reserves. There is a better outlook for manufactured goods and mill buyers show more interest in the market. The demand for Southern coals from abroad had a tendency to increase the activity of large consumers. At various terminals there was some delay in discharging boats.

Present estimates of soft-coal production in the week ended March 3, according to the Geological Survey, indicate a total output of 10,860,000 net tons, including coal shipped, mine fuel, local sales, and coal coked. This is an increase of more than one-half million tons over the revised estimate of 10,323,000 tons for the week preceding.

Preliminary reports of cars loaded in the week of March 5-10 show 42,194 cars loaded on Monday, a decrease to 33,181 cars on Tuesday and to 28,296 cars on Thursday. Loadings for the first four days of the week were slightly below those for the corresponding days of the preceding week. The total output probably will be between 10,750,000 and 10,850,000 tons.

The anthracite situation continues active. Domestic



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Feb. 17	10,285,000	10,431,000
Feb. 24 (*b*)	10,402,000	10,323,000
Mar. 3 (*a*)	10,541,000	10,860,000
Daily average	1,757,000	1,810,000
Coal year to date	390,892,000	377,729,000
Daily average coal year	1,381,000	1,333,000
ANTHRACITE		
Feb. 17	1,703,000	1,828,000
Feb. 24	1,701,000	1,838,000
Mar. 3	1,913,000	2,104,000
Coal year to date	81,427,000	47,317,000
COKE		
Feb. 24 (*b*)	157,000	371,000
Mar. 3 (*a*)	143,000	394,000
Calendar year	1,140,000	3,153,000

(*a*) Subject to revision. (*b*) Revised from last report.

sizes are moving steadily, but there has been less demand for the product of the small independent operators, with the result that their quotations have dropped. Steam coals are easier and quotations also are easier.

The movement in contracting for Connellsville furnace coke for the second quarter is now nearly completed. The great bulk was done at $7 but three or four of the latest contracts were at $7.25, the operators holding out for that price on account of quality and service. Car service in the region has been practically adequate for the past thirty days.

Midwestern Steam Market Firmer

It is obvious to most coal producers and sales companies in the Midwest that the domestic market is flat for the season. The volume of domestic coals from all fields has fallen off steadily and swiftly during the last ten days and efforts to hold circular prices in line cannot be effectual much longer. The dealer trade is determined that lump, egg and nut prices must drop lower at once. The result of all this is that the high-cost mines are beginning to shut down and the volume of coal produced has fallen to such an extent that screenings are giving just enough evidence of shortness so that the prices on them are firming a little at last. Southern Illinois screenings, which have sold down to $2.25 as a regular thing, have risen until $2.50 is more nearly an average. Central Illinois screenings have inched upward from $1.15@$1.25 nearly to $1.50, leaving only Standard district screenings unchanged from the week before. The principal reason for this is that Standard domestic sizes have been selling more steadily as they are the cheapest fuel in Illinois.

Southern Illinois field conditions are not happy. No-bills are piling up there, as they have been in all other Illinois regions for weeks. Railroad tonnage is light. Most roads have been entirely satisfied with their minimum contract quantities. Unfilled orders are now largely a thing of the past, for car supply has grown better and almost any mine that wants to run can easily get 60 jer cent of its rating, if not more. Shutdowns are the result.

Kentucky Prices Breaking

In Kentucky mild weather has cut down demand for domestic fuel, and as a result of there being some distress transit coal on some of the markets, there probably is no coal

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

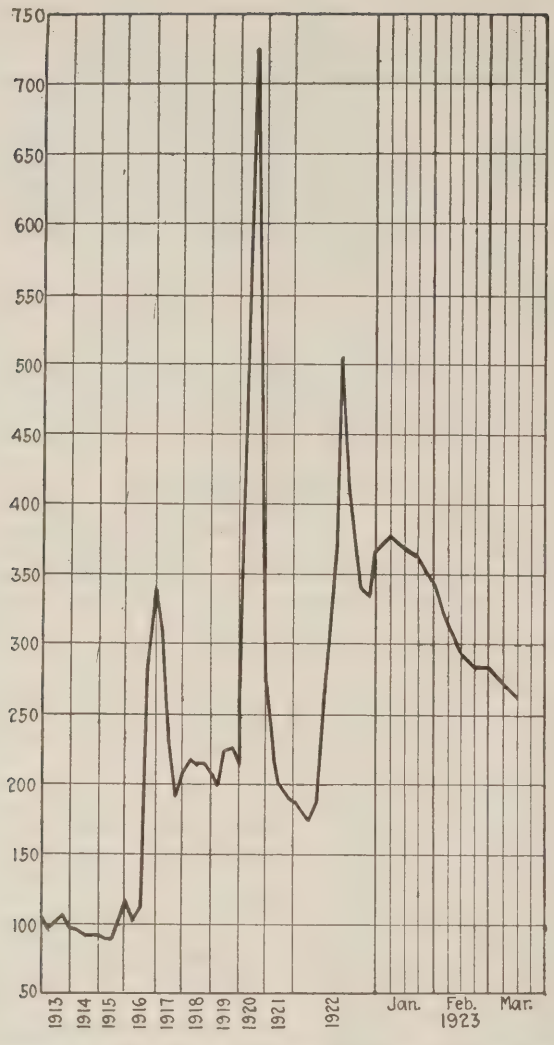
	Market Quoted	Mar. 13 1922	Feb. 26 1923	Mar. 5 1923	Mar. 12 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.15	$7.00	$7.00	$6.50@$7.50
Smokeless mine run	Columbus	1.85	4.50	4.50	4.25@ 4.75
Smokeless screenings	Columbus	1.45	4.45	4.45	4.25@ 4.65
Smokeless lump	Chicago	3.15	7.00	7.00	6.75@ 7.25
Smokeless mine run	Chicago	1.85	4.50	4.50	*3.50@ 4.50*
Smokeless lump	Cincinnati	3.15	7.50	7.00	*6.75@ 7.00*
Smokeless mine run	Cincinnati	1.75	4.75	4.75	*4.75@ 5.00*
Smokeless screenings	Cincinnati	1.15	4.10	4.75	*4.50*
*Smokeless mine run	Boston	4.60	6.20	6.15	**6.75@ 7.25**
Clearfield mine run	Boston	1.95	3.75	3.50	*2.85@ 3.75*
Cambria mine run	Boston	2.45	4.35	4.10	*3.50@ 4.50*
Somerset mine run	Boston	1.90	4.00	3.75	*3.25@ 4.00*
Pool 1 (Navy Standard)	New York	2.95	4.75	4.75	*4.25@ 4.75*
Pool 1 (Navy Standard)	Philadelphia	3.05	4.70	4.65	*4.40@ 4.80*
Pool 1 (Navy Standard)	Baltimore	2.65	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.40	3.85	3.85	**3.50@ 4.08**
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	4.25	3.80	**3.50@ 4.20**
Pool 9 (Super. Low Vol.)	Baltimore	2.15	3.50	4.00	3.75@ 4.25
Pool 10 (H.Gr.Low Vol.)	New York	2.00	3.50	3.35	*2.75@ 3.50*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	3.60	3.45	*3.00@ 3.40*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.10	3.25	3.00	3.00
Pool 11 (Low Vol.)	New York	1.70	2.90	2.45	1.90@ 3.00
Pool 11 (Low Vol.)	Philadelphia	1.75	3.05	2.90	*2.50@ 2.90*
Pool 11 (Low Vol.)	Baltimore	2.05	2.60	2.25	2.25
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.60	2.25	2.30	*2.00@ 2.40*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	2.45	.....	2.00@ 2.35
Pool 54-64 (Gas and St.)	Baltimore	1.55	2.65	2.25	2.25
Pittsburgh sc'd gas	Pittsburgh	2.70	4.10	4.10	*3.25@ 4.00*
Pittsburgh mine run (St.)	Pittsburgh	2.15	2.75	2.75	*2.50@ 2.60*
Pittsburgh slack (Gas)	Pittsburgh	1.65	2.80	2.85	*2.75*
Kanawha lump	Columbus	2.50	4.50	4.50	*3.75@ 4.75*
Kanawha mine run	Columbus	1.60	2.85	2.85	*2.50@ 2.75*
Kanawha screenings	Columbus	1.40	2.45	2.50	*2.00@ 2.25*
W. Va. lump	Cincinnati	2.50	4.75	4.00	*3.50@ 4.00*
W. Va. Gas mine run	Cincinnati	2.15	2.75	2.75	**2.75@ 3.00**
W. Va. Steam mine run	Cincinnati	1.35	2.50	2.75	2.50@ 3.00
W. Va. screenings	Cincinnati	1.30	2.35	2.35	**2.50**
Hocking lump	Columbus	2.60	4.30	4.15	*3.75@ 4.25*
Hocking mine run	Columbus	1.90	2.60	2.60	*2.35@ 2.50*
Hocking screenings	Columbus	1.50	2.10	2.15	*1.90@ 2.15*
Pitts. No. 8 lump	Cleveland	3.05	4.35	4.05	*3.75@ 4.25*
Pitts. No. 8 mine run	Cleve'and	$1.90	$3.85	$3.00	*$2.85@$3.00*
Pitts. No. 8 screenings	Cleveland	1.75	2.90	2.90	*2.65@ 2.85*
Midwest					
Franklin, Ill. lump	Chicago	3.45	4.60	4.60	4.50@ 4.75
Franklin, Ill. mine run	Chicago	2.50	3.35	3.35	3.25@ 3.50
Franklin, Ill. screenings	Chicago	1.85	2.35	2.35	2.25@ 2.50
Central, Ill. lump	Chicago	2.80	3.35	3.35	*3.00@ 3.25*
Central, Ill. mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.75	1.60	1.30	**1.40@ 1.50**
Ind. 4th Vein lump	Chicago	3.25	4.35	4.35	*3.50@ 3.75*
Ind. 4th Vein mine run	Chicago	2.40	3.10	3.10	*2.75@ 3.00*
Ind. 4th Vein screenings	Chicago	2.15	2.10	2.10	2.00@ 2.25
Ind. 5th Vein lump	Chicago	2.80	3.60	3.60	*3.25@ 3.50*
Ind. 5th Vein mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Ind. 5th Vein screenings	Chicago	1.60	1.80	1.80	*1.25@ 1.50*
Standard lump	St. Louis	2.60	3.10	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.85	2.25	2.25	2.25
Standard screenings	St. Louis	1.20	1.45	1.35	1.30@ 1.40
West Ky. lump	Louisville	2.45	3.35	3.35	*2.85@ 3.25*
West Ky. mine run	Louisville	1.85	2.20	2.05	*1.85@ 2.15*
West Ky. screenings	Louisville	1.65	1.85	1.85	*1.50@ 1.85*
West Ky. lump	Chicago	.....	3.60	3.60	*3.00@ 3.25*
West Ky. mine run	Chicago	.....	1.95	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.60	.....	.....	.....
Big Seam mine run	Birmingham	1.85	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	4.60	4.60	4.50@ 4.75
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.35	5.00	5.00	4.50@ 5.50
S. E. Ky. mine run	Louisville	1.50	2.60	2.60	2.25@ 3.00
S. E. Ky. screenings	Louisville	1.35	2.20	2.20	2.00@ 2.40
S. E. Ky. lump	Cincinnati	2.25	4.75	3.75	3.50@ 4.00
S. E. Ky. mine run	Cincinnati	1.35	2.35	2.50	**2.50@ 3.00**
S. E. Ky. screenings	Cincinnati	1.30	2.10	2.15	**2.00@ 2.50**
Kansas lump	Kansas City	5.00	5.00	5.00	*4.50*
Kansas mine run	Kansas City	4.00	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.50	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	March 3, 1923 Independent	March 3, 1923 Company	March 10, 1923† Independent	March 10, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.50@ 5.00	4.00@ 4.10	*4.50@ 4.75*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	4.00@ 5.00	4.00	4.00@ 5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.50@ 3.00	2.75@ 3.00	*2.25@ 3.00*	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	*1.40@ 2.00*	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.40@ 2.00	2.00	1.40@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 268, Week of March 12, 1923. Average spot price for same period $3.24. This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

now shipping on consignment. Prices are weaker all along the line, and lump broke under $3 last week for the first time in months, while mine-run is quoted under $2. Car allotments show larger on a percentage basis as a result of railroads cutting back to June 10 and adding 10 per cent to the May loading records in alloting cars. However, for the first time in months there was a little surplus of cars on the Illinois Central lines in western Kentucky on Monday as a result of idleness on Sunday. For the month, as far as railroads have reported, the Illinois Central shows 46 per cent of cars supplied, while the Owensboro division of the L. & N. is improving with 33 per cent and the Henderson division shows 28 per cent.

Operators acknowledge that the outlook is not promising in view of the fact that no early movement in a big way is anticipated north.

Market Sags in Northwest, Too

About the only shortage that causes even a ripple in the Northwest is the lack of coke for local use in Milwaukee. While docks in that city are scraped clean, car-ferry deliveries have improved a little. During February 23,605 tons of anthracite arrived and 62,383 tons of bituminous. By rail there arrived a little anthracite and 79,184 tons of soft coal. Interior dealers, who have been ordering broadcast and getting nothing, are not worrying much any more. Lake traffic may open up within six weeks.

The dock men are now deeply engrossed in the campaign of showing the country they cannot continue to do business unless the Interstate Commerce Commission alters rates so as to give the docks a better shake as against all-rail coal from Illinois and Indiana.

Stormy weather and some industrial activity, which have held up the market for Utah coal, are no longer effective. Mines throughout the state are shutting down. A railroad ruling that no mine shall get cars so long as it has as many as 50 per cent no-bills on hand is indicative of the situation. The mild weather is having exactly the same effect in Colorado. Fully 50 per cent of the coal operations of the state are down just now. Circulars issued in Kansas City March 8 show a 50c. break on both Kansas lump and nut and on Arkansas lump and mine run.

Ohio Hears of Smokeless Price Cut

In Ohio steel interests are inclined to talk about contracts. Demand for smokeless slack coals have picked up. Reports have it that smokeless operators are going to reduce prices on April 1. The movement for high-volatile coals has stiffened both in price and in the tone of the market. The railways have cleaned up considerably and the movement through the gateway is much better.

While steam grades are holding fairly well in the Columbus market there was a slump in domestic sizes, due largely to higher temperatures and the fact that dealers are moving slowly in placing orders. Retail prices have weakened a little because of weather conditions. Buying of both mine-run and screenings is more active and there is little free coal of those varieties on the market. With car supply reduced to about 15 to 20 per cent of capacity, steam grades are not as plentiful as formerly. Railroads with their assigned cars are taking a large part of the steam production in certain districts. Embargoes are affecting sections of Michigan and Indiana as well as some parts of Ohio.

Eastern Ohio mines are operating at a little less than 40 per cent of capacity, due to car shortage and transportation difficulties. During the week ended March 3, these mines produced 305,000 tons of coal, or 52,000 tons more than during the previous week, which however, consisted of only five work days. Manufacturers stocks are small but there are no indications any difficulty will be experienced by this class of consumer in getting his coal as needed.

Car shortage throughout West Virginia is very pronounced. There was a slight increase in production in the Pocahontas and Tug River districts, as congestion in some sections was relieved. Smokeless coal is on a firmer basis as a result of export inquiries. Quotations for mine-run ranged from $3.75 to $4.25 per ton.

Producers of high-volatile coals in West Virginia are feeling more optimistic as a result of increased industrial activity in the Eastern market and look forward to further improvement.

In the Pittsburgh district car supply is hardly any better, but there is less complaint, operators finding that production is equal to requirements. There is no demand for domestic coal except from the territory normally tributary to the district. Consumption by public service companies, manufacturers and the steel industry is heavy.

Production in the Birmingham (Ala.) district is being maintained around 385,000 tons weekly and there has been an improvement in car supply. Bunker trade at the Gulf ports has been somewhat better and some coal has been exported to Cuba. There has been a falling off in demand for domestic coals due to warmer weather.

The demand for soft coal in Buffalo is quiet.

New England Market Takes Turn for Better

With practically no advance indications the soft coal market in New England took a turn for the better something more than a week ago. Influenced partly by continuing embargoes all-rail and by a somewhat better outlook for manufactured goods mill buyers have shown more interest in current quotations. There has developed a disposition to hedge on the course of the spring market and it is probable that the remainder of March will show heavier purchases than were expected.

Both Italian and English orders have materialized within

a week's time, and while there is a tendency to exaggerate the tonnage required it is a fact that cargoes are not only in process but steamers have already made their departure for Mediterranean ports. So recent is this feature that ships are passing each other on the high seas, some of them bound this way with English coal on commitments of thirty days ago while others are outward bound with American coal destined to British agents. This new foreign demand is particularly difficult to gage because inquiries find their way to so many brokers and tonnages are often multiplied tenfold.

To all this promise of spot business the Southern smokeless coals have reacted sharply. Medium to second-grade low-volatile that were a drug a few days ago at $6@$6.25 have sold within a day or two up to $7, while navy standard coals have risen to $7.25 per gross ton f.o.b. vessel.

At Providence, Boston and Portland rehandlers are in more or less distress over terminal delays. At Portland cargoes are being detained ten days or so awaiting berth, while at Boston and Providence there are instances where boats will not be discharged before the first week in April. Some of the congestion is due to railroad fuel from Welsh ports, but perhaps the bulk of the coal awaiting disposition results from the attempts of some of the agencies to force shipments on reluctant buyers. Where a fortnight or so ago there were reasonably large accumulations at Hampton Roads daily receipts are now being absorbed with little or no delay. If car-supply can be improved on the Virginia railroads there probably is little doubt now that a materially increased output can be taken care of.

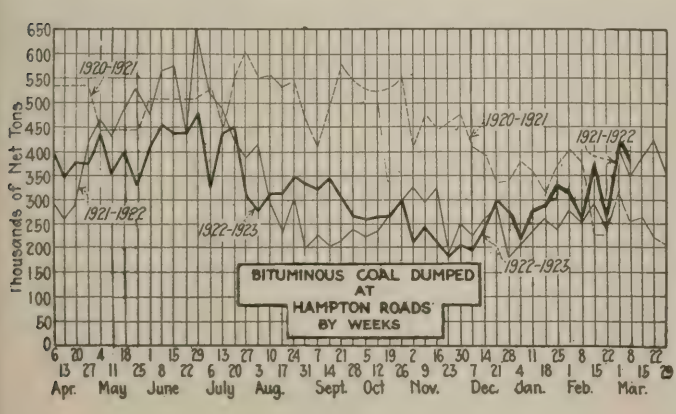
All-rail inquiry also has shown an improvement, although there has been no appreciable change in prices. In fact spot coal from central Pennsylvania was sold at a lower range than applied on December purchases for deliveries extended through February. The permit system is in use on the three chief New England carriers, especially on coal originating on the New York Central, but authority to ship is not difficult to obtain where moderate tonnages are involved, and the trade expects the gateway situation to improve measureably by April 1. Meanwhile many shippers are continuing their active canvass for contract business. Apparently they believe that taking the season as a whole it will be to their advantage to close a large proportion of anticipated output about on the basis of present spot prices. By the same logic the larger consumers here are less inclined to make contracts than to buy moderately in the present market.

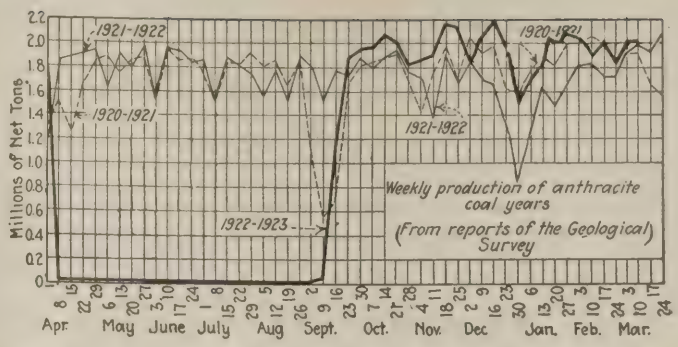
Market at New York Still Quiet

The New York market continues quiet, but most operators are optimistic. The better grades are sold up. Local houses are receiving many inquiries for foreign shipments for coal as well as for coke.

Conditions in the Philadelphia market show no change. Most consumers are buying to meet current requirements, but with active industrial conditions the actual consumption of coal is increasing.

There has been a gradual resumption of export movement at Baltimore. One steamer leaving Baltimore with 5,677 tons of Fairmont coal for Leghorn, Italy, had discharged Welsh coal at Boston. Another vessel that brought coal to Providence will load coal for Italy at the Western Maryland docks. There was a gradual growth in demand for bunker coal, with quotations for Pool 9 around $6.45 at the piers.





Domestic Anthracite Finds Ready Market

Domestic sizes of anthracite are finding a ready market. Consumers in New York territory are placing orders for next winter's supply and are telling their dealers to put the coal into their bins as soon as possible. Producers do not look for any let-up in demand this spring and summer, at least not until most consumers have put in their coal. Similar conditions exist in Philadelphia. In Baltimore, where dealers have not been able to deliver all of their orders, some consumers have cancelled parts of their orders, having sufficient deliveries to last them the balance of the season. Orders are being cut from various parts of the country. Some coal has been refused by dealers from Canada unless it is of high quality.

The production of anthracite in the week ended March 3, according to the Geological Survey, increased notably over the production in the week before and is estimated at 2,104,000 net tons, including coal shipped, mine fuel, local sales and dredge and washery output.

Early returns on car loadings during the first four days of the week March 5-10 indicate somewhat lower rate of production and a probable total output for the week of approximately 2,000,000 tons.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Feb. 24, 1923 Inclusive	Week Ended Feb. 24, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	28.2	19.5
Panhandle, W. Va.	51.3	57.3	55.9	55.8
Westmoreland	58.8	65.8	54.8	41.0
Virginia	59.9	55.7	52.4	51.1
Harlan	54.8	22.1	21.4	16.2
Hazard	58.4	16.4	18.8	14.9
Pocahontas	60.0	36.6	35.6	26.7
Tug River	63.7	28.8	32.6	29.3
Logan	61.1	26.2	30.9	32.1
Cumberland-Piedmont	50.6	31.7	44.4	45.8
Winding Gulf	64.3	30.4	32.4	33.4
Kenova-Thacker	54.3	42.4	38.6	(a)
N. E. Kentucky	47.7	28.4	28.5	25.8
New River	37.9	31.6	34.2	31.1
Oklahoma	59.6	59.1	42.2	38.8
Iowa	78.4	75.9	80.2	80.9
Ohio, Eastern	46.6	40.8	33.8	31.7
Missouri	66.8	76.3	76.4	78.2
Illinois	54.5	49.9	52.1	51.5
Kansas	54.9	55.9	50.5	41.9
Indiana	53.8	37.7	55.0	59.1
Pittsburgh†	39.8	41.2	32.5	32.7
Central Pennsylvania	50.2	53.4	43.1	44.6
Fairmont	44.0	35.5	35.7	32.5
Western Kentucky	37.7	32.4	33.8	32.4
Pittsburgh*	31.9	56.1	63.5	52.6
Kanawha	13.0	15.6	21.5	20.8
Ohio, Southern	24.3	38.1	36.2	30.5

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Coal Cars
Week ended Feb. 24, 1923	830,778	178,457
Previous week	817,778	180,988
Same week in 1922	728,925	186,640

	Surplus Cars All Cars	Coal Cars	Car Shortage	
Feb. 21, 1923	20,786	5,322	76,900	39,197
Feb 14, 1923	27,172	7,094	72,855	38,132
Same date in 1922	264,814	105,570	.....	.....

Foreign Market And Export News

Demand for Welsh Coal for Export Increases; Production Shows Slight Decrease

There was a further drop in British coal production during the week ended Feb. 24, according to a cable received by *Coal Age*. The output amounted to 5,519,000 tons, as compared with 5,560,000 tons the previous week. This is the fifth consecutive week in which production has shown a decline.

Demand upon the South Wales operators is increasing and they are heavily booked for March and April deliveries. It is reported that the German State Railways are inviting offers of any quantity of Northumberland and Durham coals for delivery at stated periods throughout the year.

There was a heavy demand for coke and coking smalls from Germany, as well as from France, Italy and Belgium.

The negotiations for the three-shift day at the docks have been broken off and the coal exporters, dock owners and others interested have asked the Industrial Court to make an inquiry.

German buyers are buying heavily in the North of England market, at prices quoted for late March and April delivery. Belgium, France and Italy also are making inquiries.

Within the past few weeks there have been strikes in various parts of South Wales over the non-unionist question, affecting several thousand men in the aggregate.

Hampton Roads Market Brisk

Business was more brisk at Hampton Roads, with prices stiffening and with a considerable volume of coal for export moving for the first time in many months. One steamer loaded coal for Germany.

Coastwise business was better, also, and supplies at the piers were being cut down materially. The eyes of the trade turned to the export field, speculating on the outcome of the German situation which is promising much business.

The tone of the market was stronger than for many weeks, and coal moved on a better schedule from the mines. The general outlook was much brighter and a better feeling throughout the trade resulted.

French Miners Get Wage Increase

Except in Lorraine and in the Saar, where the present agitation is partly due to influences from Berlin, the strikes which broke out on Feb. 16 in various French coal fields are now ended. The miners obtained the following wage increases per shift:

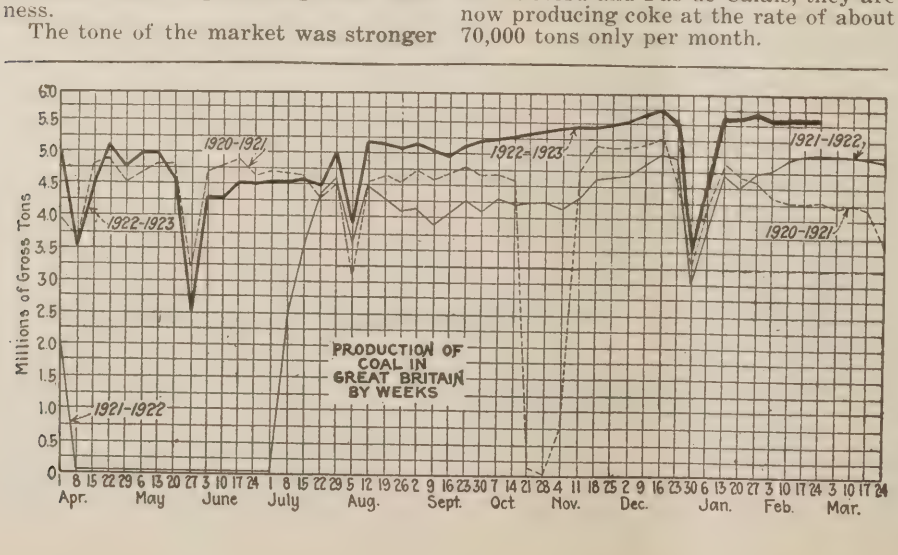
Nord and Pas-de-Calais	3 fr., 25
Loire	3 fr.
Aveyron (Decazeville)	3 fr.
Blanzy colliery	2 fr., 50
Gard	2 fr., 50

On the whole, the wages of French coal miners are brought back to their record level of 1921.

Pending the publication of their new schedules for renewal of annual contracts, the bulk of which start from April 1, collieries of the Nord and Pas-de-Calais have raised by 7 to 10 frs. prices to be applied to isolated orders or to contracts renewed before the end of March.

The interruption of shipments from the Ruhr, as well as the strikes in the Saar and in Lorraine, have taken away from the French market about one million tons per month.

French blast-furnaces, especially those of the East of France, are in a bad way as regards coke supplies. From Feb. 12 to Feb. 20, they received only 6,400 tons of coke from the Ruhr. Shipments of Belgian coke are being suspended pending the conclusion of an agreement relative to exchange shipments of French iron scrap to Belgium. British coke can of course be obtained, but in insufficient supplies and at excessive prices. As to French coke ovens of the Nord and Pas-de-Calais, they are now producing coke at the rate of about 70,000 tons only per month.



United States Coal Exports

(In Gross Tons)

	Anthracite	Bituminous
April	109,290	714,995
May	60,860	399,5,1
June	40,284	540,550
July	16,698	366,287
August	28,704	425,530
September	88,688	1,175,007
October	404,999	1,729,42[illegible]
November	440,608	1,618,0 7
December	381,758	1,468,917
1923		
January	355,272	1,090,439
Total for ten months, April, 1922, to January, 1923	1,927,161	9,528,738
Total for corresponding period ending with January, 1922	3,511,031	16,637,782

Export Clearances, Week Ended Mar. 3,

FROM HAMPTON ROADS

	Tons
For Canada:	
Nor. S.S. Erholm Johannessen, for St. Johns	1,596
For Cuba:	
Du SS. Trompenburg, for Havana	2,856
Dan. SS. Sarmatia, for Havana	1,596
For Egypt:	
Dan. SS. Brandeong, for Port Said	2,498
For Holland:	
Br. SS. Stephen, for Rotterdam	6,295
For Italy:	
Ital. SS. Vallarsa, for Porto Ferrajo	6,930
For West Indies:	
Amer. Schr. James E. Coburn, for St. Georges	1,383
Nor. SS. Bratland, for Curacao	2,969
Nor. SS. Mons, for Kingston	2,860
Amer. SS. Lake Galisteo, for Port of Spain	3,727

FROM PHILADELPHIA

For Cuba:	
Dan. SS. Sarmatia, for Havana	——
For Italy:	
Ital. Bark Santa Caterine, for Naples or Genoa	——

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	March 1	March 8
Cars on hand	962	823
Tons on hand	61,183	57,801
Tons dumped for week	151,121	124,126
Tonnage waiting	14,300	19,000
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,428	1,209
Tons on hand	82,830	70,370
Tons dumped for week	132,174	130,715
Tonnage waiting	30,282	11,315
C. & O. piers, Newport News		
Cars on hand	591	864
Tons on hand	70,055	60,650
Tons dumped for week	92,070	94,483
Tonnage waiting	5,253	18,745

Pier and Bunker Prices, Gross Tons

PIERS

	March 3	March 10†
Pool 9, New York	$7.25@$7.50	*$7.00@$7.50*
Pool 10, New York	6.25@ 6.75	*6.15@ 6.50*
Pool 11, New York	5.50@ 5.75	*5.00@ 5.75*
Pool, 9, Philadelphia	6.90@ 7.10	*7.00@ 7.20*
Pool 10, Philadelphia	6.30@ 6.55	6.30@ 6.55
Pool 11, Philadelphia	5.70@ 5.90	*5.50@ 5.80*
Pool 1, Hamp. Roads	6.40	**7.00@ 7.25**
Pools 5-6-7 Hamp. Rds.	5.75	**6.50@ 6.75**
Pool 2, Hamp. Rds.	6.40	**7.00@ 7.25**

BUNKERS

Pool 9, New York	$7.60@$7.85	*$7.30@$7.80*
Pool 10, New York	6.60@ 7.10	*6.45@ 6.80*
Pool 11, New York	5.85@ 6.10	*5.30@ 6.05*
Pool 9, Philadelphia	7.10@ 7.35	**7.25@ 7.50**
Pool 10, Philadelphia	6.65@ 6.75	**6.60@ 6.90**
Pool 11, Philadelphia	5.80@ 6.25	*5.75@ 6.15*
Pool 1, Hamp. Rds.	6.50	**7.00@ 7.25**
Pool 2, Hamp. Rds.	5.75	**6.50@ 6.75**

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	March 3	March 10†
Admiralty, large	30s.@32s.	30s.@32s.6d.
Steam, smalls	23s.@23s.6d.	**23s.@25s.**
Newcastle:		
Best steams	32s.6d.@34s.	**33s.@34s.**
Best gas	32s.6d.	**32s.6d.@35s.**
Best bunkers	32s.6d.@35s.	*30s.@32s.6d.*

† Advances over previous week shown in heavy type; declines in *italics*.

News Items From Field and Trade

ALABAMA

The Kewanee Coal Co. at Jasper has been incorporated by W. G. Duffee, J. R. Smith and A. K. Smith.

CALIFORNIA

The Chicago Pneumatic Tool Co., New York, announces the appointment of **H. J. Bradley** as San Francisco branch manager succeeding J. K. Haigh, who has been transferred to the Chicago branch to resume sales work.

COLORADO

The Colorado Fuel & Iron Co. reports for the year ended Dec. 31 last **net earnings of $3,261,327**, compared with $1,773,505 in 1921, and a deficit after depreciation, taxes, etc., of $654,944, against $2,371,171 in the previous year. J. F. Welborn, president, says that the coal strike did not adversely affect business, the average coal production during the strike period being several thousand tons in excess of the monthly average for the year.

CONNECTICUT

Governor Templeton has announced that, immediately following the adjournment of the Legislature, he **will invite the Governors of all the New England states and Pennsylvania to a conference** in Hartford to prepare for a possible repetition of the coal emergency next winter.

ILLINOIS

The Central Illinois Traffic Bureau, with offices in Chicago, is to be continued and **W. H. Holley**, manager for three years until last winter, when he joined the Nason Coal Co. at Chicago, returns to the bureau. **George Hemphill**, who has been temporarily in charge of the bureau, remains in his former capacity as Mr. Holley's right-hand man.

Between 60 and 90 tons of coal is being mined daily from the new Shuler mine near Alpha. There are 13 miners at work in the mine and as soon as the mine is enlarged the force will be increased. The Burlington R.R. has completed the switch to the mine, but the owners of the mine have not laid the track up the mine, so that coal is being transported from the mine by wagon and truck.

Is the Peabody Coal Co. of Chicago going to acquire and operate a section of the old **Chicago, Peoria & St. Louis Ry.?** The report gained circulation late in February when Stuyvesant Peabody, president of the Peabody Coal Co., inspected part of the line with engineers. "Not a word to say," was his only comment after he returned to Chicago. W. C. Hurst, general manager of the railroad said in Springfield that no offer had been made for any part of the road and that this was not the first time the Peabody interests had looked over the property. The railroad company has been petitioning the State Commerce Commission and the I. C. C. for permission to dispose of the line. That part of the railroad from Pekin south and east to Springfield makes junctions with the Illinois Central, Chicago & Alton, Chicago & Northwestern and the Burlington railroads and might be of some value as a coal originating line for a coal company with operations on it. The line now serves five mines jointly with other roads and four mines exclusively. Mr. Peabody denies that his company has bought any more mines on the line. It now operates its No. 51 mine at Andrews on the C. P. & St. L.

Frank W. DeWolf, who has been chief of the Illinois State Geological Survey at the University of Illinois, Urbana, announced his resignation Feb. 28 to engage in commercial work with The Humphreys-Gohs Oil Co., with headquarters at Dallas, Tex. Mr. DeWolf has been with the Illinois State Geological Survey since 1907 and has been in administrative charge since 1909. During this time, the most important investigations carried on by the Survey have dealt with coal and oil possibilities of Illinois. Mr. DeWolf is especially well known in mining circles in Illinois and the Central West.

Consolidation of ownership of the three Franco coal mines in Williamson County, near Marion, with capitalization at $1,500,000 has been announced by R. B. Mitchell, of Marion, vice-president and general manager of the new corporation, known as the Cosgrove Meehan Coal Co., of Illinois. Franco Nos. 1 and 2 were owned by the Ernest Coal Co. and Franco No. 3 by the Sandford Coal Co., both Cosgrove interests centering in Johnstown, Pa.

Reports are that the **Big Four railroad is to build an extension** out of Harrisburg towards West Frankfort, tapping a large section of Franklin County and its many mining centers. It is to be known as the Saline Valley Ry. and acording to reports the right of way has been acquired and work is to be started soon on the project. The proposed extension for a few miles will run parallel to the proposed Illinois Central branch which is now practicailly assured.

Despite adverse working conditions in January the Coal Operators' Association of the Fifth and Ninth Districts of Illinois, embracing 83 mines in the southern part of Illinois, report that the **output that month was greater than either November or December**, the total for the month reaching 1,770,879 tons. In December the tonnage was 1,589,619 and in November the production was 1,404,637 tons. The report for the week ending Feb. 3, shows a slackening of production with 329,297 tons hoisted, or 50,000 tons less than in the preceding week. Time worked dropped from 49 per cent of potential hours to 45 per cent. Hours lost because railroad cars were not available showed a considerable increase, and amounted to a greater number of hours than were actually put in by the miners.

R. B. Starek has been appointed executive vice-president of the **Binkley Coal Co.**, which recently purchased the properties of the W. S. Bogle Coal Co., of Chicago. H. A. Stark, former president and general manager of W. S. Bogle & Co., has been named vice-president and general manager. The company has also taken over the Essanbee Mining Co., of Clinton, Ind. The reorganization gives the Binkley company a total of 5,000 acres of coal land and an estimated output of 8,000 tons a day. W. H. Baker has charge of the Chicago sales, while Mr. Stark is in charge of all mine operations as general superintendent, with offices at Clinton, Ind.

INDIANA

The Love Coal Co. has been organized at Anderson, to mine coal. The company has a capital stock of $50,000 and the directors are Eldra O. Love, E. C. Love and L. B. DeSanctis.

The Penna, a new mine of the Templeton Coal Co., Terre Haute, located on the C. M. & St.. P. R.R., was opened Nov. 27, 1922.

The Eagle, a new mine operated by the Eagle Coal & Mining Co., Terre Haute, located on the C. & E. I. R.R., was opened Aug. 31, 1922.

The City Mine, of the City Coal Co., Jasonville, on the C. M. & St. P. R.R., was opened on Oct. 9, 1922.

More than 4,000 miners in the Terre Haute district went on vacation recently and more than twenty mines located north of that city were idle. The cause, it is said, is that the C. M. & St. P. R.R. did not send a train to the Bardyke mine the day previous, when a breakdown occurred, and no means were provided to return the men to their homes until the regular evening miner trains. In the meantime while the miners punish the railroad by not riding trains, the operators are doing repair work.

Dealers and operators of the Brazil block coal field, officially known as District No. 8, reached an agreement at a meeting recently for a continuance of the present wage contract after April 1. The contract is based on the New York agreement for soft-coal mining, but as the block coal is mined under different conditions, a separate scale is made for the Brazil district, providing a differential in favor of the block coal miners.

The Supreme Court of Indiana has ruled that coal operators need not pay employees twice a month and in cash. Numerous cases where payrolls were stolen were cited in argument against the proposed law.

IOWA

The Independent Coal Co. of Burlington has been incorporated with capital of $10,000 by A. G. Ruge and John McMahon.

KANSAS

Mine No. 11 of the Oberzan Coal Co., Mineral, located in Cherokee County on the M. K. & T. R.R., which was closed Sept. 30, 1921, was reopened in July, 1922.

The Old Smith mine, operated by George Dixon and others, of Mineral, located in Cherokee County, which was closed a number of years ago, was reopened in September, 1922. This was formerly connected with the M. K. & T. Railroad and it is the intention of the new company to re-lay the switch.

Mine No. 20 of the Sheridan Coal Co., Mulberry, located in Crawford County, is now being developed. A railroad switch has not been laid yet, but connections will be made with either the Missouri Pacific or the Kansas City Southern, or both.

Mine No. 3 of the McGrath Coal Co., of Pittsburg, in Crawford County on the Frisco R.R., a new operation, is now being developed.

Mine No. 11 of the Graham Coal Co., Pittsburg, located in Crawford County on the Santa Fe R.R., which was closed on Sept. 30, 1921, reopened Aug. 20, 1922.

KENTUCKY

A group of Luisa capitalists, headed by T. B. Lane and M. F. Conley, have formed the **Coalburg Collieries Co.** with a capital of $20,000, and with headquarters at Lawrence, where coal properties will be developed.

The Red Top Coal Co., of Lexington, has announced that it will establish a plant for the manufacture of smokeless blasting powder and that the new plant will be conducted in conjunction with its coal-mining operations.

The Midland Mining Co., of Tribbey, has announced a program of improvement, including the construction of a new tipple, mining houses and the like.

New coal companies which have filed for incorporation at Louisville are these: **Liberty Coal & Coke Co.** with a capital stock of $50,000, of 500 shares. A. R. Anderson holds 50; R. R. Atkins, 50; M. S. B. Barker, 134; A. G. Stith, 133, and T. H. Helm, 133. Limit of debt, $250,000. **L. N. L. Coal and Mining Co.**, Bell; $25,000; M, D. Bell, E. R. Martin and J. E. Bell, all of Pineville. **White Elkhorn Mining Co.**, Letchner; $25,000; Thomas Fugate and J. W. Craft, Hazard, and H. A. Price, Detroit, Mich.

The Oak Ridge Coal Co. has been incorporated at Louisville, with a capital of $50,000. The incorporators are R. Montgomery and J. L. Morris, both of Louisville, and W. R. Hudspeth, of Greenville.

The Virginia Coal & Coke Corporation, with main offices at Roanoke, Va., has leased acreage in the Elkhorn and Hazard fields of eastern Kentucky, near Whiteburg, which it will develop.

The Blackwell mine of the Blackwell Bros. Coal Co., at Powderly, on the Illinois Central Ry., was reopened on Dec. 20, 1922.

The Pond Creek mine of the Pond Creek Coal Co., Central City, on the Kentucky Midland R.R., was opened on Sept. 15, 1922.

The Nonnel mine of the Kentucky Washed Coal Co., Greenville, a strip mine, located on the Louisville & Nashville R.R., was reopened on Dec. 10, 1922.

The No. 3 mine of the Black Diamond Coal Co., Drakesboro, on the Louisville & Nashville R.R., was opened Sept. 15, 1922.

The Lelia mine of the Liberty Coal Mining Co., at Hillside, on the Illinois Central R.R., was reopened Sept. 1, 1922.

In order to relieve congestion in the Louisville terminals the **Louisville & Nashville R.R. has started work on new yards** at Highland Park, where trackage for 1,000 cars will be installed at once, with plans for later materially enlarging switching facilities. More than a year ago the company purchased 463 acres adjoining the present yards on the south.

Jacob Hetzel, M. F. Patrick and D. Glenn Sublett have incorporated the **Laurel Fork Coal Co.** at Salyersville.

A. B. Culton, of the firm of Culton & Sherwin, mining engineers, Pineville, has been **appointed to head the L. & N. rating commission** with offices in Louisville. For the present he will continue to reside in Pineville. The firm of Culton & Sherwin will continue as heretofore with Mr. Culton in a consulting capacity.

Robert Jameson, Earl Jameson and Beatrice Jameson have incorporated the **Edythe Coal Co.**, at Beattyville, Ky., with a capital stock of $20,000.

The Smothers-Gooch Coal Co., at Pineville, has been organized with the election of the following officers: President and manager, Estill A. Smothers; secretary, treasurer and construction engineer, C. L. Gooch. The company was recently incorporated for $10,000. The company plans to install a bucket system at a cost of $15,000 and will develop 300 acres of coal land with a daily capacity of five cars. Purchase of the mining equipment needed is to be made soon.

Patrick Calhoun, president of the Inland Waterways Co., Louisville, declares that by **next winter large quantities of coal will be moving into Louisville by water** from the Kentucky River section of eastern Kentucky and from the Kanawha river section of West Virginia, the company having arranged to go ahead with installation of barge unloading equipment at the old Consolidated Coal Co. yard in Portland, Louisville, where an incline and other equipment will be installed for mechanically transferring coal from barges to yards and to railroad cars for distribution about the city and to other points on a combination water and rail haul. The company is now operating several towboats and barges and is having additional equipment built for its use.

The Kentucky Utilities Co., Louisville, an Insull organization, operating great transmission lines in both the eastern and western Kentucky fields and utilities in various sections of the state, at its annual meeting in Louisville on Feb. 27, **re-elected directors and officers.** Samuel Insull is chairman of the board, Harry Reid, president; L. B. Herrington vice-president; and A. A. Tuttle, secretary. The report showed an increase of surplus from $272,108 to $400,429 for the year. During that period the company completed 121 miles of additional transmission lines in the coal fields, and now has 504 miles of sucn line in service. Plans call for additional generating capacity for eastern Kentucky to take care of increasing demand from the coal operations. It is believed this demand will become much greater as the Louisville & Nashville R.R. carries out its plans for spending large sums in improving service to the coal fields of southeastern Kentucky.

MINNESOTA

The bill proposed before the Minnesota legislature to sell coal on the basis of heat units, by a system of grading, **has been dropped.** The bill was based upon a proposition from Fuel Commisioner Bowen.

Judge McGee, of Federal Fuel Administrator fame in Minnesota, **has been named for a federal judge in this state** and the nomination has been confirmed in the Senate. As Fuel Administrator the Judge antagonized many, but he had many friends who have been pushing him for this position.

MISSOURI

A coal mine has been opened on the Luys' farb, east of Carthage, and is being operated by H. C. Campbell, D. W. Short and M. Branson, of Purcell. Several tons of coal already have been taken out and operations will be pushed. The shaft was sunk about a year ago but little mining has been done since that time. The mine seems to be in the heart of a coal bed.

George McGuire and James Holman, who have been in charge of a coal mine at Vibbar, Mo., have **leased 40 acres near Chillicothe**, and have brought equipment to open a new shaft. The mine is to be tunneled into the side of a hill. McGuire and Holman report they have 25 experienced miners they will bring here as soon as the shaft is ready.

C. C. Carpenter, of Trenton, who has just returned from Woreland, reports that **27 coal mines have been opened in the vicinity of Woreland** recently. The mines are strip mines and the coal is shipped direct to Kansas City. According to Carpenter the payroll of the mines in one month amounted to $100,000 and, because of the shortage of houses, there were 100 tents in the town before the cold weather set in.

NEW YORK

Assemblyman Coughlin, of Kings County, has offered a resolution to the State Assembly at Albany **calling on the federal government to operate the mines and distribute coal.** Mr. Coughlin maintains that the fuel shortage this winter was due in large measure to the absence of unified action and co-operation between the mines and the railroads.

The city **water works of Buffalo** has asked for bids on **furnishing 45,000 tons of "three-quarter slack" coal**, tenders to be opened March 20.

A pure coal bill was introduced in the State Senate at Albany March 5 by Senator Ryan, of Rensselaer. Under its provisions it would be a misdemeanor for any person, firm or corporation to sell or offer for sale as coal any fuel mixed with coke, charcoal, slag, limestone or slate, unless the purchaser was notified in advance of the adulteration.

The Perryman-Burns Coal Co., Inc., has been organized to deal in anthracite and bituminous coals, with offices at 90 West Street, New York City. David P. Burns, and his brother Archibald P. Burns, both formerly connected with the Tuttle-Burger Coal Co., are members of the new concern. Archibald P. Burns, who covered the New Jersey territory for the Tuttle-Burger company, will represent the new concern in that state.

Koppers coke ovens, arranged in two batteries of 57 ovens each, together with byproduct and benzol plants, coal- and coke-handling equipment, etc., **are to be built at the Lackawanna plant (at Buffalo) of the Bethlehem Steel Co.** Construction will be started at once and it is expected that the plant will be completed within a year.

OHIO

The Besola Coal Co., St. Clairsville, has been chartered with a capital of $25,000, to mine and sell coal, by W. E. Lahm, J. O. Somers, B. H. Beatty, Laura L. Somers and Emma C. Beatty.

The Middle West Coal Co., of Cincinnati, has announced the appointment of **Burke H. Keeney**, as manager and treasurer to succeed E. H. Doyle.

The property of the **Caledonian Coal Co.**, of Columbus, consisting of 385 acres and an operating mine on the T. & O. C. R.R., south of New Lexington, **has been sold to D. J. Malone**, of Fort Smith, Ark. The consideration was in the neighborhood of $168,000.

The Romaine Coal Co. has been chartered with an authorized capital of $350,000 to mine and sell coal in Jefferson County. Incorporators are Fred H. Clark, Frank R. McGee, M. B. Cole, A. B. Imhoff and J. S. Butts.

H. W. Hawk, head of the Long Hollow Coal Co., of Nelsonville, has returned from Pittsburgh, where he closed a deal for the purchase from the National Fireproofing Co. of a large acreage adjoining his property. This will be used to enlarge his mine and modern equipment will be installed, including shaker screens. The mine will be electrically equipped.

S. H. Robbins, president of the Youghiogheny & Ohio Coal Co., has been appointed chairman of the board of directors and **acting president of the Midland Bank**, Cleveland, until such time as a successor to William P. Sharer is named. Mr. Robbins also is president of the Northern Coal & Dock Co. and the Progress Coal Co. He also is a director of the Big Vein Coal Co.

The Piney Fork Coal Co., a subsidiary of the Hisylvania Coal Co., of Columbus, which was opened several years ago as a stripping operation, **has been converted to a drift-mining proposition**, as all of the coal that could be mined by stripping has been taken.

At the Canton and Columbus plants of the Timken Roller Bearing Co. provision is being made for a **considerable increase in production** of Timken tapered roller bearings. At the Canton plant a large modern factory building is in process of construction, on which work is being rushed to completion as rapidly as possible.

PENNSYLVANIA

A per capita tax of 50c. is being levied against the members of those unions which have not contributed **toward the memorial to be erected to John Mitchell**, former president of the United Mine Workers of America. The memorial is to be erected in Scranton to commemorate the unionizing of the hard-coal fields by Mr. Mitchell.

A meeting of the tri-district executive board of the Districts 1, 7 and 9 of the United Mine Workers of America **will soon be called to determine the new policy of the union** in the anthracite field in the coming negotiations with the mine owners. Two courses are said to be open to the men, one the calling of a tri-district convention to frame new demands and the other a referendum vote to have the members indorse a renewal of the demands as framed at the Shamokin convention in January, 1922.

A new mine-cave bill was introduced in the State Legislature on March 6 by Representative Walter W. Kohler of Lackawanna County. The bill provides that any persons, association, copartnership or corporation owning land in any districts in which anthracite or bituminous coal mining has been carried on may send into the mine openings competent mining engineers, agents or inspectors for the purpose of ascertaining to what extent and where and how much coal has been mined from beneath the property of the complainant. It is further provided that the owners or operators of the mine, their agents and employees shall be obliged to render such aid to the investigators as will enable them to make the examination with safety to themselves. Refusal of the owners or operators for a period of ten days after the demand to enter the mine has been made is interpreted by the provisions of the bill as a misdemeanor and upon conviction for this they shall be sentenced to pay a fine not to exceed $10,000. **Representative Kohler also introduced a bill** providing that in all cases where a right to recover damages for injuries to persons or property caused by the subsiding or caving in of the ground covering any mine or excavation the statute of limitations shall begin to run against such right of action from the time of the cave-in.

Augustus McDade, mine inspector of the **Seventh anthracite district**, reports 13 fatal accidents and 18 non-fatal accidents in that district during 1922, while **1,595,942 tons of coal were mined.** Of the coal mined 1,455,746 tons was shipped to market. In the **Thirteenth anthracite district 2,511,550 tons of coal was mined during 1922**, according to the report of Mine Inspector Frank Kettle, and that 2,511,550 tons was sent to market. There were 24 fatal accidents in the mines of the district, of which all but one occurred inside the mines. Richard Maize, Mine Inspector for the **Fifth bituminous district reports 4,203,256 tons of coal and 1,225,028 tons of coke** produced in that district during 1922. There were 12 fatal accidents inside the mines and three outside. The H. C. Frick Coke Co., the largest producer in the district, led with a total output of 2,069,863 tons. There were **4,230,024 tons of coal produced in the 20th bituminous district** in 1922, says Mine Inspector Fletcher W. Cunningham in his annual report. This was 57,882 tons more than in the previous year. Mine Inspector Nicholas Evans, of the **24th bituminous district**, reports that **3,700,193 tons of coal was produced** in that district during 1922, of which 3,600,086 tons went to market. The 1922 tonnage was about 65 per cent of the 1921 tonnage. The report of Harry Phythyon, mine inspector of the **27th bituminous district**, shows **production of coal in 1922** to have been **3,004,317 tons.**

The Fowler bill repealing the state anthracite coal tax law of 1921 has been amended to provide that the repeal shall not take effect until Jan. 1, 1925. When the bill was reached on the third-reading calendar March 6, its sponsor, Representative David Fowler, Lackawanna County, **moved that it be postponed for the present.**

In a letter to W. Clyde Harer, a Representative from Lycoming County and chairman of the House Appropriations Committee, on March 5, **Governor Pinchot suggested a giant power system** based on the principles of quantity production through utilization of the water power of the state and the power that can be generated through steam. He suggested the location of the steam stations near the coal mines and the use in them and in gas works of the by-products of coal now wasted. He asked the appropriations chairman for $35,000 with which to have a comprehensive survey made.

Attorney J. Hayden Oliver, Glen Alden Coal Co. (chairman), W. L. Allen, Scranton Coal Co.; Charles Dorrance, Hudson Coal Co.; W. A. May, Pennsylvania Coal Co., and M. J. Martin, who it was announced will represent various companies, have been chosen to represent the coal companies operating in Scranton and vicinity that will meet a committee representing the city and civic organizations to discuss **remedial mine-cave legislation.** The committee consists of fifteen members, ten representing the city and its organizations and five the coal companies.

Governor Pinchot on March 7 informed a delegation of Scranton citizens interested in the repeal of the anthracite coal tax that he was **opposed to the repeal.** He said that the state needed the money and that four-fifths of the tax was paid by residents outside the state.

The Board of Directors of the **Lehigh Valley Coal Sales Co.** have declared **a dividend of $2** per share payable April 2, 1923, to those stockholders of the company who are holders of full share certificates of stock, registered on the company's books at the close of business March 15, 1923.

The Pittsburgh Coal Co. report for 1922, just issued, shows an **output for the year of 6,612,717 net tons**, of which 5,452,255 was

produced and 1,160,462 tons purchased, a decrease from 1921 of 2,343,845 tons, or 26 per cent. For this, of course, the strike was responsible. The net earnings for the year, after full charges for interest, depletion and depreciation, but before deducting Federal income tax, were $3,714,952.84. After payment of dividends and 1921 taxes the surplus on Dec. 31, 1922, was $2,932,-714.22, an increase of $148,822.56 for the year. Full quarterly dividend payments for the year were declared on preferred stock and 3½ per cent was paid on common stock. Employees own 10,444 shares of preferred stock and 11,401 shares of common. Acreage exhausted in 1922 was 666, leaving unmined reserves owned of 164,351 acres and under lease 634 acres.

Dever C. Ashmead, associate editor of *Coal Age*, gave an **illustrated talk on "The Mining and Preparation of Anthracite"** at a meeting of Wilkes-Barre Rotary, Tuesday, March 13. James Purdue, a mining engineer, assisted in the presentation of the subject.

The administration is reported to be planning a tax on bituminous coal. What effect such a measure will have on the move to repeal the anthracite tax measure is a matter of speculation. The need for addition revenue is becoming more and more apparent, if the present educational program is to be carried out.

TENNESEE

Officials of the United Mine Workers of America in District No. 19 have annouced that **more than a hundred mines in southwestern Kentucky and Tennessee have signed wage agreements** with their men by which the 1920 wage, based on the Central Competitive Field agreement, is to be continued in force until April, 1924. The agreement will affect 8,000 miners, the union officials declare. The production of coal in Tennessee during 1922 totaled 4,-350,000 net tons, valued at $15,000,000. O. P. Pilam, state mine inspector, declares that the 1922 production was the lowest in efficiency in the history of the state. There were 13,500 miners employed, compared with 10,653 in 1921, and the production was about equal to 1921, but less than 1920 when 6,921,848 tons were produced.

The Pocahontas & Sewanee Coal & Iron Co., of Pikeville, has the development of 1,900 acres of coal land under way and this will have a 2,000-ton capacity. The company is planning to install electrical equipment and machinery.

UTAH

The I. C. C. has given permission for the **construction of the Utah Central Railroad's line in the coal-producing sections of the state.** The line will be about 50 miles long, with main and side tracks, and will tap the Denver & Rio Grande Western R.R.'s main line near Castlegate and extend southeast through Carbon County into the northeastern section of Emery County, terminating in Huntington Canyon, where the principal mines it is intended to develop are located. The company holds thousands of acres of coal land on patents and also leased government land. Several of the mines have already been developed to a limited extent as wagon mines. It is estimated that many millions of tons of coal lie undeveloped in the section about to be tapped. Former Representative James H. Mays heads the $1,000,000 company which will construct the road. The company will be permitted to retain for a period of 10 years any revenues which it receives from operating the line in excess of 5.75 per cent of the capital invested.

The Columbia Steel Corp. will construct the first unit of its blast furnace immediately, the contract having already been let.

VIRGINIA

E. White Atkinson has opened offices in Norfolk to represent the Coal River Collieries, owned and operated by the Brotherhood of Locomotive Engineers. This is the first time this company has made an effort to handle its coal through an agency here. An unfavorable freight rate has made it impossible for these mines to compete in the Hampton Roads trade, but arrangements have been made with the Chesapeake & Ohio Ry. whereby this rate is placed on a basis for competition with other coal dealers.

The Old Virginia Coal Co., has been incorporated at St. Charles with a capital of $10,000 and with E. B. Cullen as president and E. L. Fuller as secretary.

The City of Norfolk will receive bids this week for 12,000 tons of coal of mixed grades, to be delivered beginning April 1. The bidding, usually, is confined somewhat largely to local wholesalers. No announcement has been made of other bids being asked at any time soon.

WEST VIRGINIA

When a state road is damaged through loss of material support resulting from the removal of coal adjoining the right of way, a coal company is responsible, according to an opinion of Attorney General E. T. England of West Virginia.

The Gulf Smokeless Coal Co. and the **Gulf Coal Co.**, both of Beckley, have changed their principal office from Beckley to Tams. W. P. Tams, of Tams, is the president of both of the companies. The Logan Fuel Co. will hereafter have its principal office at Charleston instead of Huntington.

The Jack Run Coal Co., which was recently incorporated with a capital of $60,-000, has perfected its organization with the election of John Batturo as president and William D. Andrea as secretary. The company has 24 acres of coal land under development and expects to add to this holding to make the daily output 250 tons.

The Fire Creek Pocahontas Fuel Co. of Huntington, which was recently incorporated with a capital stock of $150,000, has organized by electing the following officers: President, C. B. Lee; Secretary, William J. Harvie; Manager; Harold E. Wilson. The company succeeds the Hump Mountain Smokeless Coal Co. It contemplates making extensive repairs and installing new machinery, so as to develop 200 acres of coal land to produce a daily output of 350 tons.

Among the recent West Virginia companies to place orders for Nolan automatic feeders are the Grey Eagle Coal Co. for their Grey Eagle No. 1 mine, the Flat-Top Pocahontas Coal Co. at Herndon, and the American Coal Co. at McComas.

Holdings of Sewickley coal in the Scott's Run field of Monongalia County have been materially increased by **E. H. Gilbert** and **R. M. Davis**, operators in that field, through the purchase of 138 acres of coal land in Cass district.

The Andrew Coal Co., operating at Granville, on the Monongahela Ry., in Monongahela County, has been sold to Fred Tropf and Frank L. Bowman of Morgantown for the sum of approximately $150,000 and in the future its mine will be operated by the **Tropf-Bowman Coal Co.**, with general offices in Monongalia County.

The Blackfield mines, hitherto owned and operated by F. B. and J. M. Black and associates as a portion of the Atlantic Coal Co. operations, **have passed into new hands**, the Blacks having disposed of their entire interests in the property, which had been in litigation for some time. Frank Romesberg, of Salisbury, is president of the new company; C. M. Bird, vice-president and superintendent; John Kretchman, secretary, and Norman Romesberg of Garrett, treasurer. Included in the deal are 1,000 acres of coal, together with tipple and bin which has a capacity of 600 tons, 200 mine cars, two steam dinkey engines, two electric motors and all other equipment that was used in operating the Blackfield mines.

The Edna Gas & Coal Co. of Fairmont, which was recently incorporated with a capital of $1,500,000, has been organized with the election of R. M. Hite as president. The company has purchased from the Jamison Coal & Coke Co. their Lehigh and No. 11 mines, with a daily capacity of 1,000 tons. The company plans to install additional equipment, which will increase the output of the plants to 2,000 tons a day.

The Main Island Creek Coal Co. at Omar has been incorporated with a capital of $25,000 by J. Henry Bell and W. H. Courtney of Lexington, and W. H. Hoover of Nicholasville, Ky.

The Weyanoke Coal & Coke Co. of Springton, of which R. D. Patterson is president, has consolidated with the **A. J. Patterson Pocahontas Co.** and the capital increased to $1,000,000.

The Richland Coal Co., of Wheeling, has increased its capital from $200,000 to $600,000.

H. H. Randolph and associates, of Burch, plan to organize the **Milestone Coal Co.** and to invest $1,000,000 in coal properties.

Cleveland people, including F. M. Kirk and others, having acquired the capital stock of the Melrose Coal Co. of Fairmont, have also **leased the mine of the Consolidation Coal Co.** at Enterprise. The company will operate under the name of the Melrose Coal Co. Pittsburgh coal is produced at the Enterprise mine, which has a capacity of from eight to ten cars of coal a day. The Melrose company is capitalized at $100,000.

Directors and officers were elected at the annual meeting of the **Atlantic Smokeless Coal Co.** held in Welch, on Feb. 27. The board as elected will be composed of the following: George Wolfe, Beckley; W. M. Black, of Lynchburg, Va.; Dr. C. R. Woolwine, of Davy; Dr. J. Howard Anderson, of Marytown; Richard Hancock of Lynchburg, Va.; J. B. Clifton, of Beckley; A. F. Wysong, of Princeton. Following the election of the board of directors, that body selected the following officers: George Wolfe, Beckley, president, treasurer and general manager; Dr. J. Howard Anderson, of Marytown, vice-president; W. M. Black, Lynchburg, secretary, and R. E. Brockman, superintendent. This company operates a mine at Asco, McDowell County, in the Tug River field. Before adjournment of the board of directors **a dividend of $26 a share was declared**, payable as of March 1.

In a $150,000 fire at Beckley late in February the Ernest M. Merrill Engineering Co. of Beckley, lost much valuable equipment, data, records, paraphernalia, etc. Within a period of 24 hours however the company had rehabilitated itself in temporary quarters and was ready to transact business as usual.

The Westmoreland Coal Co., of Philadelphia **paid $120 an acre for 5,500 acres of coal land** on Ford Fork of Little Coal River owned by the Laurel Coal & Land Co., of which Major J. E. Chilton and former Senator William E. Chilton were the largest stockholders. Through this purchase the Westmoreland company becomes one of the largest holders of coal land in southern West Virginia.

Under the terms of the **Byrer Bill** (Senate Bill No. 360), which its sponsor states is **patterned after the anthracite tax bill in Pennsylvania**, there would be levied upon every net ton of coal mined, washed, screened or otherwise prepared for market in West Virginia a tax of 2 per cent of the gross value thereof when prepared for market. Such a tax would be assessed at the time the coal was mined. Taxes so received would be placed to the credit of the "state producers' depletion fund," 50 per cent of which would be paid to the State Road Commission to be applied to the payment of interest and sinking fund, and 50 per cent of which would be paid to the boards of education in each county in the state.

Authority has just been granted by the directors of the **West Virginia Coal & Coke Co. to improve the Norton plant** of the company in Randolph County which will involve an expenditure of between $50,000 and $60,000, including the construction of a new store building, an office building, a central warehouse or supply house, a machine shop and complete equipment and a general repair shop to repair mine cars and motors. The company also will construct a macadam road leading to the Norton plant as well as a concrete bridge across Grassy Run. The office of the company physician, superintendent, chief electrician and others connected with the plant in an executive and clerical capacity will be in the new office building. Work will be begun as soon as plans and specifications can be drawn. The Norton plant is the largest of the West Virginia Coal & Coke Co., having a capacity of about 2,500 tons of coal a day.

The invasion of Logan County by representatives of **the American Civil Liberties Union**, which had been widely advertised for several weeks, **failed to make much of an impression** in the vicinity of the mining center. The party of speakers addressed perhaps 1,000 people from the court house steps in the city of Logan, on Sunday night, March 4. Instead of encountering opposition, as members of the party had indicated they expected, they were given an opportunity to present their arguments and to test the "right of free speech." The addresses were mild. Those of Heber Blankenhorn, of the Bureau of Industrial Research, and of the Rev. Henry S. Huntington, associate editor of the *Christian Work*, made little or no impression and met with no response. That of Arthur Garfield Hays, being of a humorous nature and dealing with his experiences in Pennsylvania, excited the risibilities of the crowd.

Not only have extensive improvements been made at the No. 1 mine of the **Pond Creek Coal Co.**, of which J. C. Sullivan is president, but it is now proposed **to build two miles of railroad** in order to permit the further development of the property. A contract has been let for the railroad construction to the No. 2 mine, where a modern plant will be built, fully equipped and capable of producing from 2,000 to 3,000 tons of coal a day. At the No. 1 mine the finishing touches have just been put on an all-steel tipple and it is proposed to build additional mining houses, all with a view to increasing the output of the No. 1 mine, which adjoins the property recently acquired by the Ford Motor Co.

WISCONSIN

Frank R. Bacon was elected **president of the Cutler-Hammer Co.** of Milwaukee, at a recent meeting of stockholders. The only change in the nine officers who also constitute the board of directors was the election of F. L. Pierce as vice-president in place of A. W. Berresford, who retired. The other officers of the company are as follows: Second Vice President, B. L. Worden; Treasurer, F. L. Pierce; Assistant Treasurer, L. F. Vogt; Secretary, T. E. Barnum; Manager of Operations, H. J. Wiegand; General Sales Manager, W. C. Stevens; Assistant to the president, J. C. Wilson; Director of Purchases, W. S. Hopkins.

WYOMING

According to Denver newspapers, the **Chicago, Burlington & Quincy R.R. is planning the construction of a $2,500,000 branch railroad in northeastern Wyoming and southeastern Montana** to tap the semi-bituminous coal fields of that region. Right-of-way from Sheridan, northeast into the Rosebud District, is being purchased by agents of the railroad. Construction is to start this spring.

"The new road will be a sixty-mile branch and will start from the main line which runs from Billings, Mont., through the southwest corner of South Dakota, through Nebraska, and into the network of Burlington lines which lead into Chicago, Kansas City, St. Louis and Omaha."

It is also reported that the Northern Pacific railway is about to build a similar line south from its main line, taking off at Forsyth and extending into the same fields. The Northern Pacific, already operating mines at Red Lodge, is expected to develop large stripping operations in the district.

CANADA

A resolution empowering the Standing Committee on Mines and Minerals to inquire into coal supplies, costs, transportation, desirable inter-provincial action and other **means whereby Canada may be rendered self-sustaining as regards bituminous coal**, is to be moved in the House of Commons at Ottawa, this session, by a Nova Scotia member who asks that the committee inquire into the necessity and possibility of supplying substitutes for coal.

That the government feels that **no good purpose would be served by appointing a special committee of the House to consider Canada's fuel problem** with a view to the adoption of a national and British coal policy for Canada, was the information given in the House at Ottawa a few days ago in answer to a question placed on the order paper by T. L. Church, North Toronto.

Because of the fact that no election of officers was held for District 26, United Mine Workers of America, which, according to the district constitution, must be held on the second Tuesday of December of each year, Springfield Local has forwarded a resolution to the International Executive Committee in which it is **requested that President Lewis take immediate action to enforce the constitution.**

At a well-attended meeting of the Associated Boards of Trade of eastern British Columbia, at Trail, on Feb. 22, it was resolved that **"price adjustments in the coal industry are long overdue**, and that, in the interest of the industry itself, dependent industries and the general public such adjustments should be made forthwith, and that the Dominion Government should probe the whole situation."

The British Empire Steel Corporation, which aims at an output of 400,000 tons of coal this year, made a good beginning in January, considering that much idleness was caused by severe storms. The output for the month shows an increase of 175,000 tons over that of January, 1922. In order to carry out its plans its **transportation equipment will be renewed on a large scale.**

Traffic News

Freight cars of all descriptions **on order by railroads** on Feb. 15 **totaled 97,932**, according to a report by the Car Service Division of the American Railway Association. This was an increase of 29,600 over the number on order on Jan. 1 last and 6,578 more than were on order on Feb. 1 last. Of the total orders placed, 49,646 are for box cars, an increase of 14,029 since Jan. 1. **Coal cars on order totaled 37,680**, an increase since the first of the year of 13,462. Reports up to Feb. 15 also showed that orders had been placed for 1,915 locomotives, which was an increase of 470 over the number on order on Jan. 1 last. Of the total number ordered, 1,407 were freight locomotives, 376 passenger and 132 switch engines.

New equipment ordered by the Pennsylvania Railroad system to be placed in service this year—some of it already being delivered—involves an expenditure of more than $57,000,000. In order to handle its share of the country's growing business—normally about 11 per cent of the freight and 17 per cent of the passenger traffic of the nation—the company is making large additions to its present car and locomotive capacity. Since the first of this year the Pennsylvania has ordered 500 new steam locomotives. Last fall work was started on changing 50-ton trucks to 70-ton trucks under about 10,000 coal cars, which will increase the capacity of these cars by approximately 31 per cent.

The New York Central R.R. has been ordered by the Ohio Public Service Commission to join its lines at Hopedale with the Pittsburgh & West Virginia Ry. Coal operators complained that the lack of such a connection was causing them great loss and preventing the proper distribution of coal in Ohio. The case is scheduled to be argued before the Interstate Commerce Commission on March 27.

In pursuance of a recommendation by the Federal Fuel Distributor the Interstate Commerce Commission issued March 5 **Service Order No. 39**, directing the New York, New Haven & Hartford R.R. **to permit the docking of the vessel Maumee out of its turn** at Belle Dock, New Haven, Conn., so as to provide coal to meet an emergency at the plant of the Springfield Gas Light Co. at Springfield, Mass. This order was necessary because of the regulations that vessels must be docked in turn. There were 23 ships ahead of the Maumee, which was carrying coal for the gas light company. On the showing that the coal supply of the company will have been exhausted prior to the docking of the Maumee in turn, the Interstate Commerce Commission issued its service order and also authorized priority in the placement of cars for the transportation of the coal from New Haven to Springfield.

Adjustment of Lake freight rates is being sought by operators from northern West Virginia who attended a conference early in March in Washington at which complaint was made that all-rail rates from southern Illinois were discriminatory. Representatives of the railroads said that there would be no change in the rates. The coal operators however propose to appeal directly to the presidents of the various Lake coal-carrying railroads and hope to obtain a reduction of 57c. a ton as compared with present rates, such a reduction to be absorbed by the railroads and the boat owners. It is contended by northern West Virginia shippers that inequitably low all-rail rates will interfere with the movement of a larger tonnage over the Great Lakes.

Coal dealers conferred recently with officials of the Virginian and Norfolk & Western railways regarding the **proposal** of the latter **to discontinue barging coal to waterfront customers**. No decision was reached. The proposal was scheduled to be effective April 1, but no tariffs have been published and the regulation cannot go into effect at that time.

Shipments of railroad locomotives from the principal manufacturing plants **declined slightly in February**, according to figures published by the Department of Commerce from compilations by the Bureau of the Census. Unfilled orders, however, reached a new high record at 2,220 locomotives at the end of February, an increase of 432 during the month. Both shipments and unfilled orders on foreign account continue to decline and now form but a small proportion of the total.

Association Activities

Clarksburg Coal Club

At the last meeting of the Clarksburg Coal Club of Clarksburg, W. Va., the opinion prevailed that lack of direct rail connection to New England was penalizing mines on the Baltimore & Ohio and led to an expression of hope that it might be possible to induce the Pennsylvania R.R. to extend its line from Fairmont to Clarksburg. Among those who spoke at the meeting were A. Lisle White, formerly president of the Northern West Virginia Coal Operators' Association, and "Uncle Dan" Howard, one of the well known operators of northern West Virginia. It was stated during the discussion that operators on the Pennsylvania near Fairmont were able to obtain as much as $1 a ton more for their product than operators on the Baltimore & Ohio, just across the Monongahela River from the Pennsylvania. It also was stated that the operators on the Pennsylvania system could ship direct to New England, whereas the B. & O. is unwilling to accept shipments to New England states owing to the difficulty in having cars returned. Clarksburg operators desire the Pennsylvania extended to Clarksburg not only because it will enable them to broaden their markets, but will afford them better transportation facilities than they assert they are now receiving.

Obituary

Milton Graves, 58 years old, operator of a small coal mine near Carbon, Ind., committed suicide recently by shooting himself through the head with a large revolver. He leaves a widow. No cause was given for the act.

Henry E. Patrick, 71, vice-president of C. M. Moderwell & Co. at Chicago, died Feb. 28, in a hospital near his home in Oak Park, a Chicago suburb. Death followed a stroke of paralysis. Mr. Patrick left the dry goods business in Chicago 20 years ago to join the Moderwell organization and was one of the first sales managers to handle Franklin County (Illinois) coal, now a leader among Western fuels. Mr. Patrick remained sales manager until 1917, when he was made vice-president and a director of the company. Burial was in Marengo, Ill.

Charles T. Boynton, 65, vice-president of Pickands, Brown & Co., a coal, coke and iron concern of Chicago, died of pneumonia Feb. 28 at his home in Highland Park, near Chicago. He was also vice-president and a director of the By-Products Coke Corporation, of Chicago.

M. L. Marks, a well-known coal salesman in Chicago for Walter Bledsoe & Co., an Indiana operating concern, died Feb. 28. He was once with the Dering Coal Co. and later with the Lill, Robinson Coal Co., which was absorbed by the Consumers Co.

Coming Meetings

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24. Secretary-treasurer, J. G. Crawford, Chicago, Ill.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Indiana Retail Coal Merchants' Association will hold its annual meeting April 25 and 26 at the Severin Hotel, Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 23 NEW YORK, THURSDAY, MARCH 22, 1923 Number 12

By Order of the Commission

THERE was a time in this country when private initiative, enterprise and resourcefulness were sufficient to meet an emergency. If a man's wagon became bogged, friendly neighbors gathered and pulled it out. If a family was in distress, townspeople flocked to the rescue. It was not considered either necessary or good form to lay the matter before the magistrate first and obtain an order from him before administering to the needs of those in distress. No good citizen thus evaded responsibility.

A few weeks ago a gas company in a New England town was short of coal. A vessel bringing a fresh supply arrived at the port and was ready to discharge its cargo and relieve the emergency. But there were twenty-three other ships in the harbor which had arrived prior to this vessel's coming. There was a rule, just a man-made rule, to provide fair play and expedite business, a rule of the railroad controlling the pier at which these boats must dock to discharge their cargoes, which prescribed that each vessel must take its turn.

Before that ship could have reached the dock and been unloaded, the gas company would have been out of coal. Such a thing was obviously against the public interest, but do you suppose those in charge did the perfectly obvious neighborly thing and hurried that boat into the dock, unmindful of turn, and hastened the coal to the anxious gas company?

Not at all. Those good old days must be gone. A railroad company operated the dock and stood between the boat and the consumer. Railroads no longer have initiative, or if they have any they do not seem disposed or privileged to use it. At any rate the matter was taken from far-off Connecticut to Washington and soon there issued from the office of the Interstate Commerce Commission at the capitol city Service Order No. 39, which orders and directs the railroad to do the obvious thing. This is government regulation with a vengeance.

Branding All for the Sins of a Few

THE popularity of the "coal barons" has had recent certification in the attacks of Hearst's *New York American*. That paper has been carrying a series of stories and editorials assailing the hard-coal operators for shipping "fireproof coal." There is a definite background of fact behind these stories, for refuse and uncleaned coal—material almost unburnable—has been loaded out of the region this winter. Anything would sell if it were called hard coal, and advantage has been taken of that situation by certain unscrupulous people. The facts, however, have been grossly distorted. Nothing else was to have been expected from the *American*, which delights in and is devoted to sensationalism.

No matter, it seems, from what angle it is desired to attack the coal men, some facts can be found to support the desire. It will be remembered that during the war another New York paper, employing the pen of Sophie Irene Loeb, assailed the coal barons for *not* shipping this self-same culm to New York.

Back of the attack of the *American* is the fact that a few are guilty of shipping unmerchantable coal—the Federal Fuel Distributor names six, it is alleged. The names are little known in the trade—certainly not regular producers or shippers. But what they have done in giving the whole hard-coal industry a bad name will star their names in history. No one should get the idea that culm-bank and washery coal is necessarily dirty coal, for it is not. Out of total daily shipments of around 6,000 cars of all coal from the anthracite region, not to exceed thirty cars per day is this "unmerchantable coal"—which is less than 1 per cent of the household sizes. For this the whole industry is damned.

There is one satisfactory answer to such a situation and that, of course, is suitably to punish those who are guilty. The Interstate Commerce Commission has decided that it will keep hands off and has notified the Fuel Distributor that it cannot accede to his request to withhold cars from the offenders, who it appears have been known in Washington for some time. The sufferers and complainants are householders in far-off cities, yet they are supposed to bring civil or criminal action to obtain redress. Instead they find solace in the vituperation of the *New York American*. The General Policies Committee of the Anthracite Operators tells their side of the story in a page advertisement in the *American*, which story the paper seeks to tear down in a half-page editorial in the same issue.

It may occur to some that the real cause of the trouble, the real reason why it has been possible for some to market "fireproof coal," is the long strike of last summer, when some 40,000,000 tons of production was permanently lost.

Technical Education

NO one is a worse salesman than the average college professor. Poorly indeed have the deans of colleges sold the scholastic idea. Apologists they are one and all of them. In general the maker of the poorest product is immeasurably the best salesman. The eye of the professor is on the mind of the man himself, not on the public reaction to his services. He is more interested in the work of creation than in the art of distribution.

Every now and then college professors have traveled the country round with the cry "What is wrong with our work? You are a practical man, versed in big affairs. Tell us what is wrong with us?" Thus approached the superiority complex masters the magnate thus addressed and he accordingly swells up and delivers himself as follows: "Your college men are not versed in the management of men; they do not under-

stand accounts and organization. They view matters from a scientific, not a practical, point of view." And the college dean accepts that as a good answer.

But why? The qualities of management and discrimination are largely innate. Their students have it or they have it not. If they have it not, if they ever get it it will be by experience, not by education. In that matter they are like other men. The remarkable fact about college training is that men who have it succeed more generally than men not having it. Hardly a man around the mines who has a college education fails to make some sort of mark in the world. His average certainly is higher than that attained by other men. You will see him dominated at times—not always or unduly often—by men of exceptional genius who lack college education, but even then he nevertheless is essential to the organization to which he belongs. He fills a gap that the man of exceptional talent but no scholastic training could not fill.

Treat it as we will we cannot make tool steel out of material without the proper constituents or with earthy minerals that are of a harmful character, but who, knowing this, will condemn the treatment of steel?

It is remarkable how often we find men of education succeeding solely because of their knowledge. They are not born leaders of men; they are not of the right social quality. All they have is the gift of the schools and yet they are recognized, for what they know makes them sought by others.

Today the human element is getting less important. Brute strength is giving way to science. Our mines are filled with machinery that is handled best by men knowing thermal units, volts, amperes, tensile strengths and chemical qualities better than they do brute strength and the characteristics of the superman. Furthermore, it has been found that on the whole the college man has been a safer industrialist than that numerous class of practical men who have dominated for a time solely by a disregard of human rights and aspirations.

Again and again we hear that readers do not think and thinkers do not read—a most pernicious doctrine. Carried to its true conclusion it would prove beyond peradventure that the peasants of Russia who have not even the rudiments of education are superior to the people of the United States, who as a whole are the most persistent readers of any time or country.

Fayol's Dome Theory

IN ANDREW B. CRICHTON'S paper on "Mine-Drainage Stream Pollution," before the American Institute of Mining and Metallurgical Engineers, he says that "in one area, where about half the coal had been removed and where the average depth was about 500 ft. and the rainfall 3,300 gallons per acre per day, it was found that 27 per cent of this water percolated into the mine and was pumped out." Clearly the measures above the mine were broken to the surface. We must therefore presume, if we believe in Fayol's dome theory, that the measures failed to choke themselves in a height of 500 ft. or, rejecting the theory, we must assume that the rocks were cracked by subsidence and came down into the mine with their relative position unchanged. Further, we must assume that as the surface rocks in subsidence are compressed what cracks are formed over the subsided area near the surface, if indeed there be any, must be closed and consequently most of the water must first enter through the cracks in surface rocks over the unmined coal rather than in those over the subsided area.

In Howard N. Eavenson's paper on "Mining an Upper Bituminous Seam After a Lower One Has Been Extracted," delivered before the same body, he holds that it is possible to mine a seam in some cases 19 ft. above one that has been extracted. What, then, becomes of Fayol's dome theory? It would certainly appear that there must be crevicing above the dome in the case of the mine mentioned as being situated about 500 ft. below the surface and that the dome cannot be 19 ft. high in the instance cited by Mr. Eavenson.

What is left of the Fayol theory may safely be granted to its advocates. There *is* a tumbling of rock for a certain distance above the coal, but with this the subsidence and cracking has to do only as a causative action. Both would occur and but little modified in character or extent if the tumbling did not take place. The adjustment depends mainly on subsidence, and the bending that takes place as the result of that subsidence is the cause of most of the tumbling of the rock which Fayol noted and which every engineer or laboring man who ever stepped inside a mine could not fail to observe.

It should be added that some of the tumbled rock falls only because it is really a drawslate and does not act monolithically with the main roof above. That freedom of action is the determinant quality of a drawslate. It is not monolithic with the roof. It "draws" away from it; therefore it is a *draw*slate. We frequently do not realize, however, that the depth of the rock thus drawn away may be greater than we expect.

But what, indeed, does it profit us to argue? Evidence enough has been obtained in England and perhaps in other countries that fracture and, less often, caving occurs over the pillar. All over the European coal fields we learn definite facts about subsidence. So Fayol's theory has been disproved times without number. Why should we still be bound by the fairy tales in the mining books of our youth? Surely we know that in our wooded, leaf-strewn and bramble-covered areas and from the surface of our plowed fields and glacial drift we are not likely to see evidences of cracks in the rocks below. It is only when houses and streams are met that the secret is revealed, and not often then, for our houses are not on the rock as a rule and the tilting is gradual, and when it takes place and notice is taken of it, no one has laid out the pillar line on the surface to serve as evidence that Fayol's theory has failed again to explain what happens when land is undermined.

Such cracks, moreover, are often so small as to escape observation even when they may appear on the top of the ground. It is interesting to note that General O'Toole declared that streams were robbed of their water by mining even before extraction had reached that part of the coal bed that lay immediately under them, thus evidencing that even with room-and-pillar workings the tearing action extends beyond the line of operation.

We must learn to look under the surface of things. We have been prone to judge of a rope by the fractures which can be seen in an exterior inspection and now we learn that in the heart of the rope occur breakages and cracks not visible to the inspector but equally expressive of rope failure. To deny all that we do not see is fatuous in the extreme.

In Half Century Depth of Coal at Wilkes-Barre More Than Doubles and Thickness Falls 30 per Cent

Mines Leaving Pillars to Support "Buried Valley" Forced to Work Deep Beds—In 45 Years Coal Output per Employee Has Fallen 38 per Cent, Fine Sizes Being Considered Whether Sold or Stored

By Dever C. Ashmead*
Kingston, Pa.

EXHAUSTION of the thick coal that made the early mining of anthracite famous compelled producers last year to open thinner beds or suffer material decreases in output. In *Coal Age* of Feb. 22 it was recounted how in the Lackawanna district there had been a decrease in average thickness from 6.83 ft. in 1872 to 4.88 ft. in 1922 and an increase in average depth from 229 ft. to 268 ft. This paper covers the area adjoining on the south—the Wilkes-Barre district. In the period between 1872 and 1922 the average thickness there declined from 8.76 ft. to 5.90 ft. and the average depth of working increased from 170 ft. to 399 ft.

The Wilkes-Barre district includes that part of the Northern anthracite coal field southwest of the Lackawanna-Luzerne County line. The beds of coal lie at greater depths in this district than they do in the Lackawanna district. (See Fig. 13.) At the southern edge of the anthracite field the beds pitch steeply and with many rolls and some faults. In the northern end the beds are flatter and only along the outcrop are they steeply pitching. The coal beds in this district are thicker than in the Lackawanna district and there are more of them. From the top down the beds are: Abbott, Kidney, Hillman, Stanton, Five Foot, Cooper and Bennett (Baltimore), Skidmore, Top Red Ash, Middle Red Ash, and Bottom Red Ash.

One of the noteworthy features of this district is the "buried valley." An old river bed filled with glacial drift as much as 200 ft. thick in places, this buried valley is heavily laden with water and quicksand. It is extremely dangerous to mine under this cover unless there is heavy rock intervening. Very little second mining has been done in this area, although some of the mines are being forced to do it in order to maintain their output.

The beds mined in the Wilkes-Barre district in 1872 averaged 8.8 ft. in thickness (Fig. 15). In the fifty years that have intervened there has been a steady decrease in the average thickness of coal mined and by 1922 the weighted average thickness had declined to less than 6 ft. Exhaustion of the thicker measures and increased workings in thin coal accounts for this change. (See Fig. 16.) In 1872 about 82.5 per cent of the beds being mined were thicker than 5 ft. and 65 per cent of the beds were thicker than the average for the year 1922. In 1922 57 per cent of the beds were thicker than 5 ft., against 82.5 per cent in 1872. Prior to 1882 no coal less than 3 ft. thick was mined, but by 1922 practically 10 per cent of the beds mined were less than 3 ft. in thickness and some were reported at less than 2 ft.

TABLE XI—AVERAGE DEPTH AND THICKNESS OF COAL MINED IN THE WILKES-BARRE DISTRICT, IN FEET

Years	Average Depth of Workings	Average Thickness of Beds	Years	Average Depth of Workings	Average Thickness of Beds
1872	170	8.76	1902	377	6.62
1877	250	8.59	1907	374	6.30
1882	296	8.75	1912	382	6.06
1887	330	7.64	1917	380	6.03
1892	350	7.66	1922	399	5.90
1897	341	6.80			

The Red Ash bed is one of the most important in this district. In most parts of the field it is divided into two and in some places into three splits. It is the lowest workable bed in the district and it also is one of the thickest. Most of the first mining has been completed in the Red Ash bed and in places second mining is now going on. The next bed of major importance is the Baltimore, which is divided quite generally into two main splits known as the Cooper and the Bennett. In the lower regions of the anthracite field the Baltimore bed is known as the Mammoth. First mining has been

Footnote—This is the second of a series of articles by Mr. Ashmead describing mining conditions in seven sections of the anthracite region. The first of the series, covering the Lackawanna district, appeared in *Coal Age* of Feb. 22, 1923. The third of the series, describing the district will appear in an early issue.—Editor.

*Assistant editor, *Coal Age*.

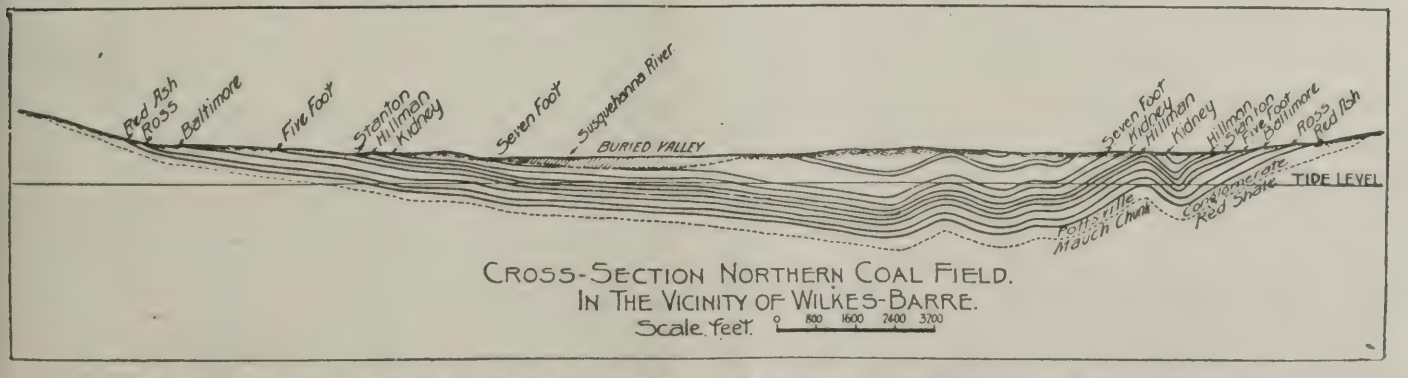


FIG. 13—SECTION OF THE NORTHERN ANTHRACITE FIELD IN THE VICINITY OF WILKES-BARRE
This is a typical section and shows the general flatness of the beds. It also shows that the beds are steeply pitching near the outcrop, particularly on the southern side of the field. The beds here are of greater depth than in the Lackawanna district

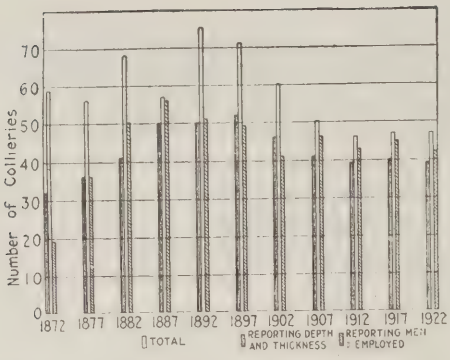


FIG. 14—NUMBER OF COLLIERIES IN THE WILKES-BARRE DISTRICT

The diagram shows the number of plants from which statistics on depth and thickness of coal mined were available and the number from which data was obtained with respect to men employed, as compared with the total.

practically completed and second mining is progressing generally throughout the district. Most of the first mining that remains is in thinner beds, as thin as 2 ft. The thinner beds, as the Ross, Skidmore, Stanton, Abbott and Five Foot, are scattered throughout the vertical section of the measures, so although the lowest bed is being mined to exhaustion, the mining of the thinner beds, which lie below the Cooper and the Bennett, pushes the average depth of workings down. Since there will be increased outputs from the thinner beds it appears that the average depth of workings will remain about what it is now.

Fig. 17 shows the change in the depth of workings in the Wilkes-Barre district. From 1872 to 1892 the depth increased rapidly, then, as the Red Ash and the Baltimore beds were developed to a maximum the average depth increased slowly, gaining only about 35 ft. in the period from 1892 to 1912, an average rate of 1.7 ft. per year. From 1912 to 1922 the change in the depth had decreased to a rate of 0.8 ft. per year. Some time in the not distant future, when the lowest measures become completely second mined, it may be expected that the curve will turn over and the average depth decrease.

In studying Fig. 18, which shows the percentage of beds being worked at 100 ft. intervals, it will be noted that since 1892 there has been no increase in the maximum depth, 1,400 ft., at which the beds are being worked. The percentage of beds within 100 ft. of the surface has been constant as has the percentage of beds between the 300 and 400 ft.

The increase in the average depth of all beds being worked is due to less workings between the 100- and 300-ft. intervals. From 1892 to 1922 the percentage of beds in the 200- to 300-ft. level decreased from 28 to 19, while in the same period the percentage of beds in the 100- to 200-ft. interval decreased from 27 to 20. At the same time the percentage of beds being worked deeper than 400 ft. has increased about 15 per cent.

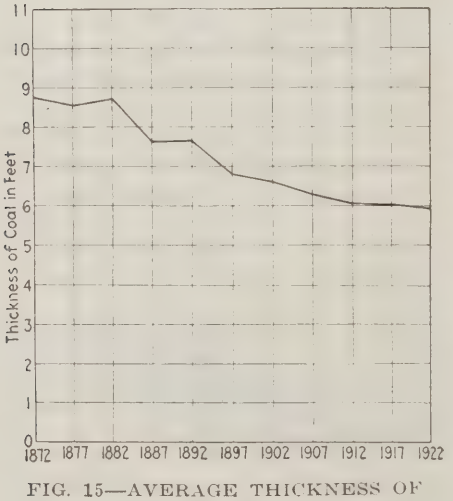


FIG. 15—AVERAGE THICKNESS OF COAL MINED AT FIVE YEAR INTERVALS IN THE WILKES-BARRE DISTRICT

The method of making the calculations shown in this diagram was the same as that described under Fig. 3 in the first installment of this article (*Coal Age*, Vol. 23, No. 8, p. 324).

TABLE XII—NUMBER OF COLLIERIES IN THE WILKES-BARRE DISTRICT

Year	Total as Reported by the Department of Mines	Having Depth Data	Having Thickness Data	Having Tonnage Data
1872	59	32	32	19
1877	56	37	37	37
1882	68	41	41	50
1887	57	50	50	56
1892	74	50	50	51
1897	71	52	52	49
1902	60	46	46	41
1907	50	41	41	46
1912	46	39	39	42
1917	47	40	40	45
1922	47	39	39	42

A rather interesting story is told by the sets of curves in Fig. 19, showing the average thickness of the beds at each 100-ft. interval in depth. In practically every case the thickness of the beds being mined has decreased

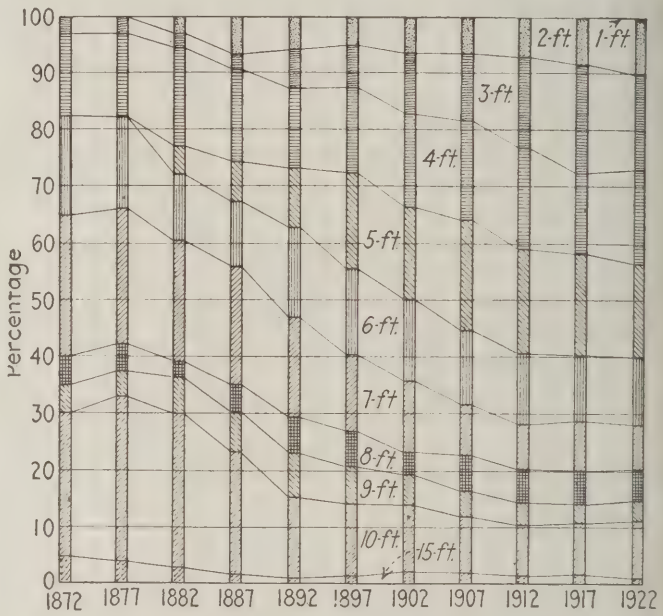


FIG. 16—PERCENTAGE DISTRIBUTION OF NUMBER OF BEDS WORKED BY THICKNESS IN THE LACKAWANNA DISTRICT

This diagram shows the percentage of the total number of beds of each thickness mined in each year.

from 1872 to date, but the greatest decrease in thickness has been in those intervals which lie between 600 and 1,000 ft. Here, in the earlier years, the beds averaged around 15 ft. in thickness, but now, due to the increased number of thin beds being worked, the average has dropped to about 7 ft. Below 1,000 ft. mining in late years of the thin splits of the Red Ash bed has reduced the average. The same is true at depths between 600 and 1,000 ft., where also there has been increased mining of the Ross and Skidmore beds.

The increase in power required to produce coal is illustrated in Fig. 20, which shows a declining output

TABLE XIII—POWER USED IN THE PRODUCTION OF ANTHRACEIT IN THE WILKES-BARRE DISTRICT

Year	Boiler Hp. Installed	Engine Hp. Installed	Tons of Coal Produced per Boiler, Hp.	Tons of Coal Produced per Engine, Hp.	Tons per Mule Daily	Number of Underground Locomotives per 100,000 Tons of Annual Production
1877	11,970	.....	1.64	....	20.32	....
1882	19,800	19,166	1.17	1.21	16.30	....
1887	24,870	.....	1.23	....	15.93	....
1892	31,500	.....	1.21	....	16.18	....
1897	27,900	.....	1.90	....	19.99	....
1902	54,526	69,167	1.08	.85	19.90	.09
1907	67,031	77,335	.70	.61	16.87	.28
1912	83,947	100,125	.64	.53	15.53	.70
1917	96,914	129,125	.61	.47	19.56	1.98

TABLE XIV—MULES AND LOCOMOTIVES IN MINES IN THE WILKES-BARRE DISTRICT

Year	Mules in Service	Inside Locomotives	Year	Mules in Service	Inside Locomotives
1877	963	...	1902	2,960	16
1882	1,442	...	1907	2,780	40
1887	1,916	...	1912	3,404	122
1892	2,337	...	1917	3,724	363
1897	2,662	...			

TABLE XV—PRODUCTION AND DAYS WORKED AT ANTHRACITE MINES IN THE WILKES-BARRE DISTRICT

Year	Production in Gross Tons	Average Days Worked	Year	Production in Gross Tons	Average Days Worked
1872	1,112,829	...	1902	5,287,853	106
1877	2,895,836	156	1907	12,002,337	216
1882	4,744,117	224	1912	13,121,885	220
1887	6,961,850	212	1917	14,789,815	283
1892	7,166,809	192	1921	13,875,753	267
1897	7,240,881	135			

per boiler and engine horsepower installed. As the difficulties of mining increase with the working of thinner beds at greater depths, ventilation and haulage requirements become greater, better preparation is needed and a larger amount of water must be handled, hence more power is required than in the old days when the beds were thick and not so deep, when hauls were short and coal was cleaner.

In 1877 the average output was 1.65 tons per boiler horsepower installed. In 1917 it had declined to 0.63 ton, a drop of more than 62 per cent. In other words, it is now necessary to install 1.59 hp. to produce a ton

TABLE XVI—MEN EMPLOYED IN THE PRODUCTION OF ANTHRACITE IN THE WILKES-BARRE DISTRICT

	Total	Inside Employees	Outside Employees	Miners and Miners' Laborers	Inside Company Men
1872	2,681	1,894	787	1,413	481
1877	9,199	6,291	2,908	4,127	2,164
1882	12,110	8,160	3,950	5,260	2,900
1887	17,489	11,409	6,080	7,694	3,715
1892	19,990	12,960	7,030	8,695	4,265
1897	24,741	16,110	8,367	10,910	5,200
1902	21,973	15,437	6,536	9,999	5,438
1907	28,144	20,637	7,597	13,353	7,284
1912	29,983	22,680	7,303	14,483	8,197
1917	28,803	21,712	7,091	13,932	7,780
1921	29,466	22,483	6,733	13,796	8,687

compared with 0.6 hp. in 1877. Corrected for small sizes not included in the earlier years, the figure for 1877 would have been about 0.4 hp. instead of 0.6.

During the last fifteen years the decrease in the amount of coal produced per horsepower installed has not been as great as previously, due to better practice in power generation and because to some extent in this district power is purchased.

Data with respect to haulage in the Wilkes-Barre district, as shown in Fig. 21, are not very enlightening. There is no apparent explanation, save that of possible errors in the annual inspectors' reports, for the discrepancies indicated for 1897 and 1902. If records for these two years be thrown out, it appears that the amount of coal hauled per mule has remained constant even since the introduction of the underground locomotive. This is taken to mean that the length of haul has rapidly increased in this district and has not as yet reached its maximum, as was concluded with respect to the Lackawanna district.

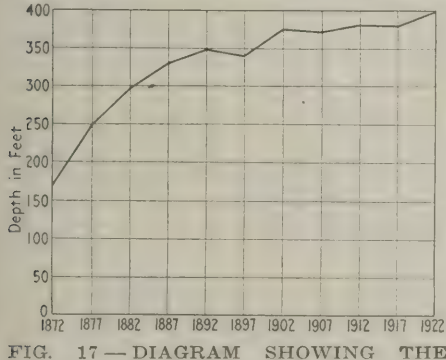


FIG. 17—DIAGRAM SHOWING THE INCREASING DEPTH AT WHICH ANTHRACITE HAS BEEN MINED IN THE WILKES-BARRE DISTRICT FROM 1872 TO 1922

The method of making the calculations on which this diagram is based was described in *Coal Age*, Vol. 23, No. 8, p. 325.

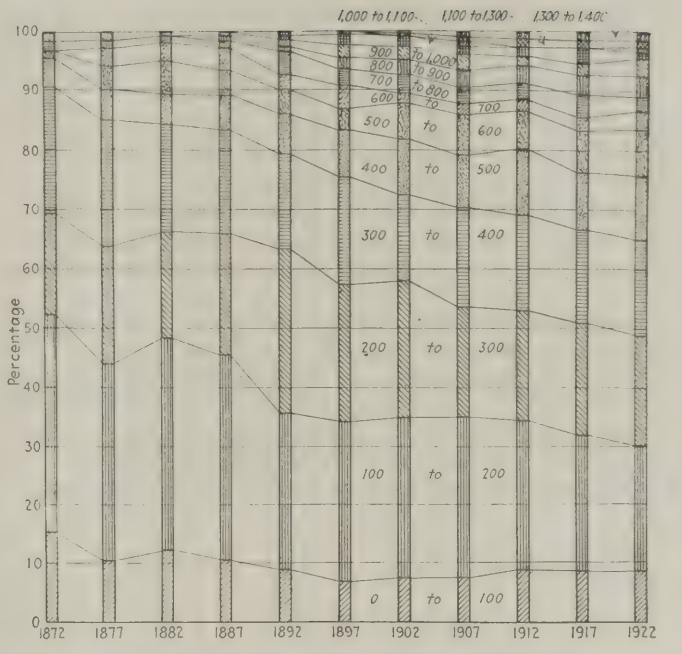


FIG. 18—PERCENTAGE DISTRIBUTION OF NUMBER OF BEDS BEING WORKED IN EACH 100-FT. INTERVAL OF DEPTH IN THE WILKES-BARRE DISTRICT

A count was made of the number of beds being worked in each 100-ft. interval of depth and their ratio to the total determined. The full description of how the calculations were made will be found in *Coal Age*, Vol. 23, No. 8, p. 325.

The average daily output, all men considered, decreased from 1877 to 1882 and then steadily gained until 1902, after which it has dropped to the present time. The explanation of these changes is found in the variations in the average daily outputs of the outside men between 1877 and 1907 and subsequently in the drop in average production by inside men.

The average daily output of the inside men increased in the earlier years to a maximum in 1902 (ignoring 1897 as incorrect), thereafter declining. Corrected for the small sizes, the data show a steady drop in the average from 1877 to 1921. With the final correction to the 8-hour day the figures show a fairly uniform figure to 1902 and thereafter a marked drop. From 1877 to 1921 the drop is from 3.98 tons to 2.45 tons, a difference of 1.55 tons, or 39 per cent. The explanation, as will later be shown, is found in the changes in the records for underground employees.

TABLE XVII—AVERAGE DAILY PRODUCTION OF ANTHRACITE PER EMPLOYEE, WILKES-BARRE DISTRICT, IN GROSS TONS

	Tons of Coal Produced per Day								
	Per Total Employee			Per Inside Employee			Per Outside Employee		
	Reported	Corrected for Small Sizes	Corrected to 8-Hour Day	Reported	Corrected for Small Sizes	Corrected to 8-Hour Day	Reported	Corrected for Small Sizes	Corrected to 8-Hour Day
1877	1.63	2.39	2.12	2.95	4.32	3.98	6.37	9.34	7.49
1882	1.18	1.67	1.47	2.95	3.67	3.38	5.35	7.60	6.08
1887	1.28	1.63	1.43	2.88	3.68	3.40	5.41	6.91	5.53
1892	1.51	1.85	1.62	2.89	3.55	3.28	5.32	6.54	5.23
1897	1.77	2.07	1.82	3.33	3.88	3.59	6.42	7.50	6.00
1902	1.85	2.00	1.86	3.22	3.40	3.33	7.60	8.20	6.78
1907	1.64	1.75	1.65	2.69	2.87	2.75	7.40	7.86	7.00
1912	1.65	1.71	1.61	2.63	2.73	2.62	8.16	8.48	7.57
1917	1.50	1.50	1.50	2.41	2.41	2.41	7.38	7.38	7.38
1922	1.48	1.48	1.48	2.31	2.31	2.31	7.71	7.71	7.71

TABLE XVIII—AVERAGE DAILY PRODUCTION OF INSIDE MEN

	Miners and Miners' Laborers		Inside Company Men		
	Reported	Corrected for Small Sizes	Reported	Corrected for Small Sizes	Corrected to 8-Hour Day
1877	4.49	6.58	8.56	12.56	10.05
1882	4.02	5.70	7.29	10.35	8.28
1887	4.27	5.45	8.85	11.30	9.04
1892	4.30	5.30	8.77	10.77	8.56
1897	4.92	5.76	10.33	12.07	9.66
1902	4.97	5.38	9.14	9.87	8.15
1907	4.16	4.41	7.63	8.11	7.22
1912	4.12	4.28	7.27	7.56	6.73
1917	3.75	3.75	6.72	6.72	6.72
1921	3.76	3.76	5.98	5.98	5.98

In the earlier years there was a steady decrease in the average daily output per outside employee. Corrected to include steam coal and to the 8-hr. day the figure for 18877 was about 7.5 tons as against 5.25 tons in 1892, a decrease of 2.25 tons, or 30 per cent. During this period there were few improvements in mining methods and because of the increasing proportion of refuse in the coal and the old style equipment for preparation, each year more and more slate pickers were required for the same total production.

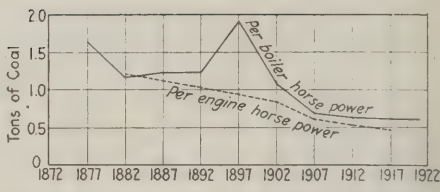


FIG. 20—DAILY PRODUCTION OF COAL PER BOILER HORSEPOWER AND ENGINE HORSEPOWER INSTALLED, 1877-1921

About 1892 mechanical improvements in the preparation of coal were introduced and by 1897 their effect began to show in an increased daily output by outside men. From that time on the gain was steady as the mechanical cleaning devices replaced manual labor in the breaker. From 1892 to 1921 the output per day per outside man increased 2.50 tons, or 47.8 per cent. At the present time the rate of increase is beginning to flatten out, but it is reasonable to expect that it will continue to mount with advances in the art of preparation.

Production of coal by the miner and miner's laborer has materially declined. The record for the Wilkes-Barre district declined from 6.58 tons in 1877 to 3.75 tons in 1921, or 2.83 tons. If 1897 be ignored, the decrease in the past 45 years is steady except for the four years 1917-1921.

The average daily output per miner and miner's laborer as finally corrected was 6.58 tons in 1877, decreasing to 3.76 tons in 1921, or by 42.9 per cent. This drop compares very closely with the decrease in output of the Lackawanna district of 43.7 per cent in the same period of time.

A study of the final corrected curve for miner and miner's laborer in Fig. 23 is interesting. In the period 1877 to 1882 there was a decided drop, possibly explained by an incomplete classification of the men in the mine inspectors' reports. Ignoring the record for 1897 there is little change in the figure up to 1902, a decrease of but 0.32 ton in the twenty years. Referring back to Fig. 16 it is seen that in 1877 but 3 per cent of the total number of beds worked were 3 ft. or under, that in 1902 this had

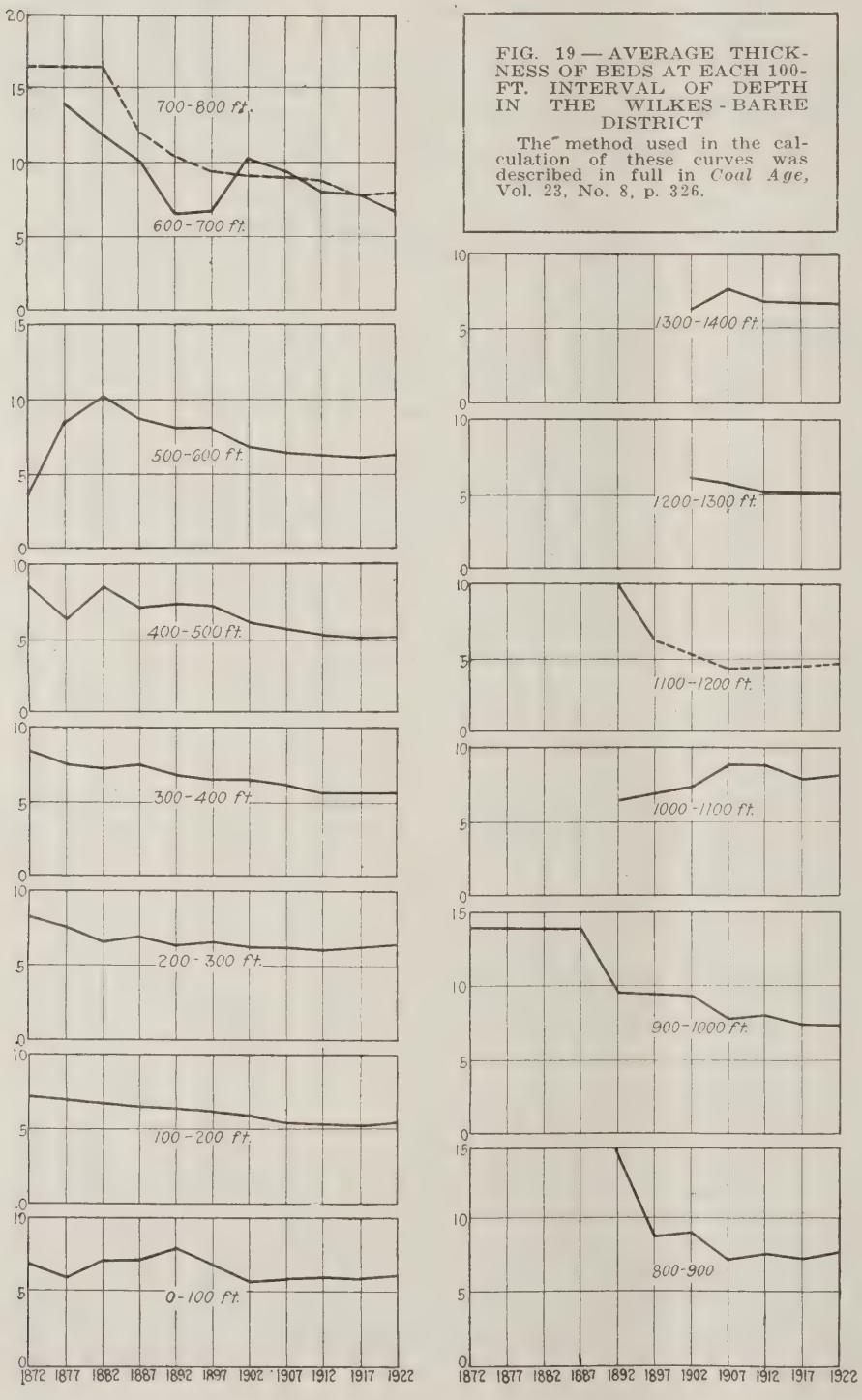


FIG. 19 — AVERAGE THICKNESS OF BEDS AT EACH 100-FT. INTERVAL OF DEPTH IN THE WILKES-BARRE DISTRICT

The method used in the calculation of these curves was described in full in *Coal Age*, Vol. 23, No. 8, p. 326.

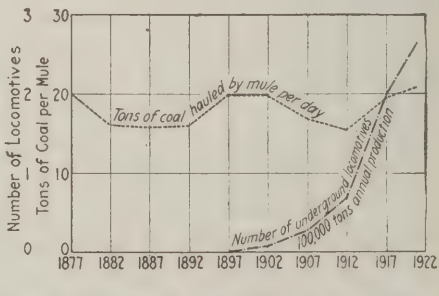


FIG. 21—TONS PER MULE AND PER LOCOMOTIVE

This diagram shows the average daily tonnage hauled per mule and number of underground locomotives per 100,000 tons of annual production in the Wilkes-Barre district.

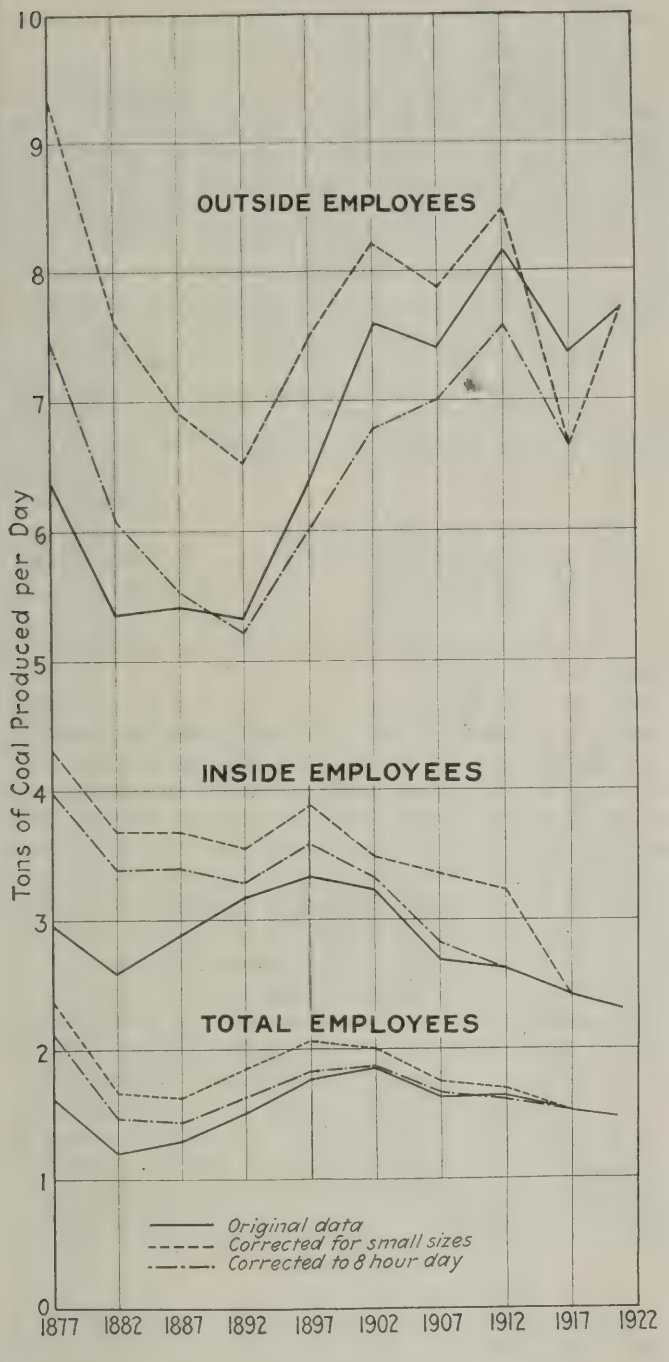


FIG. 22 — AVERAGE DAILY PRODUCTION OF COAL PER EMPLOYEE IN THE WILKES-BARRE DISTRICT, 1872-1921

The figures are shown as calculated from the reports of the state mine inspectors, also with corrections for small sizes of coal not reported as production in the earlier days, and finally to a uniform 8-hour day. The solid lines represent the figures as calculated from the original data taken from the reports of the mine inspectors in the anthracite region of the Department of Mines of the State of Pennsylvania. The days worked were determined by multiplying the number of employees by the number of breaker days at each colliery. Then the total number of employees in the district was divided into the sum of the men-days at each colliery and the result considered the weighted average number of days worked. The next step was to divide the total number of employees into the total production of the collieries to determine the average annual output per employee. This, divided by the weighted number of days worked, gave the average daily output per employee.

The dash line shows the correction for small sizes. It was impossible to obtain exact tonnages of small sizes of fresh mined coal shipped in these earlier years but from information in the reports of the Girard Estate and in the *Coal Trade Annual* estimates were made. For later years the actual figures are given by the U. S. Geological Survey. These estimates are: 1872, sizes under chestnut shipped, 8.8 per cent; 1877, 16 per cent; 1882, 26.8 per cent; 1887, 30 per cent; 1892, 42 per cent; 1897, 57 per cent; 1902, 82.7 per cent; 1907, 84.6 per cent; 1912; 90.3 per cent. Knowing the true percentages of small sizes produced, the corrections were made by difference from these estimates. As no washery coal is considered in these figures the percentage of small sizes from washeries was not taken into consideration.

increased to 6 per cent. Beds averaging between 3 and 4 ft. in thickness represented 3 per cent of the total in 1882 and in 1902 about 11 per cent. Beds 4 ft. or less in thickness thus represented 6 per cent of the total in 1882 and 17.5 per cent in 1902. It must be remembered, however, that there is a time interval between opening up a bed and bringing it to production, so that although the number of thin beds increased in proportion to the total number, the proportion of production from these beds did not increase equally fast. Although no evidence is available to substantiate it the belief is held that there was little production from the thin beds. In the early years the operators doubted the practicability of mining these thin beds of coal. This accounts for the slight decrease in average daily production per miner and miner's laborer from 1882 to 1902. From 1902 to 1921 there was a marked decrease in the average daily output of miners and miners' laborers — some 1.62 tons per man, a rate about five times that of the preceding period. This cannot be accounted for by greater number of thin beds being worked but by more intensive mining of those that were opened up. In the discussion of Fig. 11 in the preceding article on the Lackawanna district (*Coal Age*, Vol. 23, No. 8, p. 328) the reasons for the decreased output of inside company men were explained and the same general reasoning applies to the discussion of Fig. 23. The curves in the upper part of this diagram apply to the inside company men. It will be noted that the change in output per man (as corrected) is downward from

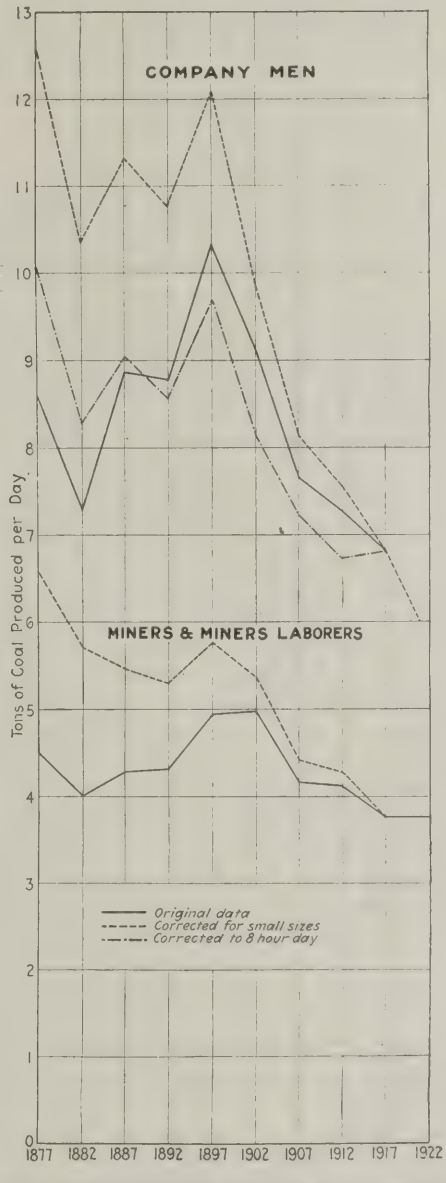


FIG. 23—AVERAGE DAILY PRODUCTION FOR INSIDE EMPLOYEES IN THE WILKES-BARRE DISTRICT

The figures are shown as calculated from the reports of the state mine inspectors, also with corrections for small sizes of coal not reported as production in the earlier days and finally to a uniform 8-hour day. In the calculation of these curves the same method was used as in calculating the curves for a number of tons of coal produced per day per total man employed. No correction was applied for hours worked for the miners, as they worked the same time under all conditions. It is again necessary to call attention to the fact that the points for the year 1897 are too high and should be neglected and that the average for the years 1892 and 1902 is considered to more nearly represent the facts.

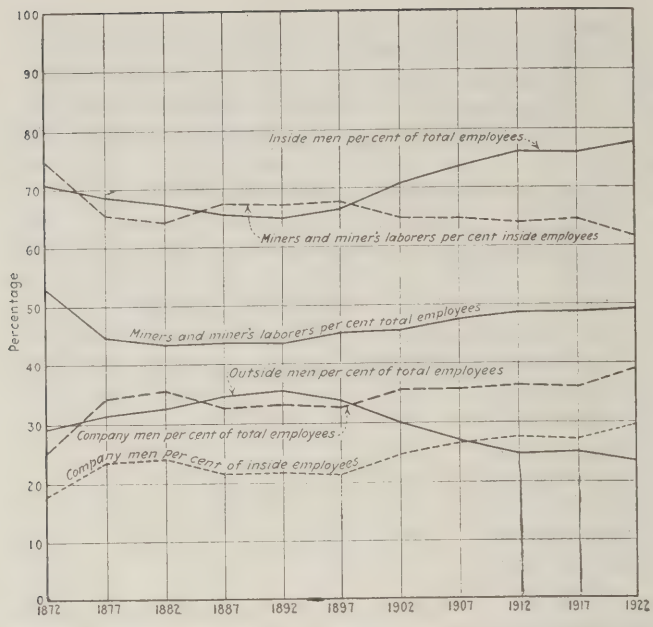


FIG. 24—PERCENTAGES OF EMPLOYEES BY CLASSES IN THE WILKES-BARRE DISTRICT
From the annual reports of the mine inspectors of the Department of Mines of Pennsylvania.

1877 to date with the exception of the period 1882 to 1887. The development of the collieries in this district has been very rapid. In 1877 the output was 2,895,836 tons and in 1921 it had reached 13,875,753 tons. Large areas were opened up, the average underground haul increased and a larger supervisory force was required. For instance, although the average number of tons per mule has remained fairly constant (if the two high points of 1897 and 1902 are ignored) the number of mules has increased greatly.

During the development period more company men are employed in these thin beds than afterward. As production increases the number of inside company men is decreased in proportion to the number of miners. Thus in certain periods the average daily output for inside company men is lowered, and later, as production from these beds is increased and more miners are employed in working them, their average daily figure is lowered.

As evidence of economies effected in the surface operation of the mines it will be noted that from 1892 to 1921 the percentage of outside men decreased from 35.2 of the total to 22.8 and the inside force has correspondingly increased. The percentage of miners and miners' laborers has decreased compared with the total number of inside employees because of the larger number of inside company men who today must be employed underground in order to cope with difficulties which greater depth and thinner beds unfortunately impose.

TABLE XIX—PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

	Inside Employees	Outside Employees	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers *a*	Inside Company Men *a*
1872	70.9	29.1	52.9	18.0	74.6	25.4
1877	68.4	31.6	44.9	23.5	65.6	34.4
1882	67.4	32.6	43.5	23.9	64.4	35.6
1887	65.2	34.8	43.9	21.3	67.4	32.6
1892	64.8	35.2	43.2	21.4	67.0	33.0
1897	66.2	33.8	45.2	21.0	67.7	32.3
1902	70.3	29.7	45.5	24.8	64.7	35.2
1907	73.4	26.6	47.2	26.2	64.7	35.3
1912	75.7	24.3	48.4	27.3	63.9	36.1
1917	75.4	24.6	48.4	27.0	64.2	35.8
1922	77.2	22.8	48.8	29.4	61.2	38.6

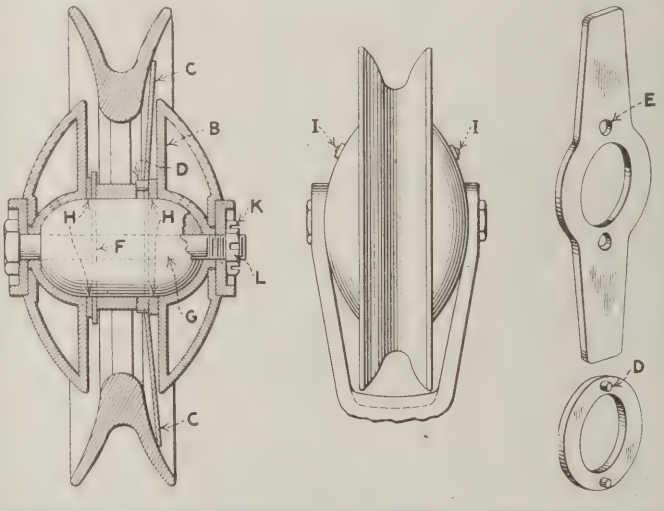
a Percentage to inside employees.

Trolley Wheel Which Passes Electricity Through Side Bearings

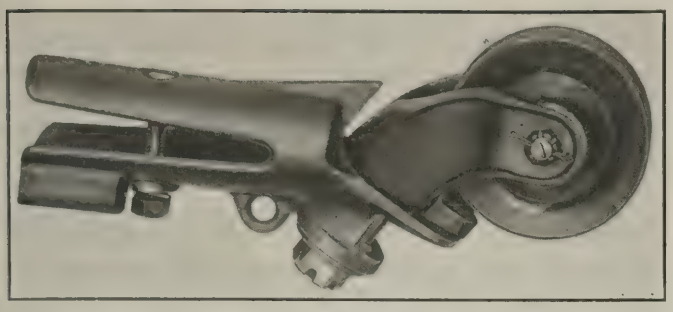
A WELL-BALANCED trolley wheel which when operating runs without vibration is that made by the Thornton Trolley Wheel Co., of Ashland, Ky. The hub of this wheel is unusually large and runs on a bearing, *F*, of which the cross-section taken laterally is almost elliptical and taken in the plane of rotation of the wheel is circular. Within the width of the wheel this bearing is like any other bearing, only larger. Only the ends of the bearing are curved.

The elliptical ends fit into two side bearings, *B*, which are held in place by a horizontal tie bolt, *G*, passing from end to end of the bearing. These side bearings do not revolve. Owing to their shape they readily can be adjusted to take up wear. They also take up all side thrust. They give adequate bearing surface and keep the wheel from wobbling from side to side as it runs along the wire. A contact spring is provided which carries the electricity to the harp without passing through the oil by which the bearing is lubricated, thus insuring that no loss of current or heating will thereby be occasioned.

This contact spring rests against the hub of the wheel and is connected by two small feathers, *D*, with a circular washer, *H*, which fits snugly against the side bearings, *B*. On the opposing side of the wheel the arrangement is the same, but the contact spring is replaced by a short piece of metal, *F*, that makes contact only with the hub of the wheel and not with its rim. Grease or oil reservoirs in the side bearings, *B*, provide for adequate lubrication. Each side bearing is fitted with three small, evenly spaced holes, *I*, for that purpose. These are filled by a grease gun. They will carry enough lubricant to serve for from one to four weeks. It is said that on electric traction work a trolley wheel of this type has run satisfactorily for 50,000 or more miles. With the removal of one cotter pin, *K*; one nut, *L*; and one bolt, *G*; the parts may all be disassembled. It is said that by eliminating vibration arcing is greatly reduced, and the groove of the trolley wheel accordingly is not burned. The absence of vibration also prevents the enlargement of the hole



SECTION AND ELEVATION OF WHEEL; ALSO CONTACT SPRING AND WASHER
Ample bearings in both directions distinguish this trolley wheel from others, preventing the wobbling which is almost a characteristic of wheels of this type. The passage of electricity from the wheel to the trolley head is not a hit-or-miss matter but is definitely provided for by the introduction of the contact spring.



MINE TROLLEY HEAD IN HORIZONTAL POSITION

The wheel, it will be noticed, has a contact spring against the side of the trolley wheel. This carries the current to the side bearing.

in which the harp swivels. The bearing will outlast twelve or fifteen wheels and as a result can be used for a long time.

A Few Days' Traffic May Destroy Brattice Cloth; Elsewhere It May Last a Year*

By George S. Rice,† J. W. Paul‡ and E. H. Denny§
Pittsburgh, Pa.

DATA assembled by the U. S. Bureau of Mines coupled with requests from coal companies have emphasized the desirability of establishing standardized specifications for brattice cloth with particular respect to durability and fireproofing. It is planned to establish these specifications through a co-operative program in which the U. S. Bureau of Standards will make a series of tests of various brattice cloths with respect to fire-resisting qualities and the U. S. Bureau of Mines will continue to assemble field data on the use of that material. Information contained in this report is based on data obtained from coal operators in bituminous districts of Pennsylvania, Alabama, Utah, Indiana, Illinois, Colorado and Nova Scotia.

Jute is used as brattice-cloth material in most of the mines from which reports have been received. The unit weight of this jute varies, ranging from 10 to 27 oz. per square yard, 14- or 16-oz. jute being that most commonly used. The 27-oz. jute was known as "calcutta" jute and apparently was an extra heavy product.

*Report of Investigations, U. S. Bureau of Mines, entitled "Preliminary Investigation of Brattice Cloth Used in Coal Mining," (slightly briefed). †Chief mining engineer, U. S. Bureau of Mines. ‡Chief coal-mining engineer, U. S. Bureau of Mines. §Mine safety engineer, U. S. Bureau of Mines.

Other brattice-cloth material reported includes "manhattan" (apparently a heavy, closely woven, treated jute cloth) and "duck," the former ranging in weight from 20 to 28-oz. and the latter weighing 10-oz. per square yard. The weave ranged from 14 to 16 threads per inch, except in the "manhattan" cloth, the heavier grades of which are 16 double and 32 single and the lighter grades 12 and 15 single.

The life of brattice-cloth varies widely, depending on the conditions under which it is used and also probably to a lesser extent on the kind of cloth out of which it is made and the general conditions of the part of the mine in which it is used. When used on haulageways it wears rapidly due to passage of motors and trips of cars, mules and men. This is particularly true if the roof or the sides of the haulageway are wet or the mine air is saturated with moisture, as the brattice cloth then becomes wet and heavy with water and drags on passing cars.

Moisture a Determining Factor of Life

Cloth used thus, under particularly unfavorable conditions, may last only three days to a week; with especially favorable conditions it may last one or more months. Probably a life of two weeks or less is a reasonable average for brattice cloth in haulageways. Its life may be much longer, however, when used in rooms and as "line" brattice for carrying air to the faces of entries or rooms to prevent possible accumulation of gas, or as a more or less permanent means of deflecting air into pillar workings. When thus used it may be still subject to more or less traffic wear and adjustment and change by bratticemen. When undisturbed by traffic, instances have been reported of brattice cloth lasting for two years, but when used in rooms and for line brattice the life usually is two to twelve months, three or four months being a rough average.

With respect to the effect of the material used or to its weight on the life of brattice cloth, only general statements can be made because conditions of service vary greatly. The heavier material can be expected normally to last the longer, although moisture-absorbing powers and consequent greater tendency to drag on passing motors and trips may in certain places make this conclusion erroneous. One company after test has adopted a 10-oz. duck costing considerably more per square yard than the ordinary jute brattice cloth. The

AREA, COST, KIND, WIDTH, WEIGHT AND LIFE OF BRATTICE USED IN NORTH AMERICAN MINES

Location	Company	Sq.Yd. Per 100,000 Tons Coal	Cost Per Sq.Yd.	Cost 100,000 Tons Coal	Material Used Kind	Width In.	Weight Oz.	Life	Remarks
Alabama	1	2,170	$0.23	$500	Calcutta	48	27	2 mo.	Fairly gaseous
	2	1,200	19	230	Jute	36, 48, 60, 72	18		Gaseous
	3	6,060	25	1,515	Manhattan	48	26, 28	3 to 6 mo.	Very gaseous
	4	500	25	125	Manhattan	36, 72	20, 28	12 mo.	Little gas
	5	2,500	15	375	Jute	36, 40	22		Gaseous
Pennsylvania (Bituminous)	6	670	14	95	Jute	72	..	Varies with service and moisture.	Gaseous
	7	245	14	345	Jute	72	..	Varies with service and moisture.	Gaseous
	8	890	35	310	Duck	80	10	Varies with service and moisture.	Gaseous
	9	510	14	70	Jute	72	..	Varies with service and moisture.	Gaseous
	10	1,120	14	155	Jute	72	..	Varies with service and moisture.	Gaseous
	11	3,050	14	430	Jute	72, 84	..	Varies with service and moisture.	Gaseous
Utah	12	2,500	14.5*	360	Jute	72	21	1-2 mo. working places, 5-6 days haulageways.	Occasional gas
	13	760	25.5	195	Jute	72	15.4	1-12 mo. according to traffic.	Occasional gas
	14	400	26	105	Jute	72	14	3-6 mo.	No gas
	15	1,000	18	180	Jute	72	14	2 weeks haulageways, 12 mo. elsewhere.	Gaseous
Indiana	16	900	16	145	Jute	72	16	6 mo.	Occasional gas
Illinois	17	500	20	100	Jute	60	10	9-12 mo.	Occasional gas
Colorado	18	2,640	22	580	Jute	60, 72, 96	..	1 wk. 3 mo. in haulageways, 2-6 mo. elsewhere	Occasional gas
Nova Scotia	19	4,174	19.2	800	....	60, 72, 84	..	3 days haulageways, 9 mo. elsewhere.	.....

* F.o.b. Wabash, Indiana

tests indicate a life of two to three months for this duck when used in entries where loaded cars pass under it.

In the majority of instances moisture and sulphur water seem to have a deteriorating effect on brattice cloth. However, two companies report that cloth used in moist places lasts longer than in dry, one company stating that in dry mines the cloth becomes dry and rotten, and moving it from place to place causes it to become rotten and leaky. It seems probable that when in continuous state of wetness or of dryness brattice cloth deteriorates less than when alternately wet and dry.

In almost all cases reported the brattice cloth used had been subjected to fireproofing treatment by the manufacturer. Various mining companies reported that they had tested such fireproofed cloth by a carbide-lamp flame and by flame from an ordinary electrician's blowtorch and found the cloth suitably resistant to fire. Tests by the Bureau of Mines indicate that supposedly fireproofed brattice cloth is not always fire-resisting, but is sometimes decidedly inflammable. The fire-resisting qualities of the cloth also change in the mine as the cloth ages and wears. As the chemicals used for treatment usually are more or less soluble, they gradually leach out in a damp place, and most mine atmospheres have a high humidity. Brattice cloth not properly fireproofed may form a distinct fire hazard if exposed to carbide lights, blasting or in contact with electric power wires. No cloth is reported as having been treated for the purpose of increasing its life, one company stating that its experience has shown that preservatives increase the susceptibility of the brattice cloth to fire—this presumably means after some use in the mine—and that no preparation can be devised which will prevent brattice cloth from being torn or frayed under hard usage.

Largest Quantities Used in Gaseous Mines

The cost to mining companies during the period of inquiry (1921-1922) is reported as varying, according to weight or grade, from 14c. to 26c. per square yard for the jute cloth, 14c. being a common figure in the Pennsylvania bituminous district. Higher prices reported from Southern and Western coal districts are due to transportation costs or to the purchase of a special grade, or to heavy weight and closeness of weave of jute cloth used. Ten-ounce duck is reported as costing 35c. per square yard in the bituminous districts of Pennsylvania.

The quantity of brattice cloth used per 100,000 tons of coal production varies greatly, the smaller quantities used being reported from non-gaseous mines and the larger quantities from the mines listed as making much gas or as being very gaseous. The number of square yards of brattice cloth used per 100,000 tons of coal produced as reported vary from 245 to 6,060, the more normal requirement for a gaseous mine being 900 to 2,000 yd. The average of nineteen mining companies reporting is 1,697 sq.yd. per 100,000 tons of coal, and the average cost per 100,000 tons, $339.

Based on the above average of 1,697 sq.yd. of cloth used per 100,000 tons of coal production, the total brattice cloth used in the coal mines of the United States annually on a 500,000,000-ton production basis would be about 8,485,000 sq.yd. However, this figure is doubtless much too high, as many non-gaseous mines make little use of brattice cloth.

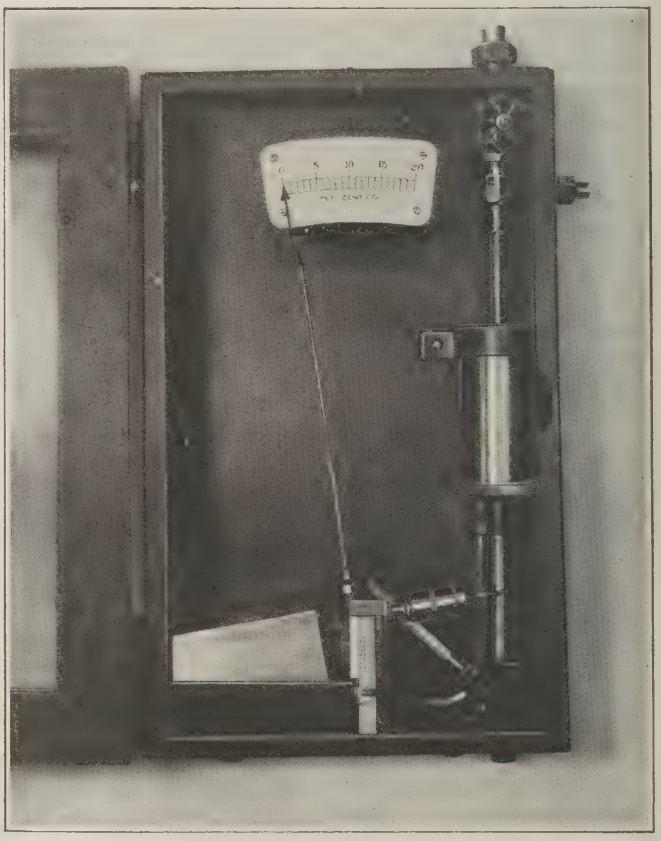
The width of brattice cloth used depends largely on the thickness of the coal seam. Widths of 36 in., 40 in. and 48 in. are common in low coal; 72-in. cloth is widely used in the thicker coal seams, but 84-in. and 96-in. widths also are reported. The appended table shows the wide variations in the conditions of use of brattice cloth, particularly with respect to quantity, cost and life.

Apparatus That Weighs Furnace Gases, Thus Determining Their Dioxide Percentage

THERE was a time, and not so very long ago, when the greatest asset a fireman in a power-plant boiler room could have was a good strong back. So long as the fireman "kept up steam"—that is, had the safety valve continuously on the verge of popping—little complaint was heard from those who footed the bills even if the amount of coal burned at times seemed large. To many men in former days efficiency meant getting the work done—the fact that it was in many instances accomplished at unnecessary expense made little difference.

As the years have gone, however, science and research have developed many instruments of which the fireman may avail himself. Today, regardless of whether he stokes with a hand shovel or with an automatic stoker, in order to be successful he must fire quite as much with his head as with his hands. In other words, he must be not only a handler of coal but a combustion expert as well.

Within a boiler furnace combustion is a continuous process carried on under conditions that are somewhat variable. In order that the fireman may conduct the process intelligently it is necessary that he have some



APPARATUS FOR WEIGHING WASTE GASES OF FURNACE

It having been found that with all the efforts at simplification, the analysis of flue gases is slow and somewhat complicated, an instrument has been devised whereby such gases can be weighed continuously as indication of their composition. The result of the weighing is made visible on a scale, so that the fireman can regulate his fire accordingly.

means of knowing exactly what is going on within the furnace. Inasmuch as combustion is a chemical process, visual inspection of the fire is not adequate to the fireman's needs. The appearance of a fire that is burning efficiently may be much the same as that of one that is burning inefficiently.

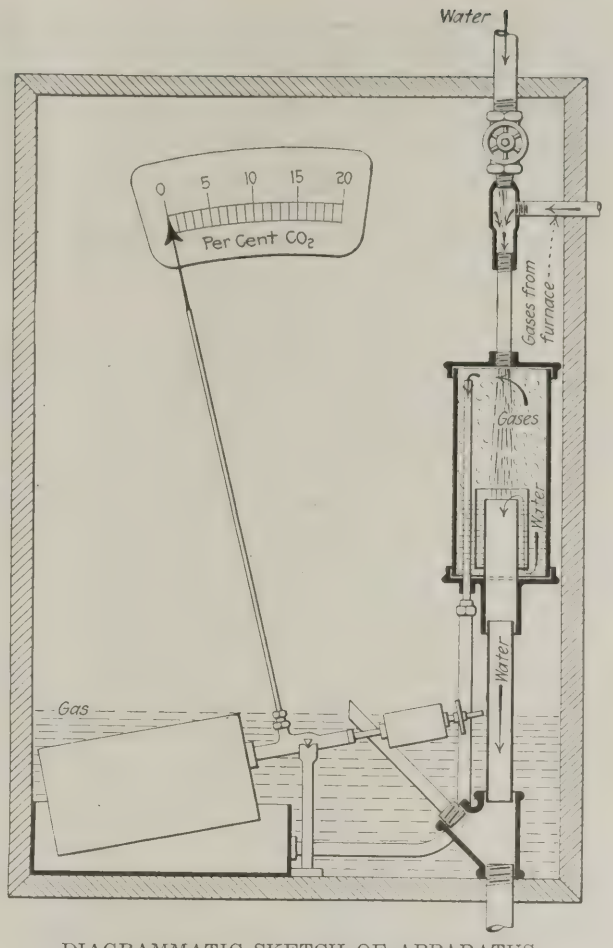
To indicate the scope and completeness of the reactions taking place within a furnace various pieces of equipment and sets of apparatus have been devised. Probably the best known of these is the Orsat flue-gas analysis equipment, with the manipulation of which most power-plant men are familiar. This apparatus and those of its kind while giving highly accurate and valuable results partakes of the nature of laboratory equipment, being somewhat fragile in construction, intermittent in operation and requiring appreciable skill in its manipulation. In short all "laboratory" apparatus is too delicate and as a rule too complicated for continuous everyday use by the man who maintains the furnace fire.

Instrument Gives Continuous Record

In order to overcome this difficulty and continuously indicate the completeness and efficiency of the combustion in the furnace, and to do it with mechanism the indications of which can be as readily observed as those on the pressure gage, the apparatus shown in the accompanying illustration has been devised by Dr. Zacharias Olsson, now of the Olsson Corporation, of 7 Hanover St., New York City. This device is intended to show continuously the carbon-dioxide content of the flue gas, this being an accurate indication of the efficiency of the combustion process. Its operation does not depend upon the absorption of one chemical substance by another but upon the difference in specific gravity between air and any mixture of nitrogen and carbon dioxide attainable by the combustion of coal in air.

The operation of this device is extremely simple. Water under pressure enters through the pipe at the top of the cabinet at the right-hand side, (see illustrations). After passing the valve by which the rate of flow is controlled it enters the aspirator, which may be seen immediately below the valve. By this aspirator flue gas is drawn continuously through the pipe which may be seen projecting through the right-hand side of the cabinet near the top. Water and gas proceed together to the cylindrical tank plainly visible at the right side of the cabinet and about half way from the top to the bottom. Here the gas disengages from the water and passes down the small pipe that bends to the left and discharges into the shallow box in the lower left-hand corner of the cabinet. The water passes down the larger straight pipe, through a wye fitting and then out of the cabinet to a drain or the sewer.

In the lower portion of the cabinet near the center is a pair of knife edges supporting a tilting lever on one end of which is a rectangular metal box or "float" and on the other an adjustable counterbalance weight. Extending upward from this lever from a point above the knife edges is a long index, or pointer, that sweeps over a suitable scale. This index lever is hollow, has a small hole at its extremity and communicates with the inside of the float in such a manner as will allow the air within the float to expand and contract according to changes in temperature and atmospheric pressure. This arrangement is made in order to prevent errors that otherwise would arise from such changes were the "air float" hermetically sealed against the outside air.



DIAGRAMMATIC SKETCH OF APPARATUS

The balance is adjusted to point at zero when the box is filled with air. The float will rise if a gas heavier than air is introduced. The instrument is calibrated and compensation made for the small percentage of carbon dioxide absorbed by the water operating the suction pump. The "U" tube at the foot of the box is omitted in this diagram as its sole purpose is to afford an indication as to the presence of flue gas in the box and show thereby whether the instrument is working.

Now when the instrument is in operation, the flue gas, after being cooled by the water in the aspirator, is discharged beneath the float and fills the entire lower portion of the cabinet (the door of which is closed) as far up as the end of the slant pipe connected to the branch outlet of the wye. Beyond this it cannot rise because the wye acts as a second aspirator and continuously sucks out the gaseous contents of the cabinet. The cabinet box thus contains two distinct gaseous strata—flue gases in the bottom as far up as the opening of the exhaust pipe and air above this point.

Being delicately counterbalanced the float will be buoyed upward under the action of any gas heavier than air. The specific gravity of flue gas depends directly upon its content of carbon dioxide. Thus the counterbalanced float will assume one elevation when the flue gas contains, say, 5 per cent of carbon dioxide and another when the content is, say, 15 per cent, this percentage being indicated by the position of the index on the scale.

Of course the indication of this instrument lags behind the actual conditions existing within the furnace by an interval equal to the time that it takes the gas to pass from the furnace to the cabinet. This lag varies with the distance traversed but normally ranges from about 15 to 20 seconds. It is incomparably shorter than that which occurs when the percentage is indicated by

a hand-manipulated intermittent chemical equipment. When that is used from 5 to 10 minutes is required to draw, measure and analyze a sample of gas. Placed on the boiler front this instrument gives a continuous accurate indication of the quality of the products of combustion.

Capping Rope Without Using Molten Zinc

By J. B. de Hart

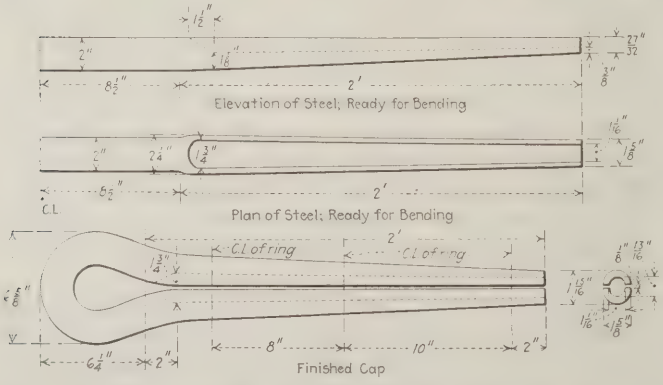
Nacmine, Alta.

In an article on "Choosing, Lubricating and Attaching Wire Ropes," published in the issue of *Coal Age* of Dec. 14, 1922, J. F. Howe gives the relative strengths of various rope cappings. He does not mention in his list, however, a style of capping much used in Great Britain, Nova Scotia and Alberta, and a description of this may prove of interest. A cap of this type can be, and generally is, made by the mine blacksmith. The following is a description of a cap prepared for use on a 1-in. rope. Other sizes can be made in proportion.

A piece of round mild steel is taken which is 2 in. in diameter and only 40 in. long before being worked. A piece long enough to form an eye of the size required to hold the clevis is marked off at its mid-length. The length in this case will be 17 in. The two ends from the marks outward are drawn down by a hammer to an even taper. A mandrel is made on the lathe of the same size and taper as the rope when bound and ready for capping, and on this the tapered ends are forged so that they will fit the rope. The two halves should fail to come together on the mandrel by about $\frac{1}{8}$-in. The figure shows a plan and elevation of one-half of the cap forged and ready for bending.

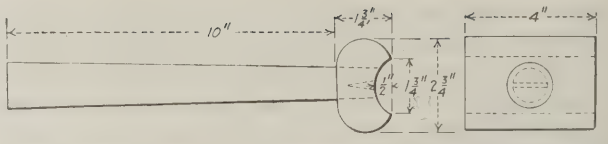
Three mild-steel oval disks are made, each about 3 in. thick, and holes are bored in the center of each. These are then forged to go over a mandrel which has been made of the same size and shape as the cap when on the rope or first mandrel. These rings, when hot, should fit tightly at approximately the points shown on the drawing of the finished cap. The outside diameters of the rings should be at all points 4 in. larger than their inside diameters.

The method of attaching the rope to the cap is as follows: Have ready four soft iron rings made of 5-16-in. round iron. The inside diameters of these rings for capping a 1-in. rope are, $1\frac{1}{4}$, $1\frac{3}{4}$, 2, and $2\frac{1}{2}$ in. The rope is then bound tightly for a length of about 4 in. at a point 19 in. from the end of the rope. The strands are



TWO STAGES IN CONSTRUCTION OF ROPE CAP

The two upper illustrations show plan and elevation of one-half of the cap before bending, and the lower illustration shows the cap when bent and the points where the rings are placed on the cap after the rope has been inserted.



HARDWOOD TOOL TO ASSIST IN BINDING ROPE

The tool is placed on the rope and the wire passed twice around the bottom end of the handle. The tool is then passed round and round the rope, the friction between the two turns of the wire and the handle holding the wire tight.

then untwisted back to the wrapping and the wires in each strand also are untwisted. Each wire in each strand is cut off at a different length with a pair of pliers.

Where using 19 in., as in this case, the first wires in each strand would be left uncut, 1 in. would be cut off the next wire, 2 in. off the next, and so on. After cutting, the wires are doubled back along the rope and laid in place, and the core is cut off where the wires are turned back.

Piece of Pipe Aids in Driving Rings to Place

The iron rings are now driven on, the largest one being driven first, and when the smallest ring is about $2\frac{1}{2}$ in. from the end, binding commences. If difficulty is experienced in driving the rings into place, a piece of pipe slightly larger than the inside diameter of the ring can be used, and the pipe driven with a hammer.

The binding is started just far enough from the end so that it will not slip off, and as it gets to the first ring the ring is driven ahead. The binding is carried to a point about 1 in. beyond the end of the cap. The two smallest rings, which will not pass back over the end of the rope, are then cut off with a hammer and chisel, or with a pair of bolt cutters. In order to make the binding tight a tool made of hardwood and shown in the drawing is used.

This tool is placed on the rope and two turns of the wire are taken around the bottom end of the handle. The tool is then passed around and around the rope, the friction between the two turns of wire and the handle holding the wire tight. A new handle can easily be put in when the wires have cut too deeply into the old one.

Rope Bound Either by Iron or Copper Wire

The wire used for binding can be either No. 14 copper wire or No. 12 soft iron wire. The latter is quite satisfactory where there is nothing to cause it to rust or corrode. The first mandrel mentioned above should be of the same shape as the rope with the binding on. The preparation of the rope is now completed and it only remains to put on the cap. The three rings are heated to a dull red heat and the end of the rope is put through them, the smallest one first and the largest one last.

The end of the rope is then laid in position in the cap, and the rings are driven tightly back onto the cap by two men with sledge hammers. This part of the work should be done as quickly as possible so that the rings are hot when driven on. The shrinkage on cooling makes the whole job tight. Finally a steel cone about 3 in. long and tapered from $\frac{3}{8}$ in. to nothing is driven into the end of the core of the rope.

Cappings such as these are used largely in Great Britain, but generally no rings are used, the rope being attached to the cap by rivets through both the cap and the rope. The cap is held tightly by clasps while the work is being riveted. The rivets are of soft iron and

riveted cold. It is doubtful if this method gives as good results as are obtained when the rings are shrunk on.

I have seen a cage weighing 7 tons and containing two cars, each weighing about 1,500 lb., catch in the dogs at the top landing and free itself after the engineman had started to unwind. This cage dropped about 18 ft. and yet the capping, which was such as I have described but placed on a 1⅛-in rope, did not give way in the slightest degree. It may not be as strong as the zinc-filled capping, as stated by Mr. Howe, but I believe a test such as this shows it to be as strong as necessary, if indeed a test is needed when we consider the number of such caps in constant use. With a cap such as this the danger of injuring the wires by pouring molten zinc upon them is avoided.

It would be interesting if Mr. Howe could give the results of comparative tests of a rope carefully capped by this method as against the solid capping. By so doing he would be able to support his statement that the latter is the strongest of all methods of capping a rope.

Utilizes Lighting Circuits for Signaling

From a British Correspondent

CERTAIN mining operations require provisions whereby a person at some distant point can transmit signals to another person operating an engine or motor. Moreover, it may be necessary to record the signals in order to provide a visual indication as well as one that is aural. The working of an engine or motor and gearing often makes much noise, and therefore in the case of a single-stroke bell a heavy blow on the gong is needed if the engineman is to be warned while the machinery is working. Likewise bells or apparatus for making signals require energy for their operation. This energy might be transmitted by a knocker wire, but this form of transmission seldom is satisfactory and therefore will not be considered. Batteries are unsatisfactory for working large bells and quite unreliable for the operation of recording apparatus.

Where alternating current is available, power for signaling may be obtained through a suitable low-voltage transformer. A direct-current supply is less flexible, for the voltage cannot be readily reduced. To put in a small motor-generator set merely to provide power for signaling is not a business proposition. To use a direct current of, say, 100 or 200 volts direct on the coils of a bell or signal indicator also is out of the question, owing to the arcing which occurs when interrupting the circuit. There is, however, a method by which such a voltage can be pressed into service, eliminating the ill effects of self-induction and providing a source of energy much stronger and more reliable than a battery. The arrangement to be described may be used for a variety of purposes which will suggest themselves to resourceful electricians and mechanics.

Almost every engineroom at a mine utilizes electricity for lighting. It is a simple matter to connect one of the lamps—say one taking about ½ amp., that is a 32 c.p. carbon lamp on 220 volts—in series with a bell or signal indicator, as shown in Fig. 1. Across the coils of this apparatus is connected a relay which is arranged to close the local circuit when the armature is not under magnetic attraction. Fig. 2 represents a normal relay. The platinum points of the local circuit are indicated at P and the circuit is closed when the armature is drawn up to the magnets, current being fed into the coils through terminals T_2T_4. The armature in its "off" position rests against an insulated stop. Now referring to Fig. 3, it will be observed that P and I are reversed relative to Fig. 2. When the relay armature is in the "off" position the local circuit is closed, and when the armature is drawn up to the magnets the local circuit is interrupted. Thus the relay is, as it were, working the reverse direction to that which is normal.

Referring again to Fig. 1 it will be noticed that the relay diagram there shown corresponds to the arrangement of Fig. 3, where terminals T_1 and T_2 would be connected to the local circuit. It will be seen from the connections that when not in operation the relay short-circuits the coils of the bell or signal indicator. This has no ill effect, owing to the lamp being between the relay and the supply. The lamp merely gives a full light, and may be used as a source of illumination. When the relay is operated by a person sending a signal, its armature is drawn up, and the short-circuit across the bell is opened. The lamp and bell are then in series, the bell coils being strongly energized. Immediately the relay armature is released it again short-circuits the bell, the armature of which falls back into its normal position.

Signal is Visualized by Flashing of Lamp

One or two points should be noticed. In the first place, when no signal is being sent the relay contact is in parallel with the bell coils. The resistance of the platinum points, however, is negligible compared with that of the bell coils. Hence scarcely any current passes through the latter, though there is sufficient to magnetize them slightly. It is necessary, therefore, not to allow the bell or indicator armature to come directly in touch with the magnets when drawn up, otherwise the apparatus will be sluggish in operation. A copper rivet in the armature, projecting about $\frac{1}{16}$ in. will eliminate any tendency of the armature to stick. Due to the relay contacts being in parallel with the bell coils, no sparking occurs at the relay contacts when the circuit is interrupted.

When fitting a relay for this purpose care should be taken to see that the insulation is good between the

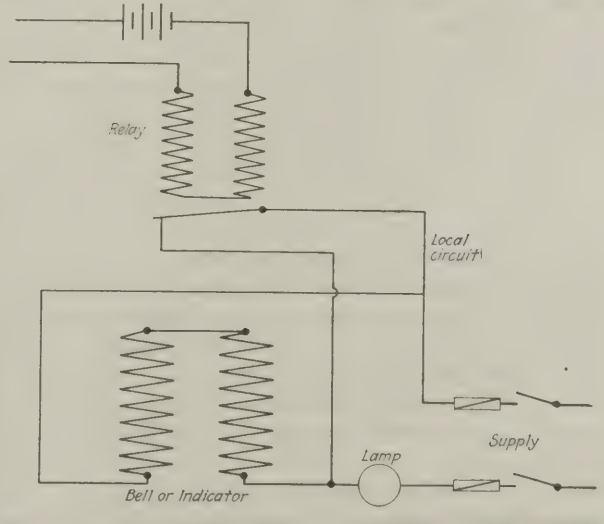
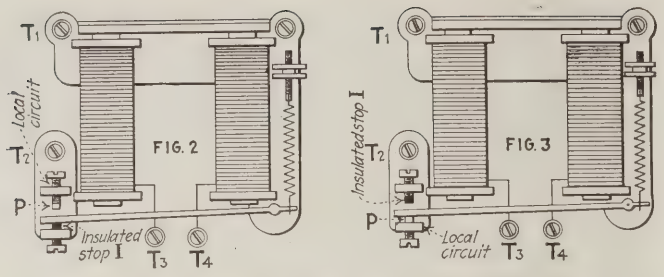


FIG. 1—LOCAL AND SIGNAL CIRCUIT CONNECTIONS

This local and signal circuit avoids the necessity of applying a high voltage to the signal buttons and gives both an aural and visual signal for conditions where there may at times be considerable noise.



FIGS. 2 AND 3—STANDARD AND ADAPTED RELAY

The standard relay may readily be adapted so that the lamp will light brightly when shunted on the bell coils and go out when in series with the bell coils, thus visualizing the signals.

relay coils and the local circuit, otherwise there will be leakage to the signaling circuit. It hardly need be added that the arrangement described should not be employed where gas is present and may be ignited. There are numerous applications, however, both in and out of a mine. The advantages may be summarized as follows: (1) No batteries have to be maintained; (2) the bell or indicator coils are strongly energized; (3) the lamp which is in series with the coils may be utilized for illumination; (4) the relay contacts do not spark and (5) no short-circuit can be formed by a failure of the bell coils, owing to the lamp being in series. The arrangement obviously is unsuitable for connecting to a trembler bell.

Life and Testing of Hoist Rope Discussed

SOCKETING of ropes, injuries in manufacture, fatigue and the possibility of testing a rope magnetically were discussed at length in the course of the joint session of the American Institute of Mining and Metallurgical Engineers and the National Safety Council during the New York meeting of the former. Strange to say, question was raised whether the strongest socket is necessarily the best.

Mr. Lindquist, an elevator rope specialist and chief engineer of the Otis Elevator Co., said that there was no one best socketing method, for the socket which might resist tension best might be so rigid that the rope would break from torsion, whipping and vibration. By whipping he had reference to the movement in the slack rope and by vibration to the action of a rope under strain. The more definite the point of rigidity the more certain the injury to the rope. It would serve but little to have a socket of unequalled efficiency if in attaining it the end of the rope was so rigid that the wires were broken. With hydraulic elevators it had been found that swiveling sockets increased life, but ball-bearing sockets are better. The socket should be light, however, or trouble will result from vibration.

Fatigue, said Mr. Lindquist, attacks the outer shell of the wire first and when the exterior cracks, failure results from the extension of these cracks. In discussing the elastic limit, dependence should not be placed on that obtained with one application of load. That is not the true elastic limit of the material. Some alloy steels seem built to mislead the purchaser; they show a high elastic limit on the first application of stress but an unduly low one where the stress is many times repeated.

Cables, he added, were uncertain quantities. Sometimes when a cable of a certain type and make has proved lacking in life, another one of identically the same type and make has been used in its replacement and proved most successful in standing up under the same working conditions. This is a matter requiring careful investigation. In making these suggestions Mr. Lindquist added that nicking in manufacture and improper stranding explained the uncertainty. When nicked a wire is prevented from sliding to accommodate itself to changing conditions. Mr. Lindquist said that the wires of a soft rope nick readily and may break without warning.

Strange to say, it is injurious to a rope to let it run under light load. It does better, said Mr. Lindquist, when the load never changes. Apparently the wires in the rope under light load have a different bearing surface under which new defects may develop.

R. L. Sanford, an expert of the Bureau of Standards, read a paper describing the line of attack by which it was hoped to find a way of testing hoisting rope in place by magnetic effects. With the aid of a magnetic field it has been possible to discover hidden defects in rails and rifle barrels. B. F. Tillson has been trying for many years to get an appropriation from the government for an inquiry into the possibility of testing wire ropes in this manner. The Bureau of Standards at last has received an appropriation. Mr. Sanford does not promise success in this investigation. There are difficulties in the way, as Mr. Lindquist sympathetically pointed out.

For instance, there may be magnet effects, said Mr. Lindquist, that have nothing to do with the mechanical condition of the rope, for the rope may itself have been magnetized in service, and this magnetization may be so pronounced that the galvanometer would fail to record the effect of passing a break in a wire or wires. Of course, we can resort to the demagnetization of the rope, but it is impossible to demagnetize a rope completely. Fortunately, Mr. Lindquist added, fatigue is not equal over the cross-section of a wire. A wire does not weaken all over at one time but cracks first form on its surface. These the galvanometer should be cognizant of, provided the rope is not too greatly magnetized before the test is made. It seemed agreed that it might be possible to pass the coil by which the test would be made over any socket on the rope. The coil would not have to fit the periphery closely.

STUDY OF THE CLEANING OF COALS of the Pacific Northwest and Alaska conducted during the past few years will be continued at Seattle, Wash., by the U. S. Bureau of Mines. The objects of this work are to study the defects of the present washeries and to determine the washability of coals not being washed at the present time. Large-size samples will be taken at the mine or washery and brought to the coal-washing laboratory for testing. Emphasis will be laid upon the use of tables in coal washing work. The application of froth flotation to the treatment of washery waste or coals difficult to wash will be studied.

A CONTINUING STUDY is being made by the field engineers of the U. S. Bureau of Mines relative to the methods of mining coal under the various conditions in which it is found, for the purpose of determining and improving if possible the percentage of extraction, together with the degree of safety attained and possible. When a sufficient number of mines has been investigated in any particular coal bed, it is planned to summarize the methods of mining in a Bureau publication, calling attention to any unnecessary loss of coal in the different methods of mining operations.

Storing Coal on the Ground and Reclaiming It with the Aid of a Cable Drag Scraper

Scraper Working Over Top of Pile Can Unload or Load Anywhere, an Advantage in Fire Control—Coal Sizes Are Mixed, Making Fire Less Likely—Handles Coal Rapidly and Cheaply

By H. V. Schiefer
Cleveland, Ohio

THE usual methods of mechanically storing coal consist of portable, or bucket, conveyors for use in small storage piles; and grab buckets with cars, grab buckets with conveyors, fixed-conveyor systems and cable drag scrapers for storage piles of large capacity. The portable conveying belt is loaded by hand. In consequence its capacity is limited by the quantity that can be shoveled onto it per hour. When the lower end of the conveyor is run into a pit beneath the railroad track and is fed by a mechanical feeder, it then becomes a fixed conveyor system and though it has a greater hourly capacity than other storage plants it is less flexible than when free to move to any point.

Fixed conveyor systems were much in vogue for coal storage from about 1910 to 1916 or 1917. These consisted usually of a V-bucket elevator conveyor, which received coal from a hopper beneath the track, elevated it about 20 ft., then ran horizontally, dropping the coal through gates to storage. The length of the conveyor was made to suit the quantity of coal to be stored. The return run of this same conveyor operated in a tunnel beneath the coal pile.

For the average plant this was one of the best of storage methods. Its chief defect was that only half the coal could be reclaimed from storage without recourse to other handling. This same objection applies to monorail or other straight-line storage systems, which pile the material in a long triangular shaped pile, half the material being out of reach of the reclaiming bucket.

Systems embodying the grab bucket and the conveyor consist either of locomotive cranes and reclaiming belt conveyors or of bridge cranes operating a grab bucket and provided with a similar conveying unit. Conveyors are used in conjunction with cranes because the latter cannot advantageously pick up a grabload of coal and travel with it.

A method of storing coal with unusual possibilities is the cable drag scraper system developed by the R. H. Beaumont Co., 319 Arch St., Philadelphia, Pa. This method of operation is being installed at the mines of the King Harlan Coal Co., at Kilday, Ky. It will handle 275 tons per hour. Another installation is in use at the mines of the Westmoreland Coal Co., Irwin, Pa. It consists of a steel scraper attached to an endless steel cable, which latter is operated by a double-drum winding machine and runs out across the field to steel posts planted around the storage area.



FIG. 1—TWO-TON SCRAPER UNLOADING COAL

In the rear will be noted the steel posts to which the pulley is attached when coal is to be unloaded or reclaimed between any one pair of posts and the initial coal pile. It will be seen that the sizes are not appreciably segregated when being dumped. With such a large scraper an unusually large tonnage can be handled.

The scraper is dragged back and forth over the coal, it being quickly detachable so that it can be turned around when the coal has to be reclaimed. The size of the storage pile is limited by the area outlined by the steel posts and the depth of the storage. More capacity can be obtained merely by moving back the steel posts. The area of the pile may be made of any shape, nor is it by any means necessary that it be level. The coal can be stored or reclaimed from any part of the area, all the preparation necessary being to move the tail blocks from one post to another.



FIG. 2—TWENTY THOUSAND TONS OF STORAGE

The two steel posts to the right in the background not being in a heavily filled area exhibit the concrete foundations which provide the necessary stability. The scraper is in the left background. This is rather a "stock yard" than a "stock pile," so moderate is the storage depth and so level the surface. These conditions make spontaneous combustion less likely. This shows a larger area of the same pile as that shown in Fig. 1.

The scraper moves out its coal from an initial pile, which may be formed by dropping coal from a tipple or from a chain-and-bucket elevator or by some other means. In reclaiming, coal is pulled back to the starting point and rehandled to the cars by the equipment that built the initial pile.

The cable drag scraper system of storing coal is controlled by an operative in an elevated cabin at the side of the storage field. The machinery house can be set anywhere. Should the coal heat, the operative can make the scraper attack the heated area and turn over the coal. On account of his remote position he is not troubled by smoke or fumes. When a steam or electric crane attempts to attack a fire in the heart of a slack pile it frequently has to dig out a large body of coal



FIG. 3—AN 8,000-TON YARD FOR AN OHIO FACTORY
On the right is the elevator from which is formed the mother pile from which the yard is filled. This elevator receives its coal from a hopper below the railroad tracks which is fed either from the yard or the railroad cars and delivers coal either to the railroad cars or the yard. It will be seen at what a high point the scraper is delivering, demonstrating that where the yard is not as level as this one the coal can nevertheless be satisfactorily placed and reclaimed.

that is not in the least heated in order to reach that which is burning or nearly burning beyond.

Another advantage of the scraper method of placing the coal is that it does not store it with the fine coal on top and the coarse coal below. When piles are placed by a grab bucket the coal falls in a pile and the larger lumps roll down to the bottom, so that if proper care is not taken the base of the storage consists of coarse coal and the top coal is fine. With the scraper method the coal is mixed thoroughly and is compressed so closely that air cannot enter the pile.

Those who have used this system of storing declare that they have had surface fires but no fires in the center of the pile. However, should such a fire occur at a point remote from the edges of the pile the scraper would uncover it without difficulty. Owing to the ease with which storage piles covering large areas may be made with scraper equipment if available ground permits, the coal need not be stored to any excessive depth. In consequence fires are less likely than with some other methods of storage.

The capacity of such a drag scraper is high, running from 50 to 600 tons per hour, dependent on the size of the scraper used and the length of the haul.

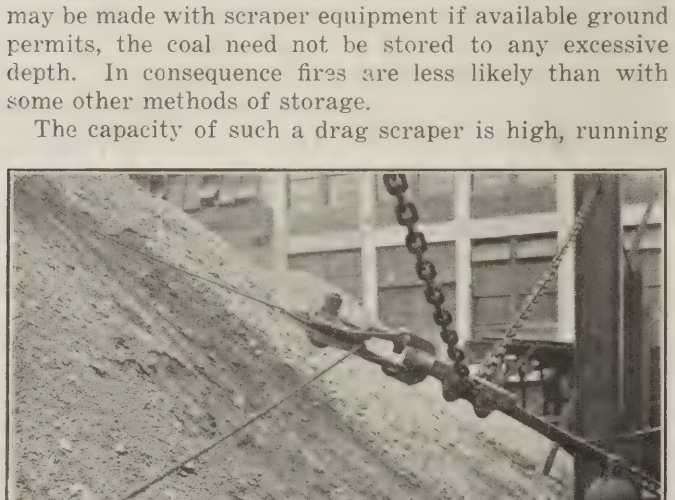


FIG. 4—METHOD OF SUSPENDING TAIL PULLEY
A chain is bolted between two of the posts, in which holes are provided for attachment. From the chain is hung the counterweighted pulley arm.

Many coal-storage equipments are extremely economical in operation. If they worked night and day and always at top capacity they would do the work at a negligible figure but when they work intermittently the interest and maintenance charges more than eliminate all the profit. Others have in addition high operating charges. For instance, an expert operator commanding a high wage must be employed to run a crane, whereas the drag scraper can be handled by a man without training or experience.

The first cost of a drag-scraper system is low and the maintenance cost is inconsiderable, for when the machine is idle the rope is wound on the drums and the scraper may be stored anywhere under cover, the only parts exposed to the weather being the machinery house and back posts. As about 90 per cent of the moving parts are of steel the wear and tear is not excessive. The largest part of the investment is in steel and concrete, which depreciate slowly. The salvage value is high, for the plant is quite mobile. It will fit any storage area. The cable can be used as a car puller by simply extending the countershaft and adding a winch head and outboard bearing. A clutch is provided to throw in the car puller when required.

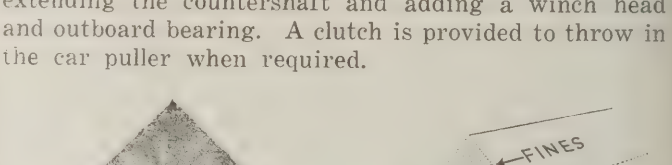


FIG. 5—ILLUSTRATING EVIL OF CONICAL PILING
In the left-hand illustration a big pile of coal has been made by a grab bucket which has dumped coal repeatedly from one point. The larger lumps have run down the side of the pile and so a body of fine coal rests on a mass of larger coal which gets progressively coarse toward the bottom. The air can circulate freely through the large coal and feed the finer coal with air should the pile begin to heat. This ventilation also favors the initial heating, for while it causes incipient combustion, the fine coal delays the escape of heat upward. The figure on the right shows the same effect obtained by a long continuous pile of pyramid shape.

$12,000,000 Power Plant Will Mean Much To Northern Colorado Coal Fields

ERECTION of a huge steam-electric power plant on Boulder Lake four miles east of Boulder, Colo., by the Doherty interests, the plan for which was announced recently, may mean a good deal to the coal fields of northern Colorado. A ready source of electric power will be available for mining use and a ready market will be at hand for a considerable volume of lignite slack such as now burdens practically every northern operation. The plant, estimated to cost $12,000,000 and to be built by the Cities Service Co., to serve the Denver Gas & Electric Light Co. and the Western Light & Power Co. may be of 100,000-kw. capacity. The first unit, a 20,000 turbo-generator to cost $4,000,000, may be in service by March, 1924. The boiler room for this is expected to consume 125,000 tons of coal annually.

From an engineering viewpoint, the plant is of much interest. It is unusual to locate such large plants on artificial sites, even large artificial lakes, as this is. Rivers or other large streams are more common. However, their absence made it necessary to select this site, a lake the surface of which will be increased to 380 acres, and volume of water impounded to 280,000,000 cu.ft. Further, steam is to be used at 375 lb. pressure and 200 deg. superheat.

Structural Details of Underground Stable

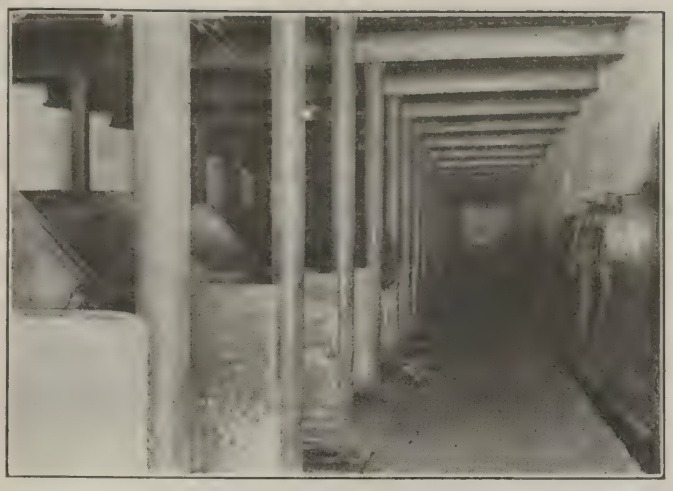
By Alphonse F. Brosky*
Pittsburgh, Pa.

SOME of the mines working the Pittsburgh and other seams still use horses for gathering operations. Gathering locomotives have not entirely supplanted animal haulage, for under certain conditions the latter is more economical than the former. More horses than gathering locomotives are used in the Criterion mine of the Westmoreland Coal Co., at Rillton, Pa., and accordingly a stable has to be maintained. In this mine the stable, which is quite modern, is placed underground.

Strangely enough, though members of humane societies object to the keeping of animals underground, mining men find that the veterinarian has fewer calls to underground stables than to those on the surface, especially where the stable is close to the entrance to the mine. So located the stable is less injurious to the health of the men in the mine and to the animals in the stable. At the Criterion mine the mules are stabled in a chamber 425 ft. from the main bottom of the hoisting shaft. It is ventilated by a split off the main entry intake, which passes through the stable to the return airway and thence to the upcast 300 ft. away.

The stable is 145 ft. long and 21 ft. wide, being furnished with twenty-two stalls of concrete, the floors of which are of wood. The ceiling is supported by 12-in. beams on 6-ft. centers which rest upon 13-in. side walls of brick and are further supported by two 6-in. pipes filled with concrete. Above the beams are 20-lb. rails used as stringers and between these rough bricks are laid, a construction often used for the roofing of overcasts.

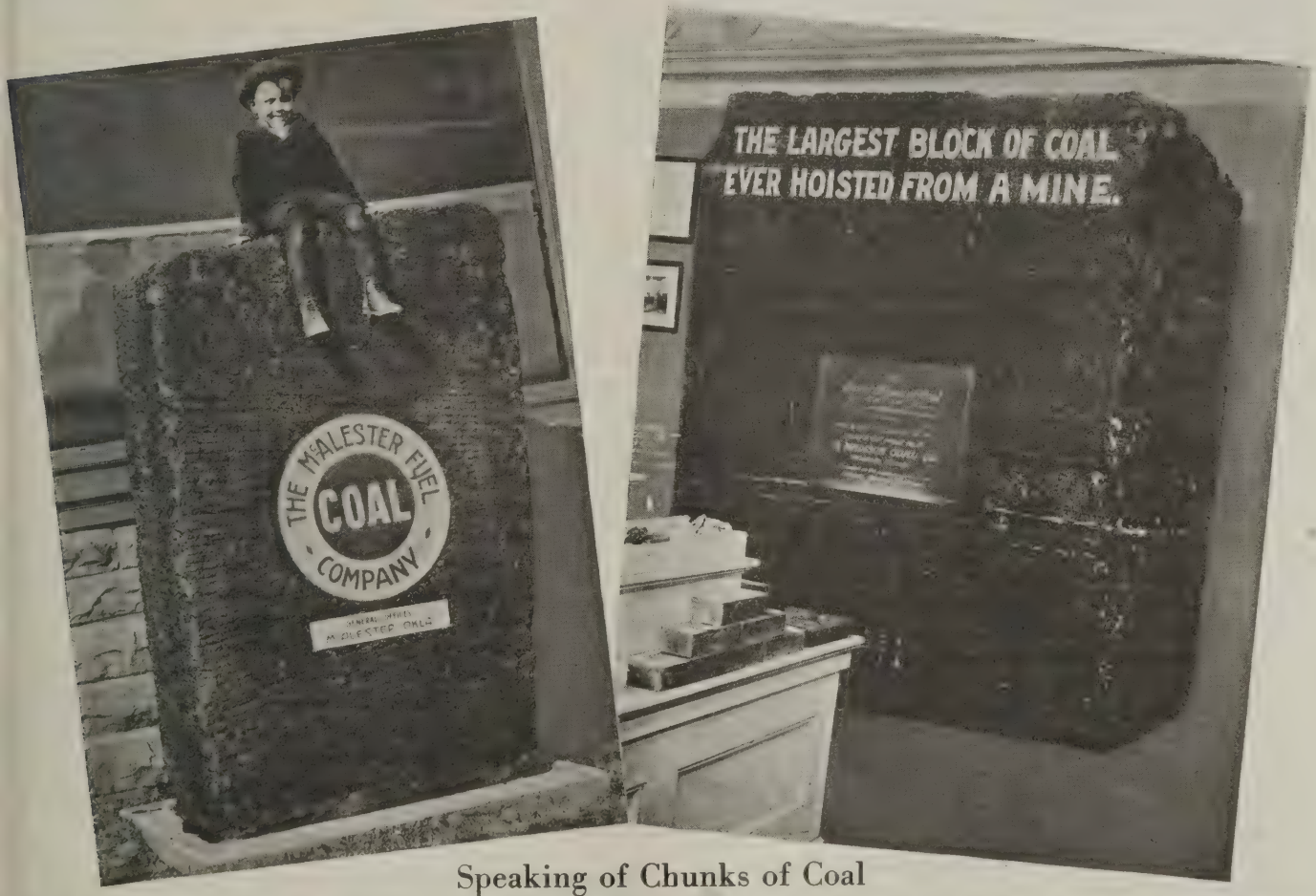
*Assistant editor, *Coal Age*.



STABLE ENTIRELY FIREPROOF EXCEPT STALL FLOORS

A really modern stable no longer is a measurable fire risk, for the stall floors are not likely to catch fire and no hay or bedding is stored in or near the stable. Should the bedding catch fire, the flame would be confined to the particular stall in which the blaze occurred.

Speaking of Chunks of Coal



Here is a 7,600-lb. lump of McAlester coal from the Homer Mine of the Osage Coal Mining Co., near McAlester, Okla. It measures 6 ft. 6 in. x 4 ft. 6 in. x 3 ft. 6 in. This chunk, extracted for the Rotary convention in Wichita, Kan., in 1921, was never shipped and now stands in front of the McAlester Fuel Co.'s office in McAlester and has stood there for some time without suffering from the weather. Its "biggest" claim is that it is the biggest chunk ever taken from a 4-ft. seam.

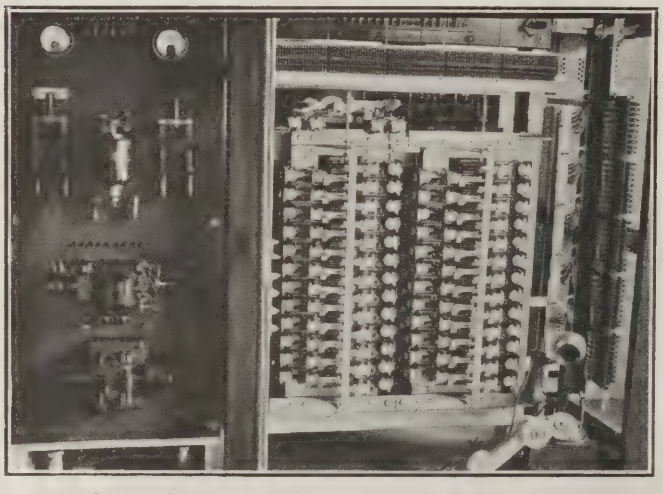
"The Cyclops of them all" is what A. J. Moorshead, president of the Madison Coal Corporation, calls this old timer exhibited at the St. Louis World's Fair in 1904. It weighed 14 tons and has a legitimate claim to the title of "biggest lump ever mined." Expert pick miners extracted it from the Divernon mine, near Springfield, Ill., at a spot close to the shaft bottom where office room was needed. The block measured 6 ft. x 7 ft. x 8 ft. 2 in. The cage was dismantled to get this monster up the 335-ft. shaft.

Raleigh Coal Co. Keeps in Touch with Key Workmen by Automatic Telephones

By A. F. Brosky*
Pittsburgh, Pa.

THE American Telephone & Telegraph Co. and other telephone companies already have come to a realization of the many advantages derived from the installation of automatic telephone service and now feel assured that millions of dollars would be saved if community telephone services were made automatic, and work has already been commenced on a large scale in the bigger cities to that end, some units being already in operation.

If the practicability of the machine-switching telephone system is so well established that the public-utility companies do not hesitate to install it on a large scale, why is it not even more ideally adapted to the conditions in the rural or the isolated districts in the coal fields, where small independent systems often are installed and operated by the coal companies? An electrical engineer who worked on the automatic telephone several years ago assured me that the new system



AUTOMATIC SWITCHBOARD OF RALEIGH COAL CO.

Mining villages usually are a little way from the mine and stretch out over a large area. If anything goes wrong when the day's work is over it is difficult to get the right man promptly for the particular repair job unless a telephone is provided, and then it should be a self-switching telephone, that will not wake up every key workman and boss on the job just when he is taking the sleep that will fortify him for his next day's work.

is far superior to the old, even where as few as fifty telephones are installed.

Wherever the automatic telephone system has been used in factories, warehouses and offices of large concerns it has operated successfully. For this reason it might be well for coal companies likewise to consider whether the automatic telephone could be applied satisfactorily to their needs either at a single mine plant or at a group of plants, including mining towns also.

Four years ago the Raleigh Coal & Coke Co. installed an automatic system of fifty telephones in the town of Raleigh, W. Va. The system co-ordinates the work of the several operating departments and provides a sure means of communication with those men whose services might be required at inopportune times during the twenty-four hours of the day. And this is accomplished without resorting to manual assistance or to a system of long and short rings whereby half a score of families are awakened in the dead of night in order to establish communication with some one somnolent individual. Direct signaling and connection are made by the caller to the party called.

Besides the telephones in the general offices and other company buildings, there are telephones in the homes of the superintendents, foremen and other bosses and company officials. The residences of the master mechanic, electricians, carpenters and others whose services are indispensable at unexpected times are similarly equipped.

The system cannot be used underground because of grounding. Consequently the automatic telephone service extends no further than to the office of the weighmaster on the tipple. All communication from the outside to the inside is delivered to the weighmaster, who relays it over the underground telephone system.

At Raleigh, W. Va., the system used is that of the Chicago Automatic Telephone Co., whose rights have been acquired by the Western Electric Co. From the original Strouger system two different types of equipment have been evolved. The type that will be used in the large cities is called the panel system and that which will be introduced into the self-contained communities is known as the step-by-step system. We are told that the machine-switching telephone system owes its success to the most complex electrically operated mechanism in the world. Primarily it is based upon a system of relays. During the process of completing a call in the large system it is said that about 750 contacts are made in a period of 7 seconds.

The machine-switching board which maneuvers the calls from 50 telephones in Raleigh appears in the illustration. The lines end on small terminals which are mounted vertically on a frame as shown. When the caller lifts his receiver an electrical condition is created which causes a line finder to elevate vertically to the line of the caller, where it stops. The caller then hears a humming noise which is a signal for him to dial the number of the party called. The numerals dialed by the caller set up electrical impulses operating an electrical device called the sender, which is the brains of the system.

The sender receives the call number dialed by the caller and directs subsequent operations of the apparatus, thus establishing a connection with the line of the party called. If that line is busy the caller is informed of that fact by a buzzing sound which is distinctive and differs from the ring of the call bell.

The potential of sending is 52 volts direct current, while that of receiving is 84 volts alternating current. A storage or secondary battery in the circuit is automatically charged through the agency of a motor-generator set in the circuit and furnishes the direct current for the transmission of the voice.

When the potential of the battery falls below 46 volts a relay makes contact and closes a circuit to an automatic starter in the circuit of the battery and generating unit. After the potential of the battery is raised to 52 volts, which is the maximum voltage, the charging is automatically cut out from the battery through a breaker.

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*Assistant editor, *Coal Age*.

"Reports of Investigations issued during 1922," Serial 2440, recently issued by the Bureau of Mines, lists a number of reports relating to the technology of solid and liquid fuels. The subjects treated include the use of bituminous coal in house-heating furnaces, fuel economy from oil plant equipment, determination of sediment in fuel oil, steaming tests of Alaskan lignite, smoke prevention, Trent amalgam, etc.

Effects of Ruhr Occupation Reflected in Curtailed Production of Coal

Although railway strikes, resulting in congestion and disorganization of the transportation system, have practically divided the Ruhr district into a number of local districts without communication with each other and almost completely isolated from the outside world, *Coal Age* is in receipt of information showing that coal production in the Ruhr which in the larger part of January was forced by all means available, had during the last week of that month decreased to an estimated tonnage of 270,000 per day, as compared with a normal daily capacity of 350,000 tons. Actual shipments after the blockade was put in force were for delivery inside the Ruhr district. Total shipments, which up to Jan. 20 averaged about 20,000 carloads of ten tons each per day, had on Jan. 30 decreased to 9,500 carloads, on Feb. 2 to 2,000 carloads and on Feb. 4 to 1,200 carloads, equalling 12,000 tons, or about 3 per cent of normal output.

As the accumulation of reserves within a few days reached the limit of available space, production was reduced early in February to the limited possibility of shipments and to the demand of coking plants, which at the beginning of the month were still in full operation. No discharge of coal miners on a large scale had taken place in the Ruhr district up to the first part of February. When not engaged in the production of coal they were used in improvement and development work.

There was no actual pinch up to the early part of February in the unoccupied parts of Germany occasioned by a lack of coal. The railways were provided with from six to seven weeks' reserve stocks and gas and electric plants and other large consumers had supplies sufficient for approximately one month.

According to the statements of the Coal Commissary and the National Ministry of Economics import licenses granted during January were considerably less than in October and November. The drop in the value of the mark widened the margin between German and British coal prices. The last increase at that time was 77 per cent, bringing the price of Ruhr fat run of mine to 68,411 marks per ton, which at the rate of exchange prevailing at the beginning of February equalled 7 gold marks.

Production in those mines situated near the borders of the Ruhr mining district, but outside of the cordon drawn, was continued under heavy pressure up to the first part of February. At that time it was considered unlikely in authoritative German circles that those mines would be included in the occupied zone.

The German Coal Commission informed a Reichstag committee March 9 that the country's coal supply was on the whole satisfactory. Thanks to large supplies of reparations fuel which were diverted to unoccupied Germany instead of to France and Belgium during the first few weeks of the occupation, and to large importations of British coal last year, the commission said, the railways, public utilities and private consumers were well taken care of.

Prior to the occupation Ruhr coal production was distributed as follows: Entente tribute, 20 per cent; occupied Germany and local consumption, 38 per cent, and the interior of Germany, 42 per cent. Considering the outlying mines left out from the occupation, the coal deficit resulting from the Ruhr blockade was estimated at about 2,700,000 tons per month, or about one-third of the output, and the shortage of coke was more than 1,000,000 tons per month. The increase in production in the remaining coal fields—Upper and Lower Silesia and Saxony—expected from overtime shifts was estimated by the Coal Commissary at about 500,000 tons per month, although it is thought it will be nearer 300,000 tons. In this connection it may be mentioned that a coal-dust explosion in one of the largest Upper Silesian mines has put this mine, which produced approximately 500,000 tons per year, out of operation for some time. The production of the Upper and Lower Silesian and Saxon fields in January was about 1,700,000 tons.

Germany is practically independent of the brown coal produced in the occupied mine fields. The latter contributed to the German interior only 5 per cent of their production of brown coal and 5 per cent of the brown coal briquets produced. It is intended to operate the brown-coal mines in central Germany on Sunday, which with the three shifts they are now working probably will increase their present production of 8,000,000 tons per month by about 1,300,000 tons. The glass industry is the only industry using brown coal to a large extent.



COAL PILES AT RECKLINGHAUSEN, IN THE RUHR VALLEY

Here are piles of precious coal that France achingly needs, and that she plans to get, fair means or foul. However, until she can get trains and workers she is helpless. Recklinghausen is now occupied by the French troops.—*Photo Keystone View Co.*

German Government Provides Foreign Funds at Low Rates to Import Coal

While all the world was wondering how Germany could hold out against the Ruhr blockade, which deprives the country of half of its coal supply and four-fifths of its iron and steel resources, the German Government threw large sums of foreign money upon the money market to improve the value of the mark in exchange. This money was taken from funds accumulated from export proceeds for the avowed purpose of reparation payments. It will be remembered that every exporter has to deliver to the government about one-fourth part of the foreign money realized by sales abroad. The government is a coal consumer only as far as the state railways and a few state works are concerned. The funds in hand exceed by far the government's own requirements.

The move to give away these funds at comparatively low rates must be interpreted as an attempt to provide industry with the necessary means for replacing the Ruhr supply of basic materials through purchases abroad. Coincidental with this move coal prices have been increased by about 80 per cent, bringing the standard grade of Ruhr fat run of mine up to 123,356 marks per ton and all other grades in proportion. The government's manipulation of the mark has raised these prices above the level of British prices. This doubtless is intended as an inducement to private consumers to cover their requirements toward coming emergencies and to do it without any sacrifice to themselves. It is the first time since the end of the war that German coal prices have been raised above world market prices.

The usual monthly report of production for January, originating from the Coal Syndicate, has come out, but it contains no figures. The January production of coal in Upper Silesia was 787,000 tons in 25 days against 733,690 tons in 22 days in December. This drop is due chiefly to accidents in two mines. In the other mining districts, those of Lower Silesia and Saxony, production has remained at the level of the preceding two months. In Lower Silesia the miners have agreed to overtime work in the shape of an additional hour every day. In the Saxon mines it has been decided to provide work for discharged Ruhr miners. Brown-coal production in central Germany in January showed a slight decline. The efforts made to increase coal production in the interior of Germany up to the middle of February had shown no material result.



Problems of Operating Men

Edited by James T. Beard



Extraction of Room Pillars in Working the Miller Seam

Conditions in Miller Seam Extremely Bad—Experience in Working Under 400-Ft. Cover—Constant Need of Taking Up Bottom

HAVING had a considerable amount of experience in the matter of extracting pillars under varying conditions in different seams, I was deeply interested in reading the inquiry of Robert Holt, which appeared in *Coal Age*, Feb. 1, p. 226, regarding the difficulties experienced in the extraction of pillars in the Miller or "B" seam.

My knowledge of the Miller seam leads me to say that conditions in that seam are the worst I have ever experienced in respect to the tendency to squeeze or creep. The description given by Mr. Holt regarding the conditions in his locality are typical of the conditions existing elsewhere in the working of that seam.

Rooms 24 Ft. Wide Driven on 60-Ft. Centers

For his information, allow me to give a little of my own experience in working the Miller seam under a cover of about 400 ft. The face headings were driven to the full dip of the seam, which was about 3½ per cent. The butts were turned to the right and left of the face headings. The rooms were turned off the butts on the full pitch of the seam, or parallel to the face headings. The rooms were driven 24 ft. wide, on 60 ft. centers.

The face headings were driven narrow, 8 ft. wide, while the butts were made wide enough to gob the rock, the back heading being 12 ft. wide. It was the purpose to drive the rooms to a depth of 275 ft., leaving a 50-ft. barrier pillar for the protection of the butt headings. In one instance in particular, owing to extraordinary roof trouble, the turning of rooms was started somewhere near the middle of the first pair of butts, which did not prove a success.

We hoped to start the break in the center and pull the pillars back quickly. But, before the rooms had advanced more than half way up the pitch it was necessary to start to take up bottom from the switch. Before the rooms were finished the bottom on the gob side was nearly up to the roof, in spite of the fact that we narrowed the rooms to a width of 18 ft.

In that case when the work of drawing back the pillars was commenced I started two new room necks. We drove these 12 ft. wide for a distance of 50 ft. before beginning to widen out the rooms. However, even then we had to come back to the heading and take up bottom to keep the road open. This shows the conditions that exist in the Miller seam.

To my mind, the only way to work this seam successfully is to drive the rooms 5 or 6 yd. in width and on centers up to 100 ft., so as to provide ample pillars for the support of the roof in the first working. The larger the pillars the better results will be obtained and there will be less danger of squeeze such as I have mentioned was our experience. I would suggest driving the rooms in groups of five. When these rooms have reached the limit, cut through the pillar from the last room to the adjoining one outby. Make this cut, say, the full width of the room and then use judgment in continuing to draw back the pillar.

Advantage in Leaving Wide Pillars

The work of drawing back the other pillars in these five rooms should proceed in regular order, taking care to keep each successive pillar at least one cut behind the preceding one. In this manner all the pillars in the five rooms should be drawn back to the entry stumps, keeping the line of pillarwork as straight as possible. Attention to this point has often been drawn in *Coal Age*.

The advantage of driving rooms with wide pillars between them is quickly seen in the work of robbing. When a few cuts have been made in the pillars in the manner just described a break will have started and there is plenty of room for a good cave, which will greatly relieve the pressure on the pillars and avoid the possibility of squeeze blocking the roads. Where the conditions require pillars, say 100 ft. wide, it will be better to haul the coal both ways on the face of the pillar. In that case, it will be found of great advantage to maintain the tracks in each room until the adjoining pillar is finished.

Narrow Pillars Sure to Develop Squeeze

It must be remembered that one disadvantage of leaving narrow pillars is that a sufficient area is not provided to afford a good cave. As a consequence the pillar coal is much crushed and it is difficult to keep the roads open by reason of squeeze. In working back wide pillars it will generally be found to pay to lay a curved track at the end of the pillar. This curve can be moved forward as the work advances and another cut is made through the pillar.

Allow me to say one cannot trifle with the work of drawing pillars in the Miller seam. I have seen a small stump left behind when taking out heading stumps and it cost the company hundreds of dollars. My advice is never leave a stump in, no matter how small it may be. It will give trouble later. If it cannot be removed with the pick shoot it out.

Under the best conditions in the Miller seam there is constant need of taking up bottom. The reason is, I believe, that the seam is overlaid with a comparatively thin slate roof, say 10 ft. thick, above which is a thick bed of sandstone that is hard to break. To make matters worse the floor of the seam is a fireclay nature that appears to slack like lime.

THOMAS HOGARTH.

Indiana, Pa.

Coal Brokerage

Sweeping statement made regarding the work of coal brokers. All brokers not "parasites." Majority fill economic positions in the coal trade.

MY ATTENTION was recently drawn to the statement of a correspondent that appeared in *Coal Age*, Feb. 22, p. 339, and is certainly misrepresentative of a large class of business connected with the selling and distribution of coal today.

Under the heading "Handling of Shipments of Coal Through Brokers," which he styles as "Harmful to the Industry," the correspondent makes the very sweeping statement that coal brokers are "parasites." To say that this statement is unfair to brokers as a whole will not be denied by those familiar with the coal business in respect to marketing the product.

While there is no doubt that some brokers are parasites to the coal industry, the large majority of this class are fulfilling a truly economic condition and one that is fully justified.

It is well known that the legitimate coal broker by his acquaintance with the avenues of trade is relieving the producer of the necessity of establishing and maintaining in many cases, sales organizations to bring him into touch with the ultimate consumer, if the mines he operates are to be kept running continuously.

In many cases the coal broker is in a position to help the operator in financing his payroll, which is not the least portion of his service. As I have just stated, however, the service rendered by the broker in finding a market for the coal mined surely justifies his existence. Had this correspondent followed out his logic to its rightful conclusion he might have said that the operators should retail their own coal in order to obviate the parasitic profits accruing to the retail distributor.

Dayton, Ohio. M. R. ATKINSON.

Lengthening of Lamp Flame in Gas

Theory of lengthening of lamp flame due to decrease of pressure absurd—Flame lengthened in effort to reach air for its consumption.

WITH much surprise and interest I read the inquiry of a correspondent who set forth a new theory in regard to the lengthening of the lamp flame in a safety lamp exposed to gas, and asked to have the views of others in regard to its correctness. This inquiry, together with the reply of the editor, appeared in *Coal Age*, Jan. 25, p. 186, and was entitled "Action of Safety Lamp Flame in Firedamp Mixture."

If I understand rightly, the theory proposed by this correspondent was that the lengthening of a lamp flame exposed to a body of firedamp was the natural result of a decreased pressure within the lamp, owing to the presence of the gas (methane).

The argument was advanced that both the heating of the air in the lamp chimney and the presence of the lighter gas had the effect of increasing the upward pressure and decreasing the downward pressure within the lamp. It was claimed that the result was to increase the velocity of the air flowing into the lamp, which forced the flame upward and lengthened it.

In the course of his remarks, he attempts to illustrate his idea by the effect that is produced when a piece of cardboard is held above the chimney of an ordinary house lamp, causing the lamp to smoke and the flame to reach upward in the chimney.

To my mind, the two lamps being entirely different cannot be compared. Bringing the cardboard over the top of the lamp chimney, of course, obstructs the flow of air and smothers the flame, causing it to smoke for lack of sufficient air for its combustion. The oxygen within the chimney being all consumed, the flame dies out.

The explanation given in the reply to this inquiry meets with my idea precisely. When gas is present within the lamp chimney, it is burned and a portion of the oxygen of the air is consumed. The natural result is to cause the flame to mount upward in its effort to reach the air required for the consumption of the carbonaceous matter of the flame.

Wilder, Tenn. OSCAR H. JONES.

What Caused the Wakesiah Mine Explosion

Violation of Mine Regulation Act—Facts show ignition started where the pumpman was working—Fireboss' lamp found in perfect condition.

I READ with interest the account given by Mine Manager W. H. Moore, *Coal Age*, Jan. 25, p. 184, regarding the Wakesiah mine explosion that occurred with fatal results at Naniamo, B. C., Nov. 24, 1922. Pardon me if I suggest that, in his account, he shows that he violated the terms of the Mine Regulation Act of British Columbia.

In the first place, he started to disturb a large body of firedamp accumulated at the face of a pitch and did not notify and withdraw from the place a pumpman who was then working on the return of that current. As a result, the pumpman was killed by the force of the explosion that occurred shortly after the body of gas was disturbed. The account states that the fireboss died of asphyxiation by reason of the afterdamp.

WHERE DID THE EXPLOSION START?

Mine Manager Moore does not state specifically at what point he considers the ignition of the firedamp took place. However, the facts given in his narrative point most strongly to the conclusion that the gas was ignited at or near the pumpman working on the return of the current. This man was killed instantly by the force of the explosion.

From his account Mr. Moore appears to think that the explosion occurred by reason of the failure of the fireboss' lamp. Notwithstanding the lamp is said to have been found in perfect condition following the explosion and to have been tested later when it withstood the test four times in succession and did not fail. The assumed failure of the lamp in the mine is, to say the least, mysterious.

In my opinion it is hard to believe that a double-gauze Wolf safety lamp would fail in this manner if properly assembled and rightly used by the fireboss.

WHAT HAPPENED AND EXACT MOVEMENTS OF FIREBOSS NOT CLEARLY EXPLAINED

It is hard to understand the exact movements of the fireboss from the description given by Mr. Moore. Seemingly the fireboss had extended the hose up the slant and deflected it in a manner to blow out the gas from its lodgment. His lamp was found 21 feet from the end of the hose and his body 84 ft. beyond the lamp. His shotfiring cable, detonators and electric fuses were found at the stopcock where he had turned on the air.

Now, assuming the ignition took place outby near where the pumpman was working, it is natural to suppose that the fireboss after turning on the air had proceeded up the slant, his lamp being found within 21 ft. of the end of the hose. In an endeavor to escape the afterdamp he had abandoned his lamp that was probably extinguished by the blast and rushed down the slant a distance of 84 ft. before being overcome by the gas.

If my supposition is correct the fireboss appears to have run considerable risk himself in advancing up the slant against the pressure of 90 lb. per sq.in. of gas-charged air blown by the nozzle of the hose from its lodgment in the roof. Again, had Mr. Moore's conclusion as to the failure of the lamp being the cause of the ignition of the gas been correct, it is more than likely that the fireboss would have been killed by the force of the explosion and the pumpman asphyxiated by the afterdamp.

In closing allow me to say in reference to the gauze showing signs of having been subjected to intense heat, it is a physical impossibility for a gauze to become red-hot without showing the same effect both outside and inside of the chimney.

In respect to the overheating of the gauze by reason of the lamp having been used for illumination seven hours, let me suggest that a safety lamp is safer when the wick flame is at its full height, provided it does not smoke. To my mind this claim is not evidence in favor of the lamp having failed in view of the condition in which it was found after the explosion.

Nanaimo, B. C. MINING ENGINEER.

Inquiries Of General Interest

Blowing vs. Exhaust Systems in Fan Ventilation

Advantage of Blowing System When Mine Generates No Gas—Exhaust System Must Be Employed in Ventilation of Gaseous Mines

ONLY recently, occurrences have led me to desire to look more carefully into the relative merits of the blowing and exhaust systems of ventillation. I think the subject was treated more or less fully in previous issues of *Coal Age*, but the matter has passed from my recollection and I desire now to obtain some information regarding the relative advantages and disadvantages of these two systems and the conditions under which the one or the other should be employed. As I recall, the choice betwen the two systems, in the ventilation of a mine, is not an arbitrary one, but depends solely on the conditions to be met in the development of the mine. I hope it is not asking too much to have the advantages and disadvantages of the two systems explained again in the columns of *Coal Age*. It will doubtless interest many like ourselves.

W. B. BROWN,
Searles, Ala. Supt. Aetna Mine.

As this correspondent has stated, the choice between the blowing or exhaust system of ventilation in the operation of a mine is not an arbitrary one. Each system has its peculiar adaptation to the conditions that will prevail in the operation of the mine, particularly with reference to the haulage of the coal. In the working of a seam generating gas, it is of the utmost importance that the main haulage road should be made the intake airway. On the other hand, if the mine generates no gas it is equally important that haulage should be performed on the main return airway.

In the former case, hauling the coal on the main intake airway avoids the danger of gas being ignited by the lamps of the drivers or motormen, who cannot conveniently use safety lamps in their work. Of course, there is no better light for a driver or motorman to use than the electric cap lamp and, since its advent in coal mining, there is not the same urgency for hauling coal on the intake as before. However, the danger is not wholly eliminated, as the breaking of an incandescent bulb is liable to cause the ignition of the gas.

Again, in the working of a non-gaseous mine, the advantage of hauling coal on the return airway is that the loaded cars move with the current and there is less obstruction to the flow of the air than when the full loaded cars must move against the current. Again, all the dust of the haulage road is carried out of the mine when hauling on the return current. Moreover, the hoisting shaft is then the upcast and the formation of ice in the winter is largely or wholly prevented by the warm air returning from the mine.

It will be understood, that, for practical reasons, the blowing fan can only be used when the main haulage road is made the intake airway. In that case, in order to avoid the use of doors on the shaft bottom, it is necessary to install an exhaust fan at the air shaft, leaving the hoisting shaft and the main haulage road unobstructed.

In the exhaust system, the mine is ventilated under a pressure less than that of the atmosphere. As compared with the blowing system of ventilation, the exhaust system makes possible the igniting of the gases issuing from abandoned workings. Because of the reduced mine pressure these gases are forced out into the live workings by reason of the greater atmospheric pressure acting through openings and crevices reaching to the surface.

Offsetting this condition, however, it is claimed that, in the blowing system, any cessation of the fan is followed immediately by the expansion of the pent up gases in abandoned workings, the outflow of these gases into the live workings being at the most critical time.

As far as the ventilator is concerned, when exhausting the air from the mine, the fan is filled with the warm air of the mine having a less density than the cold outside air that fills the fan when operated as a blower. The lighter air filling the exhaust fan has a tendency to decrease the efficiency of the ventilator. In the use of the exhaust system to ventilate a gassy mine, the density of the mine air is still further reduced by the presence of a greater or less percentage of methane.

The points mentioned above are the principal advantages and disadvantages of the exhaust and blowing systems of ventilation. Those of chief importance, however, are the ones relating to making the main haulage road the intake for the mine when the latter is generating gas. Such an arrangement demands the use of the exhaust fan to avoid the obstruction of the main haulage road by doors that would be required in the use of the blowing system under those conditions.

Examination Questions Answered

Miscellaneous Mine Examination Questions

(Answered by Request)

QUESTION—*Explain the principle of the ventilating fan. What conditions in the mine would govern you in determining the diameter and width of the fan?*

ANSWER—The principle of the centrifugal fan, which is the common type of ventilating fan in mining practice depends on the centrifugal force developed by the revolution of the weight of air contained within the fan blades. This centrifugal force is exerted radially from the center toward the circumference of the fan. As a result air is drawn in at the center of the fan and thrown out all around the circumference where it is conducted by a spiral casing to the fan drift or to the chimney as the case may be.

Briefly, the diameter of the fan is a function of the pressure the fan will produce, the latter being determined directly from the peripheral velocity of the blade tips. These two factors, in fan design, must therefore be proportioned to the unit of ventilating pressure or water gage desired. Always, the pressure developed by a fan will depend on the resisting power of the mine airways, which is determined by the quantity of air in circulation and the rubbing surface of the airways.

Again, the width of the fan is practically a function of the quantity of air to be circulated or the quantity of air the fan will handle under the same conditions in the mine.

QUESTION—*A volume of air of* 140,000 *cu.ft. per min. is delivered at the foot of the downcast shaft and there divided into three splits as follows: Split A,* 6 x 7 *ft.,* 5,000 *ft. long; split B,* 6 x 6 *ft.,* 4,500 *ft. long; split C,* 6 x 5 *ft.,* 4,000 *ft. long. What quantity will pass through each airway?*

ANSWER—The first step in the solution is to find the areas, perimeters and lengths of each of the several splits, which are as follows:

A, 6x7 ft., 5,000 ft. $a = 6x7 = 42$ sq.ft. $o = 2(6+7) = 26$ ft. $l = 5{,}000$ ft.
B, 6x6 ft., 4,500 ft. $a = 6x6 = 36$ sq.ft.; $o = 2(6+6) = 24$ ft. $l = 4{,}500$ ft.
C, 6x5 ft., 4,000 ft. $a = 6x5 = 30$ sq.ft.; $o = 2(6+5) = 22$ ft. $l = 4{,}000$ ft.

The relative values of the areas, perimeters and lengths of these airways are as follows:

Split A..... $a = 7$; $o = 13$; $l = 10$
Split B..... $a = 6$; $o = 12$; $l = 9$
Split C..... $a = 5$; $o = 11$; $l = 8$

Substituting these relative values in the formula for the relative potential factor gives for the relative split potentials:

Split A..... $a\sqrt{\frac{a}{lo}} = 7\sqrt{\frac{7}{10 \times 13}} = 1.624$

Split B..... $= 6\sqrt{\frac{6}{9 \times 12}} = 1.414$

Split C..... $= 5\sqrt{\frac{5}{8 \times 11}} = 1.192$

4.230

Since the quantity passing in each split is proportional to the split potential, we have

Split A..... 4.230 : 1.624 :: 140,000 : x = 53,750 cu.ft.
Split B..... 4.230 : 1.414 :: 140,000 : x = 46,800 cu.ft.
Split C..... 4.230 : 1.192 :: 140,000 : x = 39,450 cu.ft.

Total ..... 140,000 cu.ft.

QUESTION—*If* 65,000 *cu.ft. of air per minute passes through an airway* 7 x 7 *ft. in section, with a water gage of* 1.5 *in., what quantity of air will pass through another airway* 8 x 8 *ft. in section, the pressure remaining the same?*

ANSWER—These airways being square in section and having the same length and unit pressure, the square of the quantity of air in circulation will vary as the fifth power of a single side. In other words, the square of the quantity ratio is equal to the fifth power of the ratio of the sides of the two airways. Thus, calling the required quantity of air passing in the second airway x we have

$$x = 65{,}000\sqrt{\left(\frac{8}{7}\right)^5} = 90{,}760 \text{ cu.ft. per min.}$$

QUESTION—*If in an airway* 72 *sq.ft. in sectional area the velocity is* 550 *ft. per min. what will the velocity be if the area is decreased to* 60 *sq.ft.? What is the horsepower in each case, assuming a water gage of* 1.9 *in.?*

ANSWER—The question does not state how the reduction in sectional area has taken place. It is natural to assume that this occurred by reason of a square that reduced the height of the airway while the width remained unchanged. Then, assuming an original section 8 x 9 ft. is reduced to 8 x 7½ ft., the perimeter ratio due to the squeeze is 34:31; while the area ratio is 72:60. Assuming a constant water gage or pressure and a constant length of airway, the square of the velocity of the air varies directly as the sectional area and inversely as the perimeter. In other words, the square of the velocity ratio is equal to the product of the area ratio and the perimeter ratio and we have for the required velocity after the squeeze

$$v_2 = 550\sqrt{\frac{60}{72} \times \frac{34}{31}} = 525.8 \text{ ft. per min.}$$

QUESTION—*What is the equivalent orifice of a mine that passes* 80,000 *cu.ft. of air per minute, under a water gage of* 1 *in.?*

ANSWER—The equivalent orifice of a mine is based on the ratio of the quantity of air in circulation to the square root of the water gage, as expressed by the formula,

$$\text{Equiv. Orifice} = \frac{0.0004\,Q}{\sqrt{w.g.}}$$

Substituting the given values in this formula gives for the equivalent of this mine $(0.0004 \times 80{,}000) \div \sqrt{1} = 32$ sq.ft.

QUESTION—*When a rope carrying a load is run over a sheave wheel to what two stresses is it subject?*

ANSWER—When a rope passes over a sheave it is subject not only to the actual load it carries, but that portion bent around the sheave is under an additional stress due to bending. The strength of the rope must, therefore, be estimated with regard to both the actual load and the bending stress, the sum of the two being the working load.

QUESTION—*To what cause or causes are sudden outbursts of gas generally due?*

ANSWER—Outbursts of gas in mines frequently occur as the direct results of the extraction of the coal. As this proceeds, the pressure of the gas overcomes the strength of the coal or the strata in which it is contained, whereupon it is liberated in large volume.

World's 1922 Coal Output Less Than Any Year Except 1921 Since 1915

World's total production of all coal in the calendar year 1922, according to information now available, the Geological Survey reports, was 1,200,000,000 metric tons. This was a little larger than the output in 1921, but it was less than in any preceding year since 1915 and less than in the pre-war years 1912 and 1913. The United States' share was 417,000,000 metric tons, or 34.8 per cent of the total, as against 40.5 per cent and 40.5 per cent, respectively, in 1921 and 1920.

The following table presents the information received up to March 8, 1923. The tonnages for countries not yet heard from ordinarily amount to about 6 to 10 per cent. Receipt of data for these countries may raise or lower the final figure by some millions of tons. The table presents figures for 1920 and 1921, embodying precise data and revised estimates for countries from which only preliminary estimates had heretofore been available. Lignite and brown coal are included; where possible they are given separately.

COAL PRODUCED IN THE PRINCIPAL COUNTRIES OF THE WORLD IN THE CALENDAR YEARS 1920, 1921 AND 1922*

(In metric tons of 2,204,622 lb.)

Country	1920	1921	1922
North America			
Canada { Coal	11,812,871	10,636,471	10,093,055
Canada { Lignite	3,275,304	2,918,991	2,797,413
United States { Anthracite	81,282,000	82,076,000	47,000,000
United States { Lignite and bituminous	515,883,000	377,316,000	370,000,000
Other countries	502,308	502,200	(a)
South America	1,794,637	2,040,598	(a)
Europe			
Belgium	22,388,770	21,750,410	21,234,170
Czechoslovakia { Coal	11,143,221	11,648,399	b10,000,000
Czechoslovakia { Lignite	19,943,258	21,050,712	b19,000,000
France { Coal	24,293,000	28,243,000	b32,000,000
France { Lignite	967,800	735,600	
Germany { Coal (c)	140,766,397	145,610,000	d140,965,000
Germany { Lignite	111,887,694	123,011,000	137,207,000
Poland	6,660,145	7,842,553	e23,800,000
United Kingdom: Great Britain	233,106,377	165,781,404	255,892,000
Ireland	109,845	89,958	(a)
Other countries	33,521,009	36,183,546	(a)
Asia			
British India	18,250,508	19,511,154	19,000,000
China	19,484,896	(a)	(a)
Japan (including Taiwan and Karafuto)	30,838,066	26,000,000	25,000,000
Other countries	3,482,838	4,309,156	(a)
Africa			
Union of South Africa	10,408,497	10,339,044	b10,000,000
Other countries	748,933	755,935	(a)
Oceanica			
Australia	13,176,426	13,084,210	(a)
Other countries	3,127,902	3,210,796	(a)
	1,318,900,000	1,133,600,000	1,200,000,000

* Prepared by W. I. Whiteside, U. S. Geological Survey.
(a) Estimate included in total. (b) Estimated on 11 months' production. (c) Includes the Saar basin. (d) Includes entire output of Upper Silesia from January-May, inclusive. For months June-December only the output of the portion of Upper Silesia awarded to Germany is included. (e) Includes output of the portion of Upper Silesia awarded to Poland for months June-December, inclusive.

Record Output of Briquets Made in 1922

A new record of production of fuel briquets was established in 1922, when, according to reports to the U. S. Geological Survey, the total output was 619,425 net tons, against 398,949 tons in 1921. In comparison with 1920, the year in which the previous maximum was attained, the increase was slightly over 9 per cent. Production in all districts in 1922 was larger than in the year before, the principal increase occurring in the Central States. The chief factor in the improvement in that territory was the increased demand for briquets to make up the deficit in domestic anthracite in the region supplied from the Upper Lake Docks.

FUEL BRIQUETS PRODUCED IN THE UNITED STATES IN 1917-1922

Year	Net Tons	Value	Year	Net Tons	Value
1917	406,856	$2,233,888	1920	567,192	$4,623,831
1918	477,235	3,212,793	1921	398,949	3,632,301
1919	295,734	2,301,054	1922	619,425	5,444,926

With the exception of the General Briquetting Co., at New York City, which plant was dismantled late in 1921, all plants that were active in 1921 were operated in 1922. Each plant used the same raw fuel constituent and the same type of binder as in the year preceding.

RAW FUELS USED IN MAKING BRIQUETS IN THE UNITED STATES, 1919-1922

(In Net Tons)

Fuel	1919	1920	1921	1922
Anthracite culm and fine sizes and semi-anthracite	118,595	356,877	190,964	254,563
Semi-bituminous and bituminous slack and coke	a97,387	a125,506	121,925	235,542
Lignite, sub-bituminous coal, and oil-gas residue	80,383	89,656	b85,352	b123,339
	295,365	572,039	393,241	613,444

a Includes no coke. b Includes no brown lignite.

Of the 14 plants that operated, 6 used anthracite culm or fines, 2 semi-anthracite, 1 a mixture of anthracite fines and bituminous slack, 1 semi-bituminous slack, 1 a mixture of bituminous slack and sub-bituminous coal, 2 carbon residue from the manufacture of oil gas, and 1 bituminous coal, first subjected to low-temperature carbonization. The total quantity of raw fuel used was 609,186 net tons, of which 42 per cent was anthracite or semi-anthracite, 39 per cent semi-bituminous slack, bituminous slack and coke, and 19 per cent sub-bituminous coal and oil gas residue.

Utilities Coal Consumption in January 24 per Cent Higher Than Year Ago

Electric public-utility plants consumed 3,552,053 net tons of coal during January according to a recent report of the Geological Survey. This compares with 3,596,623 tons consumed during December, according to corrected returns.

The average daily production of electricity by public-utility power plants in January was at the unprecedented rate of 151,900,000 kw.-hr., an increase of nearly 24 per cent over January, 1922, and an increase of nearly 2 per cent over the previous record rate established in December.

New England Coal Receipts in 1922 Less Than in 1921 and 1919

The full effect of the miners' strike during the past summer on receipts of coal in New England during 1922 is shown in preliminary reports of the Massachusetts Commission on the Necessaries of Life, according to the Geological Survey. New England received less coal in 1922 than in 1921 and 1919, which were, respectively, years of industrial depression and a great coal strike. The 1922 receipts were much smaller than in any other recent years. The total quantity of anthracite received in 1922 was 6,462,000 net tons, and bituminous coal, 18,815,000 tons, which amounts were but 56 and 85 per cent, respectively, of the average receipts during the six years preceding.

Coal received during the year included about two million tons of foreign bituminous coal, nearly all of which entered New England ports after the middle of the year.

NEW ENGLAND COAL RECEIPTS*a*

(Net Tons)

Period	Anthracite Tide	Anthracite Rail	Anthracite Total	Bituminous Tide	Bituminous Rail	Bituminous Total	Aggregate
January to July, 1922	982,000	2,277,000	3,259,000	6,672,000	2,863,000	9,535,000	12,794,000
August	43,000	51,000	94,000	1,079,000	174,000	1,253,000	1,347,000
September	(b)	(b)	215,000	(b)	(b)	2,300,000	2,515,000
October	303,000	605,000	908,000	1,420,000	792,000	2,212,000	3,120,000
November	355,000	658,000	1,013,000	1,107,000	694,000	1,801,000	2,814,000
December	(b)	(b)	c973,000	(b)	(b)	1,714,000	2,687,000
Total 1922	(b)	(b)	c6,462,000	(b)	(b)	18,815,000	c25,277,000
Total 1921	3,695,000	7,679,000	11,374,000	8,814,000	8,374,000	17,188,000	28,562,000
Total 1920	3,521,000	7,734,000	11,255,000	10,211,000	12,223,000	22,434,000	33,689,000

(a) Figures furnished by courtesy of Massachusetts Commission on the Necessaries of Life. (b) Not available. (c) Subject to revision.

"Fireproof Anthracite" Causes Storm of Protest in East; Six Shippers Found; I. C. C. Does Nothing

Recent shipments of doubtful black material from anthracite waste piles in Pennsylvania by several unknown concerns caused a storm of protest to rage through parts of the East last week. It gave sensational newspapers an opportunity to deal a black eye to legitimate anthracite reclamation while hitting at the "wildcatters" and drew a statement from the General Policies Committee of the Anthracite Producers. Federal Fuel Distributor F. R. Wadleigh, after an investigation by George T. Haldeman, said six companies had been located. On Feb. 12 and Feb. 26 Mr. Wadleigh asked the Interstate Commerce Commission to refuse cars to such shippers, but the commission, in a letter March 12 from Commissioner Potter said the matter was one for the Pennsylvania courts and not for it to settle.

Commissioner Potter wrote Mr. Wadleigh as follows under date of March 12:

> Your letter of the 26th ultimo was submitted to the commission for consideration at our regular conference held on the 5th instant, upon which date the commission directed that the subject have the consideration of our Bureau of Inquiry preliminary to further action by the commission. Consideration by the Bureau of Inquiry having been had, the subject was again considered by the commission at the conference today. The decision of the commission was that we should not embark upon the investigation and hearing suggested by you in your letter of the 26th ultimo. It is the thought that the subject is primarily one that should not be dealt with by the regulation or denying of interstate transportation, but rather through the enforcement of criminal or civil laws of the state having jurisdiction to punish criminal offenses or redress contract violations, etc.
>
> This is the unanimous view of the members of Division 5, concurred in and approved by the commission.

On March 13 Mr. Wadleigh sent the following letter to Commissioner Potter:

> I have received your letter of March 12 in response to my letters of Feb. 12 and 26 in regard to shipments of unmerchantable coal . . . and regret that the commission finds itself unable to take any action that will assist in preventing the shipment of unmerchantable coal in interstate traffic. The case submitted to you is characteristic of a number of others which have been reported to this office and it was my hope that the power and authority of the Interstate Commerce Commission would be found available in such cases for the protection of the public from transactions of the character charged. . . .
>
> I return for your files my letter to you under date of Feb. 12 which was returned with your letter of Feb. 24 through an apparent inadvertence.

That both the Federal Government and the State of Pennsylvania possess ample police powers to punish anyone convicted of shipping or selling coal mixed with waste or other non-combustible material is the belief of Senator Pepper stated March 14 in a letter he addressed to Governor Pinchot of Pennsylvania, in which he incorporated a telegram he sent to the *New York American*, in response to one he received from it inviting him to join other Senators in visiting the Pennsylvania anthracite regions to determine how much alleged adulterated anthracite is being sold consumers.

Senator Pepper expressed the opinion that the "real problem is one of prevention and punishment. Since adequate inspection under existing law is impracticable, the most effective prevention would be an order of the Interstate Commerce Commission refusing railroad facilities to adulterated fuel in case the commission regards such order as justifiable."

A copy of Senator Pepper's letter to Governor Pinchot also was transmitted to James S. Benn of the Pennsylvania Public Service Commission.

Mr. Pepper also pointed out that the local District Attorney possessed ample jurisdiction to prosecute any company or individual handling such coal.

Mayor Hylan, of New York City, informed the members of the Board of Estimate at its meeting on March 16 that he had received a telegram from the *New York American* requesting him to invite them to accompany a committee of prominent persons on a tour of the coal fields for the purpose of obtaining first-hand information as to the preparation of coal in culm banks for the market. The matter was referred to the committee of the whole for action at its meeting scheduled to be held on March 21.

The telegram follows: "Will you and members of the Board of Estimate plus a similar committee of important persons, including a few state legislators, go as guests of the *New York American* to the coal fields to see what is being done by mine operators in the way of sending culm bank coal to New York? Please observe big exposé story in Monday's *American*. Personnel of committee will be entirely in your hands."

In his investigation of "dirt shippers" for the Fuel Distributor, Mr. Haldeman said six companies are "very active in the disposal of unmerchantable anthracite coal." Mr. Haldeman found every indication that these companies are deliberately putting on the market material from culm banks which contains a high percentage of non-combustible material. A former prize fighter, a former saloonkeeper, an ex-convict and others of questionable repute were found to be engaged in the production and sale of low-grade coal. In one instance the report finds that "no attempt is made to separate coal and impurities. The material contained in the run-of-bank is crushed, sized, run into bins and placed on the market."

In another case operations were in progress on a dump consisting "of masses of ashes, rock and slate interspersed with coal irregularly distributed." It is said that this particular bank had been worked over by the Hudson Coal Co. previous to this operation.

"The use of Wilmot jigs on the nut and pea size," reports Mr. Haldeman, "indicates that the company is fully aware of the quality of material prepared for the market." In another case the breaker was being operated by the "dry method." No water for washing the coal is available at the point where the little plant was erected. Much of this coal is marketed "as is" and in some cases sales contain the stipulation "nothing guaranteed." At one of the properties Mr. Haldeman found the breaker in a tumble-down and dangerous condition, with no evidence of jigs or other means of washing coal.

Vivid Copy for Sensational Journals

Such operations as those of the six companies investigated by Mr. Haldeman have furnished vivid copy for sensational newspapers. The fact that these publications failed to distinguish between legitimate reclamation and "wildcatting" drew a reply from the anthracite operators.

Legitimate reclamation of anthracite, which was once cast aside for want of a market, has been producing good coal from great waste piles for more than thirty years. It began to develop in 1890 following the invention by Eckley B. Coxe of a grate and stoker that would handle small sizes.

Coxe had vision. He sensed the problems that would face the future of the industry in which his interests were involved. It was largely through his efforts that the Pennsylvania Legislature enacted the law providing for the Anthracite Coal Waste Commission to study the causes of waste and recommend preventive measures. It began its work in 1890 and completed its report in 1893. One of the benefits derived from this investigation was the invention of the Coxe grate and stoker. Another was the development of markets for chestnut and pea sizes. When these had been accomplished the recovery of the formerly wasted fuel thrown on the so-called culm banks was made possible.

The first recovery of anthracite from the culm banks was coincident with the appointment of the Commission, the first shipments from washeries being reported in 1890, when 41,600 tons of washery coal were sent to market. By 1895 the shipments of washery coal had reached a little more than 1,000,000 tons and five years later exceeded 2,000,000 tons. In 1907 they amounted to a little more than 4,300,000 tons, or 6.4 per cent of the total anthracite shipments, after which they gradually declined until 1914, when they amounted to 1,736,750 tons. The world war stimulated demand for all kinds of coal and the washeries increased their contributions to the needed supply as follows in gross

tons: 1915, 2,492,639; 1916, 3,133,609; 1917, 5,412,709; 1918, 6,630,923.

In the slump that followed the armistice the production of washery coal dropped to 3,165,393 tons, but increased in the boom of 1920 to a little more than 5,000,000 tons and dropped again in the depression of 1921 to the lowest point since 1900—or to 1,537,147 tons.

The story of the recovery of this coal is one of the most striking examples of the conservation of natural resources and of the elimination of waste in a great industry that the history of our country records. During the period from 1890 to 1921 more than 75,000,000 tons have been recovered and it has been estimated that about 30,000,000 tons are still to be saved and used. Washery output of anthracite always is separately reported by the Geological Survey.

It is well known that anthracite does not deteriorate in storage and that the quality of the coal in the culm banks and in the river and creek bottoms is of as good fuel quality as when it was put there. It is also well known that as much care is taken to separate this coal from the impurities deposited with it as is done with the fresh-mined product. The washeries were constructed for that purpose. One of the earliest of the dredges devised for recovering "river" coal was built and operated by the Harrisburg Light & Power Co. for use in its power plant—a singular performance for a corporation if the quality of the fuel were such as to make it unfit for use.

It is also well known to the trade, though it may not be so well known to the anthracite-consuming public, that by far the larger proportion of the coal reclaimed by washeries and dredges is of sizes below chestnut. In 1917, the first of the war years' large production of washery and dredge coal, the quantity of egg, stove and chestnut included in the washery output was 555,000 tons (457,000 tons of this being chestnut) out of a total of 5,365,517 tons. The total production of domestic sizes in the fresh-mined product of that year was 46,447,104 tons, so that the percentage of mixture of washery coal in the total was a fraction over 1.

In 1918 the total production of fresh-mined domestic anthracite was 45,124,390 tons, while the domestic sizes in the washery production were 670,000 tons, or about 1½ per cent of the fresh-mined domestic tonnage. In 1921, a more normal year, the fresh-mined domestic anthracite was 45,650,613 tons, while the washery product of chestnut and larger was 255,184 tons, or a little over 0.5 per cent.

Washery owners have been charged with selling this product to the consumers at $15 a ton. The best answer to this is that according to the U. S. Geological Survey the average realization to the operators for the washery tonnage (including the 255,000 tons of domestic sizes) was $3.64 per ton, while the average realization on the fresh-mined coal was $6.266 per ton.

If it had not been for the reclamation of this previously wasted coal, which it is admitted is recovered at a much less expense than the fresh-mined coal, it is probable the public would have paid more per ton for its domestic sizes than it has paid, and when the culm banks are exhausted—as they will be in about a decade—the effect will be shown in increased prices.

Southwestern Field Is Closing Down Fast

Mines throughout the southwest are being closed down for lack of business. The Cherokee Coal Co. has closed one of its Kansas mines and proposes before long to close others. While the Central Coal & Coke Co. has not yet shut down any of its Kansas mines, it expects to before long, and has already closed six of its Arkansas shafts, decreasing its production in that field approximately 3,500 tons a day. The Sheridan Coal Co. has closed three of its mines in Kansas. The Home Riverside Coal Co., while continuing to operate its machine mine, has closed its 300-ton pick mine at Leavenworth, Kan. Many small concerns in Kansas, Arkansas, Missouri and Oklahoma have shut up shop, and larger operators are faced with the necessity of decreasing production this month in fields where mines now are operating only from one-fourth to one-third time.

It has been the mildest winter in the memory of coal men, with not even sufficient demand for domestic coal to provide screenings for the steam buyers.

New Coal Commission Questionnaire Seeks Data on Wage Rates and Changes

The U. S. Coal Commission is sending out a new questionnaire designated Form W-1, the main purpose of which as stated in the letter accompanying it, is "to obtain the information on wage rates and changes in wage rates indicated in the schedule."

In fields 100 per cent union only two or three companies are to be requested to furnish this information; but in non-union fields and in fields in which both union and non-union operations are carried on the questionnaire is to be sent to all operators whose production in 1920 exceeded 100,000 tons.

The questionnaire consists of three parts. The first part covers the question of changes in wage rates from Jan. 1, 1912, to Jan. 1, 1923. Columns are provided in which the operator is instructed to "give the day, month and year of each change in rates affecting the whole of one occupation or more." Provision is made for recording twelve changes in rates between April 1, 1912, and Jan. 1, 1923.

The second part of the questionnaire calls for rates of pick miners, machine cutters and hand-drill loaders as of Jan. 1, 1923, showing separately the rates for rooms, entries, breakthroughs listed below. The third part of the questionnaire calls for special information of various kinds.

West Kentucky to Renew Contract; Jackson Says National Strikes Are Gone Forever

The West Kentucky Coal Operators Association met in Louisville on March 12 with representatives of District 23, United Mine Workers, and continued discussions relative to renewal of the wage scale which has been in effect for two years but which expires on March 31. This agreement contains a no-strike clause which was maintained during the general strikes last spring. It is understood that the agreement will be renewed without any difficulties.

Day inside workers are paid from $6.59 to $6.95; loading rates are 74 to 76c. a ton; pick mining on mine-run, $1.05 a ton and for outside work, $6.06 a day. The day is eight hours. Lonnie Jackson, president of District 23, headed the miners' delegates. Jackson is Mayor of Central City, Ky. He gave out an interview saying that nation-wide coal strikes probably would be a thing of the past, and held that mine workers now realize the cost of such ventures, not only to themselves but to industry. He labeled as "mere bunk" any talk of strikes in the near future. In his district there are more than 12,000 men, who are contented, and indications are for quiet industry, which Jackson says, is the need of the hour. Mines are working two and one half to three days a week. Harmony has marked all discussions between operators and miners.

National Coal Association to Hold Annual Convention in Atlantic City

The National Coal Association will hold its sixth annual convention in Atlantic City from June 19 to 22, inclusive. The meeting of the Board of Directors and the various committees of the association will be held on June 19, the convention proper beginning on June 20. The convention program has not yet been completed, but as soon as final arrangements are perfected and speakers have been selected announcement will be made. The headquarters of the association during the convention will be the Hotel Traymore.

The special committee which has charge of arranging the program and other details of the convention is as follows: W. H. Cunningham, president, Cunningham, Miller & Enslow, Huntington, W. Va., Chairman; C. E. Bockus, president, Clinchfield Coal Corporation, New York City; J. C. Brydon, president, Quemahoning Creek Coal Co., Baltimore, Md.; Ira Clemens, president, Clemens Coal Co., Pittsburg, Kan.; Michael Gallagher, general manager, M. A. Hanna & Co., Cleveland, Ohio; S. L. Yerkes, vice-president, Girder Coal Sales Agency, Birmingham, Ala.

Coal Commission's Work on Production Cost and Waste In Mining Is Ahead of Schedule

Marked Discrepancies in Wholesalers' Returns in Different Sections—Dr. Smith Resents Criticism of Culm-Bank Workings — Commissioner Marshall Foresees Trouble in Somerset County and Advises Self-Probing by Other Industries

By Paul Wooton
Washington Correspondent of *Coal Age*

Additional funds and new teeth in its organic act have speeded up the work at the offices of the President's Coal Commission. The force has grown from 174 to 216 in two weeks. Field inspectors have been dispatched to each of the mining districts to gather information on causes of strikes. This work, which is under the immediate direction of Dr. Joseph H. Willits, in charge of labor relations for the commission, will be expedited particularly in the anthracite region.

Despite the uncertainty which resulted from the delay in obtaining legislation, the work on production costs and on waste in mining actually is ahead of the rather ambitious schedule which was prepared when the commission mapped out its work.

Returns to the commission on the gross margins of wholesalers show baffling discrepancies between different cities and different parts of the country. In some instances the gross margins in 1922 were no greater than those of 1921. In a number of other cases wholesalers doubled their margins in 1922.

In discussing, on March 17, the progress of the week Commissioner Smith took exception to some of the newspaper attacks on the practice of working over culm banks. This practice should not be discouraged, he said. It is conservation and is in the public interest. The washeries employ 1 per cent of the men engaged in anthracite production, but produce 6 per cent of the total shipments of that type of coal. An overwhelming proportion of the banks that are washed produce a higher grade product than the freshly-mined coal. The objection to this practice, Dr. Smith pointed out, comes from a few unscrupulous operators and dealers, who are shipping an insignificant percentage of the total tonnage. Some of these dealers, he stated, are avoiding trouble with the postal authorities by refraining from the use of the mails and are conducting their negotiations by telegraph.

After having conferred with operators and with representatives of the United Mine Workers in the South, Commissioner Marshall is impressed with the "you are another" situation in the coal industry. "There is not a great deal of dispute as to the real civic rights of the American citizen," he said, "but there is sharp dispute as to whether these rights have been violated and by whom."

Hope to Determine Rights of Citizens

Governor Marshall is taking up the charges and countercharges that have been made with the idea of determining whether the law or the rights of citizens have been violated. "The past is the eternal past, however," he observed, "except in so far as the legal authorities deem it their duty to arrest and punish men who have violated the law. The hope of the commission is to settle definitely, to the satisfaction of all concerned, what are the real rights of an American citizen. The commission will bend its best efforts to the end of getting an acknowledgment of those rights and a public pledge of obedience to the law and of preservation of those rights in the future."

"A conflict is brewing in Somerset County," continued Governor Marshall. "We are having men investigate the matter for us, so that if trouble occurs we can find out who is responsible. If trouble should occur, we hope there will be found, on each side, a tendency to frown down any violation of law and a disposition to assist in bringing to punishment any individual who attempts to break the law.

"There is a tendency for each side to clothe itself in white garments and to say in the language of Shakespeare 'thou canst not say I did it.' An opportunity may be presented in Somerset County for the parties to the controversy to disclose their real Americanism by procuring and defending their rights in lawfully constituted courts rather than with the use of clubs, pistols or dynamite, and by insisting on the punishment of any man who resorts to force in obtaining his rights.

"If we are to justify our democracy, now is a good time to put the soft pedal on hate and allow to roll out the chorus of brotherhood, conciliation and compromise. Other business under public suspicion should take warning from the necessity of the coal investigation to probe themselves and determine whether there has been a square deal in all the departments of the business. These investigations are regrettable. It is unfortunate that they have to be. We should all glory in the progress of America. No right-thinking man is jealous of the success of his neighbor. The world held the ragged Continental in veneration long after it had forgotten the rich and the poor profiteer. It is a good thing to make money. It is a good thing to receive high wages, but the finest thing is to contribute to the reality of democracy.

"There is something wrong in the coal industry. Spring housecleaning is in order, but it is not for me at this stage to express an opinion as to whose is the responsibility."

In commenting on his Southern trip, Governor Marshall stated that he was much impressed with the model villages and fine hospitals of the Tennessee Coal, Iron & Railroad Co., but they caused him to wonder "how far in the long run is the common good of a people advanced by benefactions handed down from above."

Field Investigators Now at Work

Field investigators engaged to examine into the question of causes of strikes have recently gone into the field for the coal commission. The following are those recently engaged by Professor Willits, who has charge of this phase of the work:

Prof. Willard E. Hotchkiss, formerly secretary of the Shipbuilding Labor Adjustment Board and dean of the School of Commerce of Northwestern University, and Secretary of the President's Industrial Congress.

John S. Keir, the head of the Department of Industrial Economics at Carnegie Institute of Pittsburgh.

O. Le Preble, who specialized on personnel relations in several industries and as examiner for the Shipbuilding Labor Adjustment Board handled industrial relations in the shipyards of New England for the Navy Department.

Royal S. Melendy, whose work in labor management included connection with the Stevenson Corporation in New York, and the Firestone Tube & Rubber Co., of Akron.

Otto T. Mallery, who was a member of the State Industrial Board of Pennsylvania.

Dr. Boris Emmett, formerly with the Department of Labor and for some years the labor manager for H. Sonneborn & Co. at Baltimore.

S. B. Mathewson, who is now the director of personnel for Antioch College and was formerly with the Scott Company, industrial consultants.

Charles Frazier, until recently an investigator employed by the International Association of Machinists.

Russell G. Wagenet, labor manager of the clothing industry at Rochester.

Henry S. Gilbertson, formerly associated with Dr. Hotchkiss and now with a firm of industrial engineers engaged in organization work for the State of Kentucky.

At Hoover's Request Wadleigh to Study Transportation, Community Storage and Co-operative Marketing

Studies of community storage of coal, of certain phases of coal transportation and of co-operative marketing of coal are to be conducted by Federal Fuel Distributor F. R. Wadleigh. These studies are being made under the powers vested in the Fuel Distributor and at the request of Commerce Secretary Hoover. The work will be co-ordinated with that being done by the President's Coal Commission.

Mr. Wadleigh calls particular attention to the fact that the study of community storage will not enter upon the problems of municipal storage. The work is being done with no preconceived ideas that all phases of the problem of central storage in cities can be brought out. The study will include the matter of motor-truck distribution.

The study of transportation will deal with coal-car distribution other than the allotment of cars to mines. Particular attention will be given to the movement of coal cars, which will include an analysis of delays which may result from inadequate motive power, inadequacy of terminals, or other parts of the railroads' plant. This portion of the study will be under the immediate direction of E. A. Blake, until recently general superintendent of the Eastern division of the Norfolk & Western R.R.

The success which has attended co-operative marketing of farm products and other commodities has led many students of the coal situation, including Secretary Hoover, to believe that collective selling of coal would mark a step forward. The application of the co-operative marketing principle to coal never has been the subject of any profound study and it is believed that an analysis can be made of the possibilities of such a plan, which will give a much clearer idea of where it may lead.

The object of these studies is to develop facts and correlate the best opinion as to their solution, but no recommendations as to legislation are to be made.

Why Were Troops Not Sent to Herrin? Illinois Legislature May Find Out

While the second trial for wholesale murder at Herrin, Ill., last June droned along at Marion, Ill., without interesting developments last week, something relating to the Herrin mine massacre was going on in the State Legislature at Springfield. A Democratic member of the Illinois House declared Carlos Black, state adjutant general, was at fault for not sending state troops to prevent the Herrin riot and got the House to pass a resolution calling for a legislative investigation. The resolution has not been adopted yet by the Senate.

The attack in the House is not so much a move against the adjutant general as it is in an effort to embarrass Governor Len Small, who appointed him. However the verbal assault was centered upon Black for dereliction of duty and for trying to lay the blame upon Colonel Sam Hunter, who represented the adjutant general at Herrin before and during the massacre which followed the surrender of 48 non-union strip miners to a mob which shot and cut 21 of them to death. Colonel Hunter's reports show that three times he advised that troops be sent to Herrin, but the adjutant general did not comply because the local authorities did not join in the appeal.

The Chicago Tribune recently advocated editorially that the christian churches of the United States expend a good deal of their missionary effort in Williamson County instead of among alien peoples. "There is need in Williamson County, if anywhere," says this newspaper, "for an evangel of mercy and for a vigorous teaching of the fundamentals of christianity or even of ordinary uninspired humanity. We think there will be a reproach upon all foreign missionary effort while in our own vineyard the beast goes untamed."

International Mine-Rescue Meet to Be Held In Salt Lake City August 27-29

The Seventh International First-Aid and Mine-Rescue Meet will be held in Salt Lake City Aug. 27, 28 and 29, under the auspices of the U. S. Bureau of Mines, in co-operation with the National Safety Council, the American Red Cross, miners' organizations, operators' associations and other agencies.

Although sixty-three teams of miners from almost every mining community in the United States and a championship first-aid team from British Columbia, Canada, competed in the last international contests, which were held in St. Louis in 1921, and representatives of the governments and mining industries of Great Britain, Mexico, France and Belgium also attended the meeting, it is expected that, with promises of continued operation of coal mines during the summer months, the number of teams entered in this year's contests will exceed all previous entries.

With the advent of the trained rescue miner, wearing the oxygen-breathing apparatus, has come the trained first-aid man who takes the victim of a mine disaster and gives him the emergency aid that oftentimes means the difference between life and death. Today there are more than 100,000 men in this country trained by the Bureau of Mines in modern first-aid or mine-rescue work or both, all of them volunteers, ready to help their own or those in some other place, no matter where.

In the contests to be held in Salt Lake City competition between the various teams will be held under conditions approximately as closely as possible those found at a mine during an accident.

Retailers Tender Aid to Coal Commission In Collation of Data

The Board of Directors of the National Retail Coal Merchants' Association at a meeting held March 19 at the Hotel Pennsylvania, New York City, which was open to all members of the New York State Coal Merchants' Association, adopted a resolution to co-operate fully with the U. S. Coal Commission in obtaining the information desired by the commission in the questionnaire sent to the retail trade. To aid in this work a committee was appointed to assist in the work of preparing the answers required. This committee consists of Roderick Stephens, New York (chairman); Marshall Keig, Chicago; E. R. Sweeney, Kansas City; Maurice Klaus, Boston; Samuel B. Crowell, Philadelphia, and Homer D. Jones, president of the National Retail Coal Merchants' Association, Chicago, ex officio.

There were about 200 persons present at the dinner given in the evening at which brief addresses were made by President Jones and Lawrence F. Ferguson, president of the Chicago Retail Merchants' Association. There was a vaudeville program.

The annual convention of the association will be held in Scranton, June 25, 26 and 27. Headquarters will be established in the Hotel Casey.

THE U. S. SUPREME COURT is to receive the cost-reporting case of the Claire Furnace Co. versus the Federal Trade Commission. As this is a test case to determine the scope of the powers of the Federal Trade Commission in demanding returns on costs, no objection was made to the appeal, which will result in a final decision of this litigation.

THE PUBLIC UTILITIES COMMISSION of the District of Columbia discontinued the regulation of anthracite distribution on March 15.

American Coal Export Trade Shows Effects of French Occupation of Ruhr

Occupation of the Ruhr coal field by the French, with consequent decrease in its coal production, entailing as it does shutting off supplies to Italy, France, Germany and other European countries, according to F. R. Wadleigh in *Commerce Reports*, has had a marked effect on our coal export trade and has already resulted in the placing of orders for a considerable tonnage from this country, together with many inquiries.

British colliery owners and coal merchants seem to be unable to supply the increased demand for coal and coke resulting from the Ruhr situation, as not only has their production of coal reached its probable maximum under existing conditions, but their dock capacity, which is and has been for some time the governing factor in their export trade, is heavily overtaxed. This is due largely to the fact that British dock labor has insisted upon only two 8-hour shifts per day. Strong efforts have been made to put on an additional shift, but so far with but little success, and the whole matter has now been referred to the Industrial Court, which means a probable delay of six months before the matter can be adjusted.

To show the handicap imposed upon the British export trade by their limited ship-loading facilities it was publicly stated by the head of one of the largest South Wales coal shippers that during the last week in February "out of a hundred thousand wagons (cars) employed in the coal field in the transport of coal from pit to port, no less than 70,000 of them, loaded with 700,000 tons of coal, are standing at the collieries, sidings and docks waiting shipment."

British Exports and Production.—British coal exports for January were 5,611,670 gross tons, as compared with 6,070,316 tons in January, 1913; 5,794,770 tons in January, 1914, and 4,020,935 tons in January, 1922.

British production is now ranging from about 5,567,000 to 5,644,000 tons per week, compared with an average of 5,520,000 tons per week in 1913, the year of greatest production; the total production for 1922 was 259,839,000 gross tons, as compared with 286,729,000 tons in 1913.

For the year 1922 British exports were 64,198,384 gross tons, as against 24,660,552 tons in 1921 and 73,400,118 in 1913, the record year.

Ruhr Production.—Production in the Ruhr field in past years and up to Feb. 1, 1923, is given in the following tables, in metric tons:

ANNUAL COAL PRODUCTION IN RUHR FIELD, 1913-1922

1913	114,487,000	1918	96,016,000
1914	98,285,000	1919	71,153,000
1915	86,778,000	1920	84,986,000
1916	94,563,000	1921	91,321,000
1917	99,365,000	1922	93,788,284

MONTHLY PRODUCTION IN THE RUHR COAL FIELD, 1922

January	8,152,763	August	8,336,773
February	7,737,974	September	8,265,688
March	5,014,278	October	8,827,126
April	7,512,646	November	8,536,214
May	8,081,951	December (estimated)	7,900,000
June	7,078,361		
July	7,854,400	Total	93,298,174

For January, 1923, no figure is available, but it is estimated that it was 25 per cent below December; for February the estimated production was 33 per cent of the December output.

In 1922 the total reparation deliveries amounted to some 18,000,000 tons, as against the demands of the Reparation Commission for 22,279,000 tons, while the total output of the German coal field in 1922, outside of lignite, amounted to 130,664,000 tons.

Belgium.—There is a great demand in Belgium for coke and coking coals. The Belgian coke ovens are producing only about 70 per cent of their normal output, owing to the lack of suitable coal. None is being received from the Ruhr and the British coking coals cannot be obtained in sufficient supplies, although in 1922 British exports to Belgium increased to 3,489,419 tons, from 618,066 tons in 1921.

France.—Since Jan. 19 very little coke or coal has been imported from Germany, causing a greatly increased demand for the British product, which, however, cannot be obtained in any increased amount. This has made it necessary for French buyers, including the government, to make inquiry in this country for both coal and coke. France is particularly short of coke and coking coal, reducing metallurgical production, as the supply available is absorbed by contract requirements. A great number of blast furnaces are reported as now being blown out owing to the lack of coke. British coke is now costing about 240 fr. per metric ton, c.i.f. Dunkirk.

British coal exports to France in 1922 were actually in excess of those in 1913 and twice as large as in 1921, the figures being as follows: 1913, 12,775,909 gross tons; 1921, 6,395,651 gross tons; 1922, 13,479,417 gross tons.

Italy.—For the past year Italy's coal requirements have been taken care of by the import of British coal, supplemented by that received from German original sources. Now, however, Italy is looking to this country, especially for gas and coking coal, as shown by inquiries and the actual closing of a fairly large tonnage over the next three months.

Germany.—Germany apparently is in urgent need of large tonnages of industrial coal. For the past year she has been purchasing increased quantities in England, as shown by the following figures of British exports to Germany: 1913, 8,952,328 gross tons; 1921, 817,877 gross tons; 1922, 8,345,606 gross tons.

There also is a considerable tonnage of coal from Great Britain that reaches Germany through Holland and it is significant that British exports to Holland increased from 1,787,678 tons in 1921 to 6,067,789 tons in 1922.

Inquiries have been received here for a large tonnage of coal for Germany, said to amount to at least one million tons; one sale of 200,000 tons, over four months, has been reported as closed.

Sweden.—As a result of the European situation, Sweden also has asked for quotations on coal suitable for locomotive fuel, but no actual sales have been reported.

South America.—Owing to the increased demand in Europe, British exporters have cut down their shipments to South America, exports to Argentina having been decreased from 308,078 tons in December, 1922, to 207,786 tons in January, 1923, with a probable further decrease in February.

Inquiries for U. S. coals have been quite numerous from Brazil and Argentina, although but little actual business has resulted up to this time.

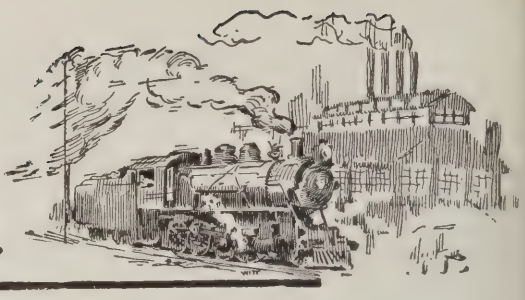
As a result of the European conditions, from Feb. 20 to March 12 some fifty-two steamships have been closed for our transatlantic coal and coke trade at rates varying from $2.40 to Rotterdam to $3.50 to West Italy for coal; indications point to an increase in these rates and it is expected that they will reach higher levels, as sharp advances in coal freights from South Wales to other countries already have been made. Of the fixture mentioned, 14 were for West Italy and 28 for Rotterdam-Antwerp.

The export inquiries now being received are principally for gas, coking coals, locomotive coals and coke; current supplies at Tidewater are not equal to the demand, owing largely to shortage of equipment. It is particularly unfortunate that the latter condition exists, as it has given an excuse for advancing prices f.o.b. Tidewater, a rise of over $1 per ton at Hampton Roads in the last two weeks having taken place.

It is greatly feared that the rising prices will tend to retard overseas exports, but with the coming of warmer weather, additional equipment and better movement, the car supply at our mines should steadily improve, which would mean a heavier movement to Tidewater, with a probable reduction of prices, or at least no further rise.



Production and the Market



Weekly Review

As April 1 approaches there is speculation as to the turn prices will take for the coming coal year. On the whole conditions favor a higher level than obtained at the opening of the coal year two years ago. Industrial activity then was on the wane, the country was in the process of deflation and prices of other commodities and labor were declining. Business men were despondent. Today matters are on the opposite course. Industrial activity is gaining momentum, business is optimistic, commodity prices are going up.

Notwithstanding the improvement in general business, bituminous-coal prices are descending as spring approaches. Throughout the winter the ability of the railroads to move soft coal has set the upper limit of output at around 11,000,000 tons per week and prices have slowly dragged downward as urgency of demand declined. The easing off of buyers began in the West and has moved progressively East. Doubtless it would be even more pronounced on the Atlantic seaboard now were it not for the incipient export demand.

Coal Age Index dropped five points in the week of March 19 to 263, corresponding to an average spot price of $3.19.

Coke for Export in Demand

There is very little talk now of wage reductions in the non-union fields, but for that matter there was little this early in 1921. On the other hand there are companies assuring their non-union men that wages will not be reduced this year. The assurance is opportune, of course, in view of the anticipated drive by the United Mine Workers for the organization of these fields next month.

The possibility of an active export market is hanging over the trade in the East. More than fifty ships have been chartered and a few have been loaded for European ports. The demand occasioned by the cessation of production of coal and coke in the Ruhr is being transferred to this country, although for the most part the inquiries and orders that reach here are founded on apprehension rather than definite and positive want of coal. The recent advances in coal prices for export and in boat rates have disclosed how light the foreign demand really is at this time.

Coke was in good demand for export, it being reported that orders for 25,000 to 30,000 tons had been placed for shipment from either Baltimore or Philadelphia. Connellsville coke was quoted at $12@$12.50 f.o.b. piers with freight charges ranging $5@$6.

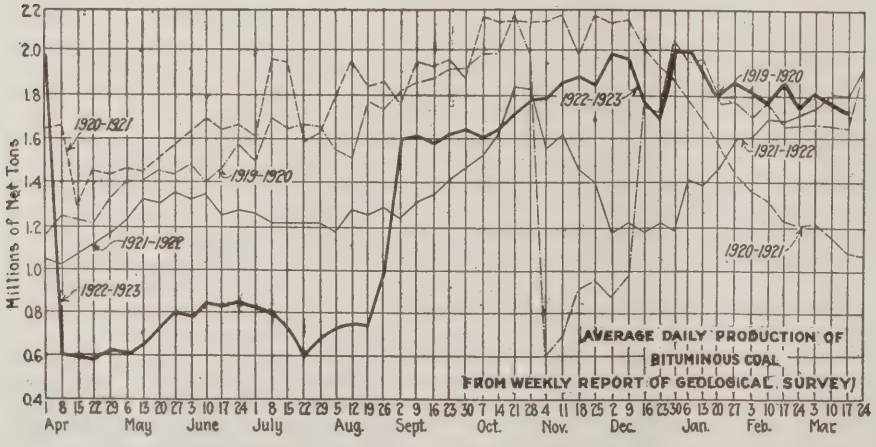
Prices Drop in Midwest

As in all other parts of the country, prices dropped in the Midwest. Demand in the Standard district was good for cheap coal. A good deal of attention was being given to the contract situation. In the Northwest industrial trade was fair and domestic demand quiet. Cheaper coal is expected by dealers when Lake navigation reopens.

Central Pennsylvania coals are free to flow uninterruptedly into New England now that most of the embargoes have been lifted. The tonnage moved, however, is not large, buying among the industrials being extremely light.

"Present estimates of soft-coal production for the week ended March 10," says the Geological Survey, "indicate a total output of 10,609,000 net tons, including coal shipped, mine fuel, local sales and coal coked. This is a decrease of 337,000 tons as compared with the revised estimate of 10,946,000 for the week that ended March 3.

"Preliminary reports of cars loaded in the week March 12-17 indicate a further decline in production. Loadings on Monday [March 12] were 38,654 cars as compared with 41,669 cars on Monday of the week before. On



Estimates of Production

Net Tons)

	1922	1923
BITUMINOUS		
Feb. 24 (*b*)	10,402,000	10,324,000
Mar. 3 (*b*)	10,541,000	10,946,000
Mar. 10 (*a*)	11,102,000	10,609,000
Daily average	1,850,000	1,768,000
Coal year to date	401,994,000	388,425,000
Daily average coal year.	1,391,000	1,343,000
ANTHRACITE		
Feb. 24	1,710,000	1,888,000
Mar. 3	1,913,000	2,104,000
Mar. 10	1,982,000	2,048,000
Coal year to date	83,409,000	49,365,000
COKE		
Mar. 3 (*b*)	143,000	402,000
Mar. 10 (*a*)	154,000	366,000
Calendar year	1,294,000	3,527,000

(*a*) Subject to revision. (*b*) Revised from last report.

Tuesday of the present week [March 13] loadings dropped to 31,550 cars. Wednesday's report showed a slight pick-up, but on Thursday loadings fell to 27,955 cars. The total output thus indicated for the week is between 10,400,000 and 10,500,000 tons."

The anthracite situation was easier. Movement increased and the smaller independent producers found it necessary to reduce their prices in order to move coal. Buckwheat was difficult to move and some producers endeavored to get rid of it in conjunction with the movement of the domestic coals. New England and Canada are reported to be badly in need of coal.

Production of coke in the Connellsville region during the week ended March 10 was reported as 280,530 tons, an increase of 2,200 tons over the preceding week.

Midwest Prices Drop Again

Franklin County (Illinois) domestic sizes took another drop in price early this week, drawing other Midwestern coals down with them. The new circular, which went into the mails Saturday, cut lump, furnace, small egg and stove, which means all sizes above 2 in., from $4.75 down to $3.85, leaving all other sizes where they were. Mine-run remains at $3@$3.50, and screenings $2.50@$2.75. Indiana Fourth Vein Lump, which has been quoted at $4, goes down to $3.50@$3.75, all other competing coals drop in proportion.

Even steam demand lay almost dormant as the struggle to unload domestic sizes went on. Good southern Illinois was quoted steadily at $2.50 but a great deal of even the high-grade stuff moved at $2.25 and lesser grades from the southern tier of Illinois counties sagged as low as $1.90 on the Chicago market and $1.75 at St. Louis.

In the Mt. Olive district the failure to move steam coal has tied up several mines and working time is about two days a week. The "Standpatters" are demanding $4 for Mt. Olive 3-in. lump with Franklin County at $3.75. Very little of this is moving excepting on contracts.

In the Standard district the demand for cheap coal has been good, but there is an overproduction and some mines have had to shut down on account of "no bills" of all sizes, but the sizes moving best seem to be 6-in. lump.

Contracts are getting a good deal of attention just now. Cement and brick plants, whose business is rushing, are signing up and a number of railroads have bids out.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

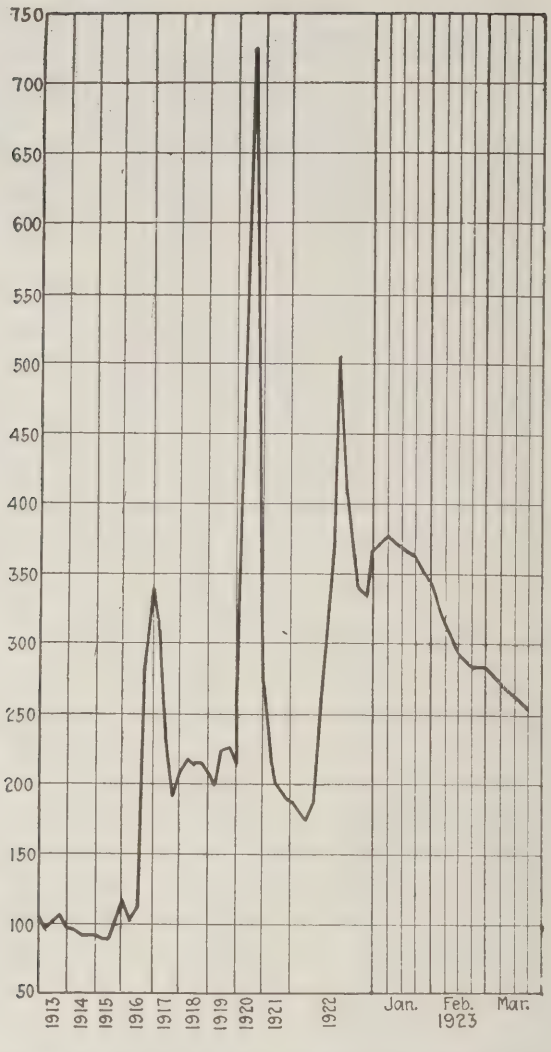
	Market Quoted	Mar. 20 1922	Mar. 5 1923	Mar. 12 1923	Mar. 19 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.05	$7.00	$7.00	$6.50@$7.50
Smokeless mine run	Columbus	1.85	4.50	4.50	4.25@ 4.75
Smokeless screenings	Columbus	1.15	4.45	4.45	*4.00@ 4.50*
Smokeless lump	Chicago	3.15	7.00	7.00	*6.00@ 6.75*
Smokeless mine run	Chicago	1.85	4.50	4.00	3.50@ 4.50
Smokeless lump	Cincinnati	2.85	7.00	6.85	**7.00**
Smokeless mine run	Cincinnati	1.70	4.75	4.85	4.75@ 5.00
Smokeless screenings	Cincinnati	1.15	4.75	4.50	**4.50@ 5.00**
*Smokeless mine run	Boston	4.55	6.15	7.00	**7.00@ 7.25**
Clearfield mine run	Boston	1.95	3.50	3.30	*2.65@ 3.50*
Cambria mine run	Boston	2.45	4.10	4.00	*3.50@ 4.25*
Somerset mine run	Boston	1.90	3.75	3.60	*3.00@ 3.75*
Pool 1 (Navy Standard)	New York	2.85	4.75	4.50	*4.00@ 4.75*
Pool 1 (Navy Standard)	Philadelphia	3.00	4.65	4.60	*4.35@ 4.75*
Pool 1 (Navy Standard)	Baltimore	2.65	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.30	3.85	3.80	*3.25@ 4.00*
Pool 9 (Super. Low Vol.)	Philadelphia	2.35	3.80	3.85	*3.50@ 4.15*
Pool 9 (Super. Low Vol.)	Baltimore	2.15	4.00	4.00	*3.50*
Pool 10 (H.Gr.Low Vol.)	New York	1.90	3.35	3.10	2.75@ 3.50
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	3.45	3.20	*3.00@ 3.35*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.10	3.00	3.00	**3.25**
Pool 11 (Low Vol.)	New York	1.70	2.45	2.45	**2.25@ 2.80**
Pool 11 (Low Vol.)	Philadelphia	1.75	2.90	2.70	*2.25@ 2.85*
Pool 11 (Low Vol.)	Baltimore	2.05	2.25	2.25	**2.35**
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.50	2.30	2.20	**2.20@ 2.50**
Pool 54-64 (Gas and St.)	Philadelphia	1.50	.....	2.15	**2.10@ 2.40**
Pool 54-64 (Gas and St.)	Baltimore	1.55	2.25	2.25	**2.40**
Pittsburgh sc'd gas	Pittsburgh	2.65	4.10	3.60	**4.00@ 4.10**
Pittsburgh mine run (St.)	Pittsburgh	2.00	2.75	2.55	*2.25@ 2.50*
Pittsburgh slack (Gas)	Pittsburgh	1.55	2.85	2.75	*2.50@ 2.75*
Kanawha lump	Columbus	2.30	4.50	4.25	3.75@ 4.75
Kanawha mine run	Columbus	1.50	2.85	2.60	2.50@ 2.75
Kanawha screenings	Columbus	1.45	2.50	2.10	*2.00@ 2.15*
W. Va. lump	Cincinnati	2.15	4.00	3.75	3.25@ 4.25
W. Va. Gas mine run	Cincinnati	1.85	2.75	2.85	**3.25@ 3.50**
W. Va. Steam mine run	Cincinnati	1.40	2.75	2.75	**2.75@ 3.25**
W. Va. screenings	Cincinnati	1.30	2.35	2.50	*2.25@ 2.50*
Hocking lump	Columbus	2.60	4.15	4.00	*3.50@ 4.00*
Hocking mine run	Columbus	1.75	2.60	2.40	*2.25@ 2.50*
Hocking screenings	Columbus	1.55	2.15	2.00	*1.90@ 2.00*
Pitts. No. 8 lump	Cleveland	2.90	4.05	4.00	*3.45@ 4.00*
Pitts. No. 8 mine run	Cleve'and	$1.90	$3.00	$2.90	*$2.65@$2.75*
Pitts. No. 8 screenings	Cleveland	1.70	2.90	2.75	*2.40@ 2.60*
Midwest					
Franklin, Ill. lump	Chicago	3.40	4.60	4.60	*3.85*
Franklin, Ill. mine run	Chicago	2.50	3.35	3.35	3.25@ 3.50
Franklin, Ill. screenings	Chicago	1.95	2.35	2.35	2.25@ 2.50
Central, Ill. lump	Chicago	2.80	3.35	3.10	3.00@ 3.25
Central, Ill. mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.75	1.30	1.45	**1.50@ 1.75**
Ind. 4th Vein lump	Chicago	3.15	4.35	3.60	3.50@ 3.75
Ind. 4th Vein mine run	Chicago	2.45	3.10	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.00	2.10	2.10	2.00@ 2.25
Ind. 5th Vein lump	Chicago	2.80	3.60	3.35	*3.00@ 3.25*
Ind. 5th Vein mine run	Chicago	2.20	2.60	2.60	*2.00@ 2.25*
Ind. 5th Vein screenings	Chicago	1.60	1.80	1.35	**1.50@ 1.25**
Standard lump	St. Louis	2.55	3.10	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.80	2.25	2.25	2.25
Standard screenings	St. Louis	1.10	1.35	1.35	*1.25*
West Ky. lump	Louisville	2.35	3.35	3.05	*2.50@ 3.15*
West Ky. mine run	Louisville	1.75	2.05	2.00	*1.75@ 2.00*
West Ky. screenings	Louisville	1.45	1.85	1.65	1.50@ 1.85
West Ky. lump	Chicago	.....	3.60	3.10	*2.75@ 3.00*
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.60	.....	.....	.....
Big Seam mine run	Birmingham	1.85	2.10	2.10	.....
Big Seam (washed)	Birmingham	1.85	2.60	2.60	.....
S. E. Ky. lump	Chicago	.....	4.60	4.60	4.50@ 4.75
S. E. Ky. mine run	Chicago	.....	2.85	2.85	*2.75@ 3.00*
S. E. Ky. lump	Louisville	2.10	5.00	5.00	**4.50@ 5.65**
S. E. Ky. mine run	Louisville	1.60	2.60	2.60	**2.50@ 3.00**
S. E. Ky. screenings	Louisville	1.30	2.20	2.20	*2.25@ 2.75*
S. E. Ky. lump	Cincinnati	2.10	3.75	3.75	*3.25@ 4.00*
S. E. Ky. mine run	Cincinnati	1.45	2.50	2.75	2.50@ 3.00
S. E. Ky. screenings	Cincinnati	1.25	2.15	2.25	**2.25@ 2.50**
Kansas lump	Kansas City	5.00	5.00	4.50	4.50
Kansas mine run	Kansas City	4.00	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	March 12, 1923 Independent	March 12, 1923 Company	March 19, 1923† Independent	March 19, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	*9.25@11.00*	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	*9.25@11.00*	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@12.00	8.00@ 8.35	*9.25@11.00*	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	*6.30@ 9.00*	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.50@ 4.75	4.00@ 4.10	*3.75@ 4.25*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	4.00@ 5.00	4.00	4.00@ 5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 3.00	2.75@ 3.00	2.25@ 3.00	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.40@ 2.00	1.50@ 2.00	1.40@ 2.00	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.40@ 2.00	2.00	1.40@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 263, Week of March 19, 1923. Average spot price for same period $3.19. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

St. Louis Full of Coal

An unusually quiet market prevailed at St. Louis except during a flurry caused by the temperature falling to 25 deg. above last week. This brought out a lot of small domestic orders, principally for cheaper grades. Wagonload steam also became active. Dealers report a plentiful supply of everything on hand, including a lot of Carterville that was purchased at $5.50 and some in transit that was bought at $4.75, although the prevailing mine price today in St. Louis is $3.75. Retail prices have not been reduced.

Carload steam business in St. Louis was unusually quiet and there was practically nothing going out to the country. The St. Louis market was cleaned up by consignment shipment to Chicago and some Standard screenings sold there for as low as 50c.

Kentucky Watches Lakes and Export

Lake inquiry grew a bit livelier throughout Kentucky during the past week and a good many hopeful eyes were turned eastward at a developing export trade that may drain a good deal of West Virginia coal out of the Kentucky competitive market at $3.25 mine-run, or even a little better. However, prices on most sizes and grades in Kentucky softened a shade. Within the next two weeks the last trace of $5 best gas lump is likely to disappear from Kentucky quotations.

Eastern Kentucky screenings are said to be a shade firmer as a result of relatively small production of block coal.

Northwest Is Inactive

Northwest trade lay nearly dormant during the past week. Weather remained mild in spite of the near-blizzard which swept across the country just below the Lakes. Though industrial demand was fair, the domestic trade was flat. In about a month it is likely that boats will be able to get in and out of most Northwest harbors. Cheaper coal is confidently expected by most buyers after the first cargo arrives.

There remains 4,200 tons of anthracite on the Superior docks, according to reports, but nobody seems to be able to account for that volume. Briquet plants have turned from anthracite to Pocahontas. In Milwaukee traffic jams still have the market nearly empty though a little hard coal has arrived. The local coal shortage has drawn in coke from points as distant as Alabama.

Some Activity in the West

Colorado mines this spring are going after business by making the annual summer price drop $1 instead of 50c. This has started some movement of coal. Wintry weather helped the market during the past week. All mines show an increase in production reaching about 75 per cent of normal. A new tariff between the Rocky Mountain states and South Dakota on the Chicago, Milwaukee & St. Paul and the Chicago & Northwestern railroads has increased the market field for mountain coal.

In Utah running time is now about 55 per cent and the weather has been such that dealers have done a satisfactory domestic business lately. Utah coal suffered a blow, however, in the fact that the Salt Lake route is shifting from coal to oil. This means that oil will displace about 190,000 tons of coal annually.

Trade is flat for the Kansas and Oklahoma fields. The drop last week in Kansas lump had no appreciable effect. Most mines in the Southwest are working less than one-third of the time. Many are shutting down.

Steam Trade Firm in Columbus

The export demand, together with the continued car shortage caused a firmness in the steam trade in the Columbus (Ohio) market. Assigned cars made up a large percentage of the car supply at many mines. Embargoes are holding up shipments, especially on many lines in Michigan and northern Indiana.

Industrial buyers are returning to the Cincinnati market. Lake buyers also have been in evidence, bringing reports of a complete clean-up of several of the docks.

There has been some inquiry in the Pittsburgh district for coal for export, and some sales appear to have been made. It is understood that a cargo of about 10,000 tons of gas coal has been sold.

Production picked up in central Pennsylvania last week, 19,352 cars being shipped, an increase of 1,298 over the previous week, but to offset this, demand fell off and some coal was left standing on siding, unsold.

Car supply improved in the Buffalo market, but demand was slow.

New England Notes Pause in Buying

While the New England market on cars was unaffected, there was appreciably less demand at Hampton Roads. For a time prices advanced 25c. a day until $7.50 was reached, and thereafter the market receded to $7.25 with intimations that $7 would be accepted.

The contract basis on Pocahontas and New River seems difficult to gage. One large producer has named $4 per net ton at the mines as a basis for April, a price that would mean $7 per gross ton f.o.b. vessel at Norfolk, but at the same time other interests are naming $6.50 as a season figure.

The flurry over export inquiry influenced producers of the more favorably known grades in Pennsylvania to hold prices rather stiffly on contract in the hope they might catch some of the overflow demand from Hampton Roads, but

the same interests have now renewed their canvass for season business among home buyers.

New York Interested in Export Conditions

Demand in New York market was slow. More interest was manifested in the export situation than in local conditions. Local houses received many inquiries but high prices and high freight rates caused much delay in placing orders.

In the Philadelphia market there was much improvement in the business closed for overseas delivery and to South America and the West Indies.

There was a strong demand for gas coals in the Baltimore market. The coke market was strong, with home and foreign demand in excess of actual production. Coal exported from Baltimore during the first thirteen days of March was more than double that exported during January and February together.

A total of 2,708,000 net tons of soft coal was moved through North Atlantic ports in February, according to the Geological Survey, as compared with January dumpings, 3,189,000 tons, there is indicated a very slight decrease in the rate of movement, allowing for the difference in lengths of the months. Shipments in February were about the same as in December but were heavier than in previous months and in February a year ago when they totaled 2,625,000 tons.

TIDEWATER BITUMINOUS COAL SHIPMENTS FOR FEBRUARY, 1923
(In Net Tons)

Destination	New York	Philadelphia	Baltimore	Hampton Roads	Charleston	Total
Coastwise to New England	134,000	41,000	99,000	795,000	16,000	1,085,000
Exports	1,000	9,000	10,000	78,000	8,000	106,000
Bunker	226,000	30,000	21,000	129,000	6,000	412,000
Inside Capes	.....	143,000	129,000	68,000	.....	340,000
Other tonnage	536,000	.....	8,000	218,000	3,000	765,000
Totals	897,000	223,000	267,000	1,288,000	33,000	2,708,000

Anthracite Production Lower

"The production of anthracite in the week ended March 10," says the Geological Survey, "is estimated, on the basis of 39,170 cars loaded, at 2,048,000 net tons including coal shipped, mine fuel, local sales and dredge and washery output. This is a little less than the output during the week preceding.

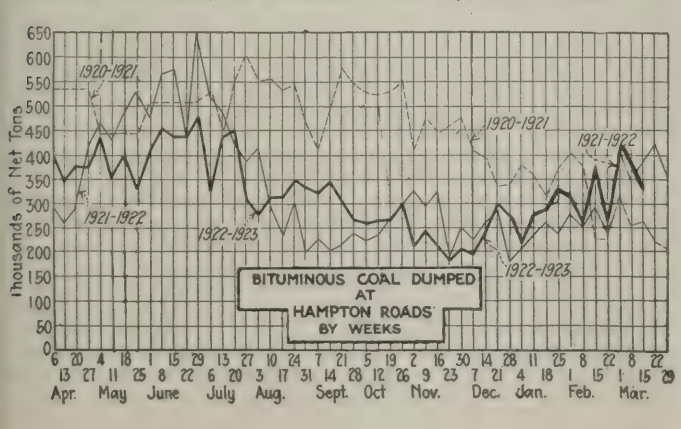
"The cumulative production for the coal year now nearly closed stands at 49,365,000 net tons, as compared with 83,409,000 tons a year ago, thus bearing out early estimates of 40-per cent deficiency.

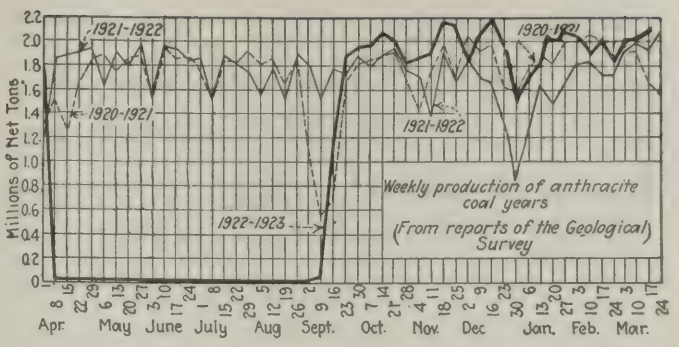
"Early returns for the week March 12-17 indicate a slightly higher rate of production and a probable total of 2,100,000 net tons."

Coke

The production of byproduct coke in February was 2,810,000 net tons, as compared with 3,100,000 tons in January. A slight increase was shown in the average daily output. This was at the rate of 83.5 per cent of full capacity. Of the 71 plants in existence, 62 were in operation and 9 were idle.

Despite the short month, the total output of beehive coke in February was more than in January, being 1,482,000 net tons, as compared with 1,478,000 tons.





MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE IN THE UNITED STATES (a)
(In Net Tons)

	Byproduct Coke	Beehive Coke	Total
1917 monthly average	1,870,000	2,764,000	4,634,000
1918 monthly average	2,166,000	2,540,000	4,706,000
1919 monthly average	2,095,000	1,638,000	3,733,000
1920 monthly average	2,565,000	1,748,000	4,313,000
1921 monthly average	1,646,000	462,000	2,108,000
1922 monthly average	2,374,000	669,000	3,043,000
Dec., 1922	3,063,000	1,233,000	4,296,000
Jan., 1923	3,100,000	1,478,000	4,578,000
Feb., 1923	2,810,000	1,482,000	4,292,000

(a) Excludes screenings and breeze.

It is estimated that the coke production in February required a total of 6,376,000 net tons of coal. This requirement is slightly in excess of the monthly average consumption during the active business year, 1920.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE (a)
(In Net Tons)

	Consumed In Byproduct Ovens	Consumed In Beehive Ovens	Total Coal Consumed
1917 monthly average	2,625,000	4,354,000	6,979,000
1918 monthly average	3,072,000	4,014,000	7,086,000
1919 monthly average	2,988,000	2,478,000	5,466,000
1920 monthly average	3,684,000	2,665,000	6,349,000
1921 monthly average	2,401,000	706,000	3,107,000
1922 monthly average	3,411,000	1,056,000	4,467,000
December, 1922	4,401,000	1,945,000	6,346,000
January, 1923	4,454,000	2,331,000	6,785,000
February, 1923	4,037,000	2,339,000	6,376,000

(a) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged by product ovens and 63.4 per cent in beehive ovens.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Mar. 3, 1923 Inclusive	Week Ended March 3, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	27.8	24.8
Panhandle, W. Va.	51.3	57.3	56.1	57.8
Westmoreland	58.8	65.8	53.2	40.3
Virginia	59.9	55.7	53.1	58.5
Harlan	54.8	22.1	21.1	18.7
Hazard	58.4	16.4	18.6	17.3
Pocahontas	60.0	36.6	36.9	45.9
Tug River	63.7	28.8	33.8	43.7
Logan	61.1	26.2	31.2	33.3
Cumberland-Piedmont	50.6	31.7	45.1	50.6
Winding Gulf	64.3	30.4	32.4	32.1
Kenova-Thacker	54.3	42.4	38.7	42.2
N. E. Kentucky	47.7	28.4	28.2	26.4
New River	37.9	31.6	34.2	34.4
Oklahoma	59.6	59.1	41.3	34.7
Iowa	78.4	75.9	81.4	91.0
Ohio, Eastern	46.6	40.8	33.9	35.3
Missouri	66.8	76.3	77.0	81.8
Illinois	54.5	49.9	51.9	50.7
Kansas	54.9	55.9	50.5	51.0
Indiana	53.8	37.7	54.8	53.3
Pittsburgh†	39.8	41.2	32.2	29.7
Central Pennsylvania	50.2	53.4	43.6	47.4
Fairmont	44.0	35.5	36.1	38.9
Western Kentucky	37.7	32.4	33.4	33.2
Pittsburgh*	31.9	56.1	61.9	50.4
Kanawha	13.0	15.6	21.4	20.7
Ohio, Southern	24.3	38.1	34.5	30.0

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended March 3, 1923	917,896	193,551
Previous week	830,223	178,457
Same week in 1922	793,115	195,970

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
Feb. 28, 1923	15,819	4,845	80,633	38,771
Feb. 21, 1923	20,786	5,322	76,900	39,197
Same date in 1922	254,100	97,634	.....	.....

Foreign Market And Export News

British Production and Prices Show Increase Export Demand Strong

The output of coal in the British mines during the week ended March 3 was 5,566,000 tons, according to a cable received by *Coal Age*. This was within 78,000 tons of the high record for the year.

Quotations for the various grades for the week ended March 17 show a substantial advance over the previous week.

The South Wales market continues strong. Most operators are booked ahead for the balance of the month, while additional inquiries are coming in from France and other countries. There was no improvement in shipping facilities.

Coke is in good demand, both for home consumption and export. French buyers are numerous.

It is reported that the gas companies are endeavoring to make certain changes in their buying policy with respect to contracts for the ensuing year. Under present conditions coal is supplied to the gas works in regular monthly tonnages. This practice has been in force for several years. Previously it was the practice to supply 60 per cent of the required tonnage during the six winter months and 40 per cent during the remaining months of the year. It is said that the gas companies intend to resume this plan of deliveries by inserting a clause to that effect in their new contracts.

Export Movement at Hampton Roads Active

Business at Hampton Roads last week was brisk, with prices slightly on the incline and with increase in export business the feature of the market. Movement in all directions increased, although a temporary dropping off in dumpings took place, due to delayed shipping coastwise.

Movement of coal to Germany and the Scandinavian countries was one of the unusual features of the market, and the trade looked forward to a continuance of this business which is being developed on a rather extensive scale.

The tone of the market was somewhat stronger than in past weeks and the outlook was brighter. The car situation improved, and price fluctuations were not regarded as permanent.

Export Clearances, Week Ending March 10, 1923

FROM HAMPTON ROADS

	Tons
For Cuba:	
Br. SS. Berwindvale, for Havana	7,928
For Germany:	
Nor. SS. Hallgyn, for Hamburg	9,316
For Holland:	
Br. SS. Ventura de Larrinåga, for Rotterdam	7,285
For South Africa:	
Dan. SS. Rolf, for St. Lucia	2,699
For West Indies:	
Dan. SS. Nordstjernes, for Bridgetown	3,331
Amer. SS. Levisa, for Kingston	2,263
Nor. SS. Landaas, for Jarnverkets	7,004
Amer. Schr. Augusta W. Snow, for Tucacao	990

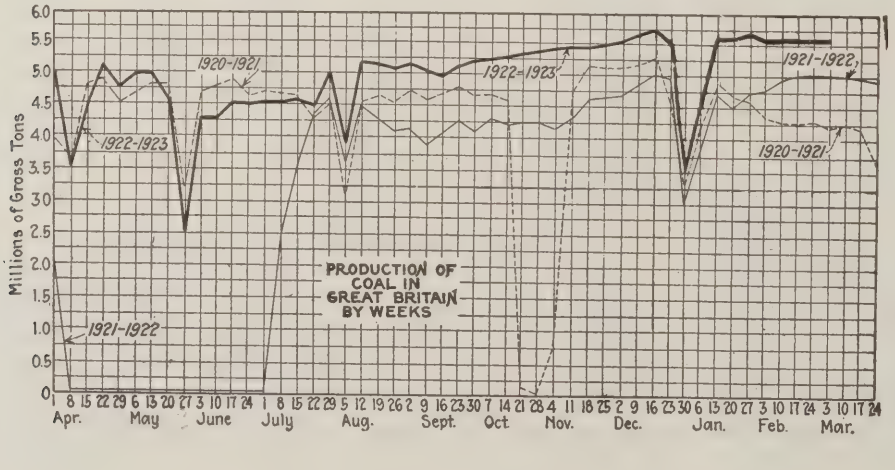
FROM PHILADELPHIA

For Belgium:	
Nor. SS. Mirjam, for Antwerp	—
Nos. SS. Tideman, for Antwerp	—
For Cuba:	
Nos. SS. Hundvaago, for Havana	—
Nor. SS. H. K. Waage, for Havana	—

French Production, Imports, Exports and Consumption, 1922

PRODUCTION
In Metric Tons

Districts	Dec. 1922	1922
Coal:		
Nord and Pas-de-Calais		
Non-devastated mines	638,646	7,554,532
Devastated mines	734,236	7,825,021
Loire	324,486	3,676,764
Lyons	224,257	2,688,280
Clermont-Ferrand	112,839	1,289,987
Alais	164,686	1,904,806
Toulouse	157,077	1,783,834
Marseilles	65,534	734,984
Nantes	4,687	55,988
Bordeaux	5,366	69,140
Nancy	7,780	99,873
Lorraine	381,229	4,232,400
Totals	2,820,823	31,915,609
Coke:		
Nord and Pas-de-Calais		
Non-devastated mines	35,011	348,714
Devastated mines	30,484	191,175
Loire	34,494	363,599
Alais	852	8,643
Toulouse	9,762	94,984
Lorraine	2,895	19,352
Totals	113,498	1,026,467
Patent fuel	277,634	2,828,803



IMPORTS

Coal:	Dec. 1922	1922
Saar	347,730	3,534,224
Great Britain	1,273,383	12,098,927
Belgium	176,864	2,378,697
U. S. A.	.....	23,255
Germany	367,344	3,730,605
Netherlands	11,319	564,076
Other countries	105	4,342
Totals	2,176,745	22,334,126
Coke:		
Great Britain	27,684	70,169
Belgium	47,837	497,650
Germany	408,435	4,303,324
Other countries	56,869	269,040
Totals	540,825	5,140,183
Patent fuel:		
Great Britain	17,088	138,207
Belgium	52,235	781,264
Germany	47,481	498,420
Other countries	267	4,483
Totals	117,071	1,422,374

EXPORTS

Coal:		
Belgium	96,587	453,075
Switzerland	123,217	704,048
Spain	1,109	2,925
Italy	10,226	59,022
Germany	37,905	454,950
Other countries, and bunker coals	31,329	473,415
Totals	300,373	2,147,435
Coke:		
Switzerland	5,928	89,334
Spain	451	2,376
Italy	20,567	192,880
Germany	.....	9,678
Other countries	5,334	168,860
Totals	32,280	463,128
Patent fuel:		
Switzerland	9,084	45,575
Other countries and bunkers	8,332	68,479
Totals	17,416	114,054

CONSUMPTION

Coal	4,697,195	52,102,300
Coke	622,043	5,703,522
Patent fuel	377,289	4,137,123
Totals	5,696,527	61,942,945

Hampton Roads Pier Situation

	Mar. 8	Mar. 15
N. & W. piers, Lamberts Pt.		
Cars on hand	823	707
Tons on hand	57,801	49,990
Tons dumped for week	124,126	131,863
Tonnage waiting	19,000	11,475
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,209	1,354
Tons on hand	70,370	78,080
Tons dumped for week	130,715	107,822
Tonnage waiting	11,315	10,697
C. & O. piers, Newport News		
Cars on hand	864	1,375
Tons on hand	60,650	75,750
Tons dumped for week	94,483	67,505
Tonnage waiting	18,745	5,620

Pier and Bunker Prices, Gross Tons

PIERS

	March 10	March 17†
Pool 9, New York	$7.00@$7.50	*$6.75@$7.25*
Pool 10, New York	6.15@ 6.50	*6.00@ 6.40*
Pool 11, New York	5.00@ 5.75	**5.25@ 5.75**
Pool 9, Philadelphia	7.00@ 7.20	**7.00@ 7.40**
Pool 10, Philadelphia	6.30@ 6.55	*6.25@ 6.50*
Pool 11, Philadelphia	5.50@ 5.80	*5.25@ 5.70*
Pool 1, Hamp. Roads	7.00@ 7.25	**7.25**
Pools 5-6-7 Hamp. Rds.	6.50@ 6.75	*6.40@ 6.65*
Pool 2, Hamp. Rds.	7.00@ 7.25	**7.25**

BUNKERS

Pool 9, New York	$7.30@$7.80	*7.05@ 7.55*
Pool 10, New York	6.45@ 6.80	*6.30@ 6.70*
Pool 11, New York	5.30@ 6.05	5.50@ 6.05
Pool 9, Philadelphia	7.25@ 7.50	*7.20@ 7.50*
Pool 10, Philadelphia	6.60@ 6.90	*6.50@ 6.75*
Pool 11, Philadelphia	5.75@ 6.15	*5.35@ 6.00*
Pool 1, Hamp Rds.	7.00@ 7.25	**7.25**
Pool 2, Hamp. Rds.	6.50@ 6.75	**7.25**

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	March 10	March 17†
Admiralty, large	30s.@32s.6d.	**34s.@35s.**
Steam, smalls	23s.@25s.	**26s.@27s.**
Newcastle:		
Best steams	33s.@34s.	**34s.@35s.**
Best gas	32s.6d.@35s.	**35s.**
Best bunkers	30s.@32s.6d.	**35s.@37s.6d.**

† Advances over previous week shown in heavy type; declines in *italics*.

News Items From Field and Trade

ALABAMA

The Pratt Consolidated Coal Co. is making ten new openings near its old workings at Dora and is constructing a spur track connection to move the output.

The American Fuel Co., Birmingham, has been incorporated with a capital stock of $500,000, with $100,000 paid in, and will engage in a general fuel business.

Glen Mary Coal Co., Birmingham, is developing a new mine in Marion County.

The Jagger Coal Co., Birmingham, is electrifying its mines at Prospect, Ala.

The Corona Coal Co. is considering the reopening of its Townley mines, which have been idle for the past two years.

ARKANSAS

The Southwestern Coal Commission was organized at Fort Smith, Ark., Feb. 28, at a meeting of coal operators and representatives of the United Mine Workers of America, District 21, to discuss the agreement, previously signed in Kansas City by operators and workers. John L. Britton, McAlester, Okla., president of District 21, was elected chairman of the commission. Members of the commission elected were for the miners: Dave Frampton, Moberly, Mo., international organizer for the miners, and W. C. Dockerman, Huntington, Ark., for the operators, J. C. Reid, general manager, Cameron Coal Co., Williams, Okla.; Robert Boyd, Central Coal & Coke Co., Hartford, Ark., and P. R. Steward, Fort Smith, commissioner for the coal operators' association.

Passage of a severance tax bill, levying 1 cent a ton on all coal mined in the state, was one of the final acts of the Arkansas Legislature, and the only one affecting the coal industry in the state. An alternate proposal to levy a tax of 1 per cent on the sale price at the mine failed to carry. The proceeds of the proposed tax were to have been used for the support of schools in the state.

COLORADO

The Cambro Mine, of the Co-operative Fuel Co., Denver, located in Boulder County, on the C. B. & Q. R.R., which closed in March, 1922, was reopened in November, 1922.

The Red Ash Mine, owned by Davis, Lewis & Son, Gorham, located in Boulder County, on the C. & S. R.R., which closed in October, 1922, was reopened Jan. 15, 1923.

Hastings Mine No. 5, of the Victor American Fuel Co., Denver, located in Las Animas County, on the C. & S. E. R.R., which closed in July, 1921, was reopened in July, 1922.

The Southwestern Mine, of the Rocky Mountain Fuel Co., Denver, located in Las Animas County, on the C. & S. R.R., which closed in January, 1922, was reopened in August, 1922.

Brodhead No. 10 Mine, of the Temple Fuel Co., Trinidad, located in Las Animas County, on the C. & S. R.R., which closed in March, 1921, was reopened in August, 1922.

The Lambert House bill No. 1 and the Lacy House bill No. 248 are now in the Colorado Senate. One of these bills provides for the **abolishment of the state coal mine inspector's office** and turns it over to the State Utility Commission. The other abolishes the office and puts the work in the hands of the metalliferous department of the state. Both bills are termed extremely malicious by the coal operators. The present system of state coal mine inspection is paid for by the operators, who bear a small tax by the state on each ton of coal mined.

House bill No. 149 in the legislature, **a hobby, it is alleged of the United Mine Workers, provides that every coal miner is required to have a state license** to work underground, that he will not be granted a license unless he has worked underground at least two years. This bill has just been ordered printed and has not come up for passage.

In the Colorado Legislature amendments have been made to the House bill introduced by R. D. Elder, Lake County, providing for the **establishment of a state fuel administration to regulate and control coal and coke fuel prices,** the measure being passed by the House on third reading.

The Mine & Smelter Supply Co., with branches in Denver, Salt Lake City and El Paso, has taken over exclusive representation for the States of Colorado, Utah, Nevada, Wyoming, New Mexico, and Western Texas for Wilson Plastic-Arc Welders and Wilson Color-tipt Welding Metals.

Storage season prices for this year, effective April 1, **have been announced** by the Colorado Fuel & Iron Co., which usually sets the precedent for Colorado. Mine quotations for the Walsenburg and Canon City districts are: Lump: April and May, $5; June, $5.25; July, $5.50; August, $5.75; September, $6. Nut: April and May, $4.50; June, $4.75; July, $5; August, $5.25; September, $5.50. In the Trinidad district prices are: Lump: April-July, $4.50; August, $4.75; September, $5. Nut: April-July, $4.25; August, $4.50; September, $4.75.

ILLINOIS

The Shuler Coal Mining Co., at Alpha, Mercer County, **is developing its No. 1 mine,** a new property, on the Burlington R.R.

Hickory Hill Coal Co., at Equality, Gallatin County, **reopened their mine,** closed in October, 1921, located on the Shawneetown branch of the L. & N. Ry.

Gallatin Coal & Coke Co., at Equality, Gallatin County, have **reopened their mine,** located in the L. & N. Ry., which was closed in October, 1921.

Big Creek Coals, Inc., at Harrisburg, Saline County, **has reopened mines Nos. 2, 4, 5 and 6,** located in the Big Four. Mine No. 2 was closed in October, 1921; Nos. 4 and 5 in August, 1921, and No. 6 in December, 1920. This company has another mine, No. 3, also located at Harrisburg.

A new coal company, incorporated under the name of the **Utilities Coal Co.** has taken over the No. 18 and No. 19 mines operated by the Peabody Coal Co. at West Frankfort, and owned previously by the By-Products Coke Corporation, of Chicago. The new company has John F. Gilchrist of the Commonwealth Edison Co. as its president and Stuyvesant Peabody, head of the Peabody Coal Co. as its vice-president. The Peabody company will continue to operate the mines.

The Globe Coal Co., of Chicago, has issued formal announcement of the transfer of the Western sales agency for Pittston anthracite from Williams & Peters to itself, as previously reported in *Coal Age*. After April 1 the Globe company will handle all Pittston all-rail anthracite west of Pennsylvania and will continue the sale of the Hudson Coal Co.'s Lackawanna coal west of Indiana. It also was announced in New York that the Buffalo Lake tonnage will be handled by the Pittsburgh Coal Co. of Wisconsin, and the C. Reiss Coal Co. The following changes in the personnel of the Globe company are announced: F. W. Barrett, who has been connected with the company in various capacities for a great many years, will be vice president, succeeding E. S. Van Sant, retired; F. N. Pease, who for a long period of years has been the Western representative of Williams & Peters, will be secretary; A. R. Loring, who has acted in the past as assistant treasurer, will be treasurer, succeeding Willis D. Maier, retired; L. W. Sanborn, who has been associated with the company for many years, will be assistant treasurer.

The No. 12 mine of the O'Gara Coal Co. near Harrisburg, **will be rebuilt** during the coming six months. The mine was shut down March 1 to permit the construction of a steel and concrete tipple and the installation of some new machinery. Haulageway grades underground will be leveled so that 2 per cent will be the maximum for any part of the mine and a good deal of new steel will be laid. Four electric gathering locomotives and several more shortwall coal cutters will be added to the production equipment. Heretofore mules have been used extensively for gathering. After the improvements have been made few mules will be left. It is expected the potential capacity of the mine will be raised from 1,000 tons a day to approximately 2,000 tons.

The Southern Mining Co., of Danville, has incorporated with a capital of $150,000. The incorporators of the new company are Richard Y. Hoffman, Walter L. Millner and Kenneth M. Fiske.

On Feb. 28 the No. 2 mine of the **Groveland Coal Co.,** which is 202 ft. deep and whose average coal thickness is 4 ft. 4 in. **hoisted 2,115 cars in exactly 8 hours,** which netted 2,932 tons of coal.

M. S. Ketchum, dean and director of the College of Engineering and Engineering Experiment Station, University of Illinois, has announced that **applications for appointment to the research graduate assistantships** which are maintained by the experiment station of the university **will be received up to April 1, 1923.** The university maintains fourteen of the assistantships and two others have been established under the patronage of the Illinois Gas Association. These appointments are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics or applied chemistry.

The Citizens Coal Mining Co. has made a stock dividend of 650 per cent, basing this stock issue on accumulated surplus and undivided profits. The company increases its capital from $60,000 to $300,000.

The executive committee of the Illinois **Mining Institute** in Springfield March 10, decided **to hold the summer meeting of the Institute on a boat trip on either the Illinois or the Mississippi River.** W. J. Gates, of St. Louis, was made chairman of the entertainment committee, which indicates that the institute will have a successful and satisfactory outing. John E. Jones, safety engineer of the Old Ben Coal Corporation, was chosen to succeed the late Prof. H. H. Stoek on the executive committee.

INDIANA

Warren S. Blauvelt, president of the Indiana Coke & Gas Co., of Terre Haute, believes it is possible, by allowing a commission on freight bills graded to encourage summer shipment, **to establish a system of freight rates on coal and coke** which would adequately reward consumers, dealers, and shippers for co-operating to utilize existing mine and railroad equipment uniformly throughout the year, and thus reduce the costs of mining, transporting and distributing fuel, with consequent material reduction in price to consumers.

Three new provisions are contained in the codification of the state mining laws introduced as a bill in the General Assembly by Senator Clem J. Richards, a coal operator. One provision seeks to protect miners from the danger of oil and gas wells that are drilled in concrete or piping. Another governs the placing and use of electrical appliances in mines, and the third deals with the manner in which worked-out parts of mines shall be sealed off from other parts. The bill introduced previously by Senator Richards providing for a state mining department, separating the present state mining inspection work from the State Industrial Board, is not a part of the codification bill. The proposal however, has the unanimous approval of the codification commission, Governor McCray, the Industrial Board and operators and miners in the state, according to Carey Littlejohn, state mine inspector. The bill has passed the Senate by a vote of 40 to 3 and has gone to the House.

Clem G. Richards, Senator in the Indiana General Assembly, is being boosted in the western part of Indiana **for the nomination for Governor** at the next primaries. Mr. Richards is a coal operator of Terre Haute.

The Big Four contemplates starting actual **construction of its $5,000,000 terminal yards just north of Terre Haute** some time this year, according to a Big Four official. The company also is making arrangements whereby coal and freight trains from and to the Evansville, Indianapolis & Terre Haute R.R. will be constructed over the Chicago, Milwaukee & St. Paul belt line east of Terre Haute, thus eliminating all freight movement through the city and permitting a **much speedier service for coal and freight** trains. The company also contemplates constructing a cut-off from the new yards to the bridge of the C. M. & S. P. over the Wabash and from there to some point on the main line between St. Mary-of-the-Woods and Sanford. This will eliminate a heavy grade between Terre Haute and St. Mary and dispense with all coal and freight movement through Terre Haute.

The Love Coal Co., Anderson has been incorporated with a capital of $50,000, to engage in coal mining; directors, Eldra O. Love, E. C. Love and L. B. DeSanctis.

A second election in District No. 11, U.M.W.A., the Indiana district, held because of insufficient pluralities in the first election, made no important changes in results. The complete roster of officials elected for the new term follows: W. D. Van Horn, Terre Haute, international board member; John Hessler, Terre Haute, district president; T. I. Roberts, Terre Haute, district, vice-president; William Mitch, Terre Haute, district secretary-treasurer; Elmer Whitman, Princeton, board member subdistrict No. 1; Harvey Cartwright, Bicknell, board member subdistrict No. 2; James H. Terry, Dugger, board member subdistrict No. 3; Dave Jones, Terre Haute, board member, subdistrict No. 4; William Lackey, of Bicknell, and Joe Wallace, of Terre Haute, assistants to the legal department; John R. Morgan, of Linton; Earl Jones, of Terre Haute, and Roscoe Barrett, of Shelburn, district auditors and members of the credential committee, and Clyde Webster, Terre Haute; Joe Edwards, Bicknell, and Richard Roberts, Linton, district tellers.

KANSAS

The old Morley coal mine near La Cygne, which was originally dug and operated by the Morley Bros., in the early 80's **is to be reopened** and operated by an organization consisting of Jake Demarrs and others. The mine shaft has been sunk to a depth of 98 ft.

KENTUCKY

Plans to install radio sending and receiving sets in Cincinnati, Lexington and Hazard with a network of receiving stations throughout the coal field in eastern Kentucky to facilitate communication are being made by the Hazard Coal Operators' Exchange representing coal operators in eastern Kentucky. The object is to keep isolated mine offices posted on prices and market conditions at a big saving in long distance telephone tolls.

Coal properties of the state are to be taxed more severely in 1923, the State Tax Commission having ordered a levy increase of $81,235,000 for the year, and of this $27,550,000 is to be added to the coal assessments. So much talk is heard relative to coal not paying its proportional tax that the matter is being pushed, especially by the press, and it looks as if the next legislative session might pass a coal-tonnage tax. Operators have fought this movement for years.

Considerable construction is planned by Eastern Kentucky mining companies this year. It is reported that the Imperial Elkhorn Coal Co., at Sergent, Ky., plans erection of 100 additional miners' homes; and the Consolidated Fuel Co. will add 50 at Dalna, while the Apex Coal Co. plans a new commissary along with other buildings. It is further reported that some of the companies are planning to enlarge facilities for larger capacity production, realizing the need of a high rail rating in order to get out much coal when car shortage is chronic.

According to a press statement the State Tax Commission has been busy **trying to explain how come that Henry Ford paid $15,000,000 for 30,000 acres of land** and improvements in Pike County, when **Pike's entire 423,782 acres is assessed at only $19,466,686.**

According to preliminary figures issued by the Kentucky Department of Mines on March 5, **coal output of the state in 1922 was 41,293,933 tons,** or 11,016,274 tons greater than in 1921, in spite of mine and rail strikes, which hampered production for some time, and in spite of a year of poor car supply. Harlan County, with 6,128,361 tons, led the state. District No. 6, composed of Letcher, Perry and Knott counties, showed 7,882,613 tons. In western Kentucky District No. 1, including Webster, Hopkins, Christian, Henderson and Union Counties showed 7,408,238 tons. It was reported that 46,558 men were employees as against 39,971 the previous year.

Several water power projects for development of cheap electric current in the state are of interest. The Louisville Gas & Electric Co. and City of Louisville are after rights for producing power at the Ohio Falls, Louisville, and on the Cumberland River, near Burnside, Ky., while a group of Indianapolis men are also after the Burnside project.

MINNESOTA

A bill has been introduced in the Minnesota Legislature **requiring coke** offered for sale **to be free from foreign substances and thoroughly dry** when weighed.

MISSOURI

Four farms, comprising **376 acres were purchased** early in March by representatives of the **Glasgow Mining and Manufacturing Co.** The purchase was made in connection with the **new coal field development work** now in progress **by the Kansas City Power & Light Co.,** and the land will be used by the company.

A large coal deposit has been located on the farm of John Hobein, two miles south of Drake in Gasconade County. The vein is close to the surface.

Norman Holt, who has been prospecting for coal on the Dilley farm, near De Witt, **has found a vein of fine quality coal** overlaid with a layer of slate that will make it safe for mining purposes. Work will be continued to bring the mine to a state where operations can be continued and coal gotten out for market purposes on a paying basis.

NEW YORK

John M. Ross has been named vice-president of the Coal and Iron National Bank, New York City, effective April 1. Mr. Ross has been recently identified with the Lowry National Bank of Atlanta, Ga., as vice-president. He is well known in New York banking circles, having for a time prior to the war been Atlanta representative of the National City Bank of New York. After the war Mr. Ross went to the Guaranty Trust Co., becoming assistant treasurer.

Directors of **Burns Bros. have set April 9 for a special meeting** of stockholders at which the recently announced plan for recapitalizing the corporation will be acted upon.

Announcement is made that the **exclusive license to manufacture and sell the Mitchell electric vibrating screen has been acquired by the C. W. Hunt Co., Inc.,** New York City, designers and manufacturers of material handling equipment.

OHIO

A strike of about 900 miners at the Sugar Creek mines of the Ohio Collieries Co., near Athens, was declared last week because of the method of dividing work. Men "marked up" at one mine refused to go to work unless men at other mines received their proportion of work. The miners have been having about one-third employment for some time. Officials of the United Mine Workers, Ohio district, have been called upon to settle the trouble.

Effective March 1, **John J. Masterson** has been appointed manager for the Pittsburgh Coal Co., at Akron, with office in Second National Building, succeeding Robert E. Frazer, who has been advanced to manager of the company's New York office.

OKLAHOMA

The Oklahoma Coal Operators' Association has signed a **contract renewing the existing wage scale** with the United Mine Workers of America, according to a statement of John L. Britton, district president of the mine workers.

The Union Tractor Co., of Coffeyville, Kan., has obtained leases on a large acreage of coal land near Oologah, and it is announced that the company will extend its electric line to the district in the near future and develop the coal. It is planned to open several mines at once.

The Central Coal & Coke Co., of Kansas City, is planning to develop a large coal field in the vicinity of Vinita. It will be a steam shovel proposition.

PENNSYLVANIA

The Lehigh & New England R.R. has announced that it **will receive bids for the following anthracite locomotive fuel:** 450 gross tons of pea coal and 60,000 gross tons of No. 1 buckwheat coal. Bids must be submitted and addressed to E. Hughes, purchasing agent, rooms 612-614, 437 Chestnut St., Philadelphia, Pa., by noon, March 29, and they will be opened at 3 p.m. on that day.

Robert Johnson, mine inspector of the **eighth anthracite district,** reports seven fatal accidents during 1922 among a total of 9,409 men and boys employed in and about the mines. **Coal produced totaled 2,006,957 tons,** 1,715,230 tons of which was shipped to market. Owing to the six months' strike the number of days worked averaged from 121 to 156.

Shipments of anthracite in February, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 5,951,713 gross tons, as compared with 5,239,014 gross tons during the corresponding month last year—an increase of 712,699 tons, or 13.6 per cent. The record for February of this year is second only to that of February, 1921, when the peak shipment for that month was established, 5,966,101 gross tons being shipped to market. With only twenty-four week days, two of which were legal holidays, bringing the working time during that month to 22 days, February shipments of this year were exceeded by the preceding month of January, when there were 26 working days, by only 720,109 tons, or 10.8 per cent. The daily shipments in February were 270,532 tons, as compared with 256,608.5 tons in January. Shipments by originating carriers were as follows in gross tons:

	February 1923	January 1923
Phila. & Reading....	1,206,538	1,381,359
Lehigh Valley	1,097,351	1,093,052
Jersey Central	521,430	588,093
Lackawanna	957,612	1,038,719
Delaware & Hudson.	629,514	741,739
Pennsylvania	483,466	596,989
Erie	712,210	750,277
N. Y., O. & W.....	169,176	178,072
Lehigh & New Eng.	174,416	303,522
	5,951,713	6,671,822

A bill that would tax for state purposes **"all coal other than anthracite"** was introduced in the House by Representative Walter W. Kohler, Lackawanna County, on March 12. It provides for a 1½-per cent tax on the value of coal when washed, screened or otherwise prepared for market, for coking or other use. The tax thus applied to bituminous is the same as now provided for anthracite coal. The bill follows closely the provisions of the anthracite tax law relative to the making of reports to the Auditor General, the payment of the tax, penalties for violation.

Senator Albert Davis introduced a bill on March 12 providing for **compensation for loss of life or property due to surface subsidence caused by the mining of coal,** minerals or other materials from beneath the surface of lands within the state.

Senator Albert Davis, Lackawanna County, on March 13 offered in the Legislature two measures, one creating an **anthracite mine-cave fund** and the other the **anthracite municipalities fund.** Both bills will be introduced in the House by Representative David Fowler, Lackawanna. The mine-cave fund bill appropriates 25 per cent of the anthracite tax collected annually to the use of the commission. This money is to be placed in the anthracite mine-cave fund of the State Treasury. The measures provide that the **anthracite municipalities fund's 50 per cent of the anthracite tax revenues shall be taken from the tax moneys after 25 per cent has been deducted from the tax moneys for the anthracite mine-cave fund.**

The United Mine Workers of America and organized labor generally are behind **a new workmen's compensation measure** introduced in the State Senate March 12 by Senator Joyce, of Luzerne. It raises the maximum weekly compensation to $20 and fixes $7 as the minimum. In total disability cases compensation would run during the period of disability and in a partial disability case a period of five hundred weeks is provided.

Insufficient facilities to ship coal was reflected in the **output of the mines in the central Pennsylvania field during February** when the total output **was 69,287 cars,** as compared with 82,835 cars in January. However, the production was slightly larger than the corresponding month in 1922, when the output was 67,255 cars. It is reported that the railroads are closing contracts at prices around $2.50 to $3.

So drastic is the slump in the coal business in Somerset County that the **mines in the vicinity of Meyersdale,** including the Statler Coal Co., the Schell Coal Co. and others, **have closed down indefinitely.** Some of the mines are working short time, filling orders as far as the car supply, which is very limited, will permit.

George S. Baton, Frank W. Byrne and R. H. Jamison were appointed **receivers of the American Coke Corporation,** with offices in Pittsburgh, by the U. S. District Court March 5 after a bill in equity had been filed against the corporation by the Union Explosives Co. Bond of the receivers was fixed at $50,000. The explosives company charges that the defendant corporation owes it $4,600 for merchandise delivered. The assets of the coke company, according to the bill, are in excess of the liabilities, but it is asserted that some creditors are threatening suits

and the property is subject to judgments and executions. The corporation's plants were shut down for 10 months in 1922, according to the bill, but are now in condition to operate in full for the first time in two years.

District No. 9, U. M. W. A. has opened headquarters in the Plaza Theatre Building, Brownsville, for the purpose, it is believed, of endeavoring to hold together the membership gained in the Connellsville coke region during the past year.

The Department of Internal Affairs has just issued **a bulletin by the Bureau of Topographic and Geological Survey dealing with coal beds in southern Somerset County**, by J. D. Sisler. The report, covering twenty pages, describes the distribution, thickness and character of the coal beds of the Wellersburg, Berlin-Salisbury and Confluence-Johnstown basins. The report contains thirty analyses, most of which have been made in the last five years, and some of which are now published for the first time. The information in this report is based on field work, most of which has been done during the past two years.

R. V. Norris, consulting engineer, Wilkes-Barre, **has taken his son, R. V. Norris, Jr., in as junior partner**, and the firm will hereafter be known as R. V. Norris & Son. The new member is a graduate of Yale, Ph.B., and Columbia School of Mines 1917, E. M. Since graduating he has been assistant colliery superintendent and later mining engineer for the Lehigh Coal & Navigation Co., lieutenant of engineers in the A. E. F., in France, and junior and senior accountant in Los Angeles. He will attend to much of the routine work of examination and calculation.

Bituminous coal companies incorporated at Harrisburg recently were: **M. & N. Coal Co.**, Curwensville; capital, $50,000; treasurer, L. C. Morris, Clearfield; incorporators: D. G. Mahaffey, F. C. Mahaffey, of Mahaffey, and H. J. Houston, Curwensville. **Renwick Fuel Co.**, Ligonier; mining coal and manufacturing coke; $300,000; A. K. Renwick, Ligonier, treasurer, who with W. E. Brown and L. L. Tosh, Ligonier, incorporated the company. **Logans Ferry Coal Co.**, New Kensington; mining, buying and selling coal and manufacturing coke; $100,000; Frank E. Pratt, 208 Charles Avenue, New Kensington, treasurer. Incorporators: Robert M. Young, 338 Fourth Street, Parnassus; Edgar Earney, Arnold, and W. D. Sharpe, Arnold. **Grampian Coal Mining Co.**, Clearfield; $35,000; incorporators, A. K. Wright, Clearfield, treasurer; George R. Bigler and Ruth Spencer, Clearfield. **B. M. Coal Co.**, Uniontown; mining coal and other minerals; $15,000; incorporators, John R. Best, Uniontown, treasurer; William G. Miller, Indian Head, and Pauline Best, Uniontown.

State charters have been issued to the following coal companies: **Shamokin Anthracite Reclaiming Co.**, Reading; capital, $10,000; treasurer, C. H. Price, 1403 Hill Road, Reading; incorporators, C. H. Price, Clarence L. Noecker, Shoemakersville, and William V. Hassler, Wernersville. **H. J. Thomas Coal Co.**, St. Marys; acquiring coal and coal lands and mining; capital, $30,000; incorporators, G. B. Straub, St. Marys, treasurer; H. J. Thomas, Kittanning, and I. J. Meenan, St. Marys. **Oakdale Coal Co.**, Oakdale, mining coal and manufacturing coke; capital, $50,000; incorporators Valentine Kirch, Oakdale, treasurer; J. G. Schreiner, Pittsburgh, and Anton Kirch, Pittsburgh. **McKeesport Coal & Coke Co.**, Pittsburgh, mining, buying and selling coal and manufacturing coke; capital, $600,000; incorporators, H. A. Davis, Solway street and Shady avenue, Pittsburgh, treasurer; Whitney Warner, Cleveland, Ohio, and F. C. Thompson, Dormont, Pa.

TEXAS

The Dillard-McCain Oil Co., drilling a test for oil one mile north of Whitesboro, **struck a rich vein of bituminous coal** at a depth of 500 ft. The coal has been analyzed and declared of good quality, and borings are now being made to determine if the vein is of sufficient thickness and extent to justify sinking a shaft for mining it.

C. W. Osborne, president and manager of the O. K. Lignite Co. of Dallas, **has made arrangements to develop 600 acres of coal land near Garrison.** The company is now making arrangements to install a hoisting engine and small boilers, as well as mine cars, and it is estimated that the daily output will be five carloads.

UTAH

The town of Huntington mines its own coal as a municipal enterprise. The little town is located near the coal field south of Salt Lake City. A federal license had to be first secured before the enterprise could be started on a municipal basis.

The Rocky Mountain Coal Co., of Salt Lake City, with 500,000 shares of preferred stock at $1 and 1,000,000 shares of common stock with no par value, **has been granted permission** by the Utah Securities Commission **to sell 100,000 shares of 8 per cent cumulative non-voting preferred stock** convertible into first mortgage bonds. The stock will be disposed of only through licensed agents operating in the state. It is estimated that the cost of opening up the company's property will be $277,000.

The Pahvant Coal Co. has received permission from the Utah Securities Commission **to sell $600,000 worth of first mortgage, 7 per cent 20-year bonds**, subject to a discount of not more than 20 per cent, provided that the company gives one share of common stock at a par value of $1 with each share of bonds sold. The money received in payment is to be trusted, subject to release of the commission. The basic assets of the company consist of coal properties in Carbon County. The capital is $2,000,000 in 2,000,000 shares of par value of $1.

WEST VIRGINIA

The Chippewa New River Coal Corporation, of Washington, D. C., has been granted a charter of incorporation and will operate in Raleigh and Fayette counties. The company has an authorized capital stock of $1,000,000. The incorporators are George L. Miller, of Beckley; Hilton W. Robertson, Francis A. Crawford, Joseph T. Saylor and Carl T. Crawford, of Washington.

The Clarksburg Big Vein Coal Co., Clarksburg, capital $100,000, has been incorporated by John P. Kelley, O. L. Billingsley, James J. Killeen, James P. Tierney and E. B. Templeman, all of Clarksburg.

The Hess Coal & Coke Co., with an operating mine at Granville, along the Monongahela River two miles north of Morgantown has been sold to Frank L. Bowman and Fred Troph, of Morgantown. The property involved in the sale consists of 100 acres of Sewickly coal land, 12 acres of Pittsburgh coal land and an operating mine with a capacity of 15 cars daily. This is the second purchase of coal property by the Bowman-Troph interests they having purchased the Andrew mine, adjoining the Hess workings, only a short time ago. The mines will be operated under the name of the troph Coal Co.

The Piedmont Coal Co., Huntington, with a capital of 20,000 shares without par value, has been incorporated by C. W. Stricklan, Roy H. Cunningham, G. C. Garred, James E. Hart and E. E. Winters, Jr., all of Huntington.

The Island Creek Coal Co. declared an extra dividend of $3 a share on the common stock in addition to the regular quarterly of $2, both payable April 2 to stock of record March 26. The regular quarterly dividend of $1.50 a share was declared on the preferred, payable the same date.

WYOMING

The policy committee of District 22, United Mine Workers of America, and the operators of southern Wyoming **accepted the existing agreement as a basis for the coming year** beginning April 1. It was less than 15 minutes after the men had gotten together that they signed a contract. Among those in attendance at the meeting, held at Cheyenne, were P. J. Quealy and Gomer Reese, of Kemmerer; Thomas Russell, of Diamondville; John Giorgis, of Cumberland; E. C. Brooks and Glenn Knox, of Rock Springs, and Martin Cahill, George Young and James J. Morgan, representing the miners' union. Conferences with the northern operators have not yet been held, but it is believed that a similar plan will be worked out in short order.

CANADA

Senator Raoul Dandurant, government leader of the Canadian Senate, **introduced a bill** on March 9 to give effect to an order in council that had been passed by the late Government, **setting aside the Hoppe coal areas, in Alberta, as a Government coal reservation.** Senator Dandurant stated that the reservation could not be set aside without the consent of Parliament, and the bill was introduced for that purpose. The Hoppe coal areas were granted in 1912, and cancelled during the war, because of non-payment of rentals. In 1919 the Government withdrew them from location, by an order in council, and set them aside for a Crown coal reserve. The Hoppe areas are situated in the Smoky River district, in central western Alberta, and contain seams of high-grade coal running from 4 to 17 ft. in thickness. The grade of the coal ranges from bituminous to semi-anthracite. At the present time there is no railway connection with the field.

Operating profits of the Inter-Colonial Coal Mining Co. for 1922 are lower by $25,000, at $135,475, according to a statement submitted at the annual meeting in Montreal. Surplus, after payment of $15,253 preferred dividends and $40,000 common dividends is $29,131, compared with $47,922 in 1921. Total surplus, however, is higher at $340,511, compared with $311,380 in 1921. The output of coal for the year was 135,508 tons against 150,491 tons for the year previous.

WASHINGTON, D. C.

The case of the **J. M. MacDonald Coal Mining Co.** of West Virginia, **against the United States was submitted on briefs** to the U. S. Supreme Court on March 12. This case involves the right to claim from the United States the difference between prices fixed by the President under Section 25 of the Lever Act and prices which the coal company claimed would be necessary to cover the cost of production plus a fair profit.

Traffic News

The concerted effort of most railroads serving Indiana and Illinois to put into effect **a new plan of rating mines for cars is getting some results.** Already the Pennsylvania R.R. has made tentative agreements with all its Indiana mines and with most of those it serves in Illinois to abide by ratings to be made by a railroad board and to accept cars on a round-robin system in each field served. The plan provides that if any mine owner feels aggrieved, the production of his mine during the ensuing six full days shall be totaled, divided by six and the result accepted as the daily capacity of the mine. Agreement has not been reached yet by Illinois and western Kentucky operators with the Illinois Central and the Louisville & Nashville, which serve both Illinois and western Kentucky, and with the Burlington, which taps parts of Illinois. Many Illinois operators, especially those in the southern Illinois field, insist the carriers' proposed plan of abritrary rating by a railroad board is unfair and too rigid. A counter proposal by certain sections of the state is said to be in preparation for the next joint conference with the roads on March 23.

Directors of the **Louisville & Nashville R.R. declared a stock dividend of 62½ per cent** on the outstanding $72,000,000 capital on March 15, payable May 7 to stock of record April 16. This increase of $45,000,000 will bring the total capitalization up to $117,000,000. The regular cash dividend of 2½ per cent was declared in advance, payable Aug. 10, to stock of record July 17.

The carriers in presenting their side of the issues involved in the matter of **Ohio coal rates** and in the case of the **Southern Ohio Coal Exchange vs. the Chesapeake & Ohio** and other carriers, among other things state: "The commission should order carriers to remove the advantages and preferences shown to exist in favor of Ohio coal shippers and Ohio coal originating fields and interstate commerce in Ohio and the prejudice and discrimination shown to exist against coal shippers and coal originating fields in Pennsylvania, Maryland, West Virginia, Kentucky, Virginia and Tennessee, the preference and advantage in favor of Ohio consumers of Ohio coal and the discrimination and prejudice shown to exist against consumers of Ohio coal located in Pennsylvania, Michigan and Indiana; and the preference and advantage in favor of interstate commerce in Ohio and the discrimination and prejudice shown to exist against interstate commerce by putting into effect between Ohio coal originating points and Ohio destinations rates made in accordance with the plan proposed by Eastern carriers and approved by the commission."

A report, adverse to the contentions of the Baltimore & Ohio, Norfolk & Western, Chesapeake & Ohio and Louisville & Nashville has been made by Interstate Commerce Commission Examiner Bardwell, in the matter of divisions between carriers of rates on bituminous coal to destinations in Michigan, Ohio, Indiana, Illinois and Wisconsin. The examiner finds that the **divisions as increased by Ex Parte 74 from the inner and outer crescent districts to points in Michigan and other states are not in-**

equitable or otherwise unlawful. "The historical method of making divisions," says the examiner's report, "resulted in respondents' divisions being increased on Aug. 26, 1920, by greater percentages than those of petitioners were increased, but the additional revenue accruing to the respondents from this cause was more than offset by the increase in their operating expenses resulting from the higher freight rates on fuel coal, from which petitioners suffered no corresponding disadvantage. Assuming, as we must on this record, that the divisions in force on Aug. 25, 1920, were just and equitable, it is impossible to escape the conclusion that the application of the historical method to the rates as increased under Ex Parte 74 did not result in divisions which were unreasonable or unfair to the petitioners."

Seventeen large coal companies of Illinois have filed a complaint with the Illinois Commerce Commission against eleven railroads as to excessive freight rates and they have asked that the commission order a reduction for coal in carload lots. **The operators ask for a reduction of from 20c. to 40c. a ton in carload lots.** The complaint of the mining companies is to the effect that the mines are located within a radius of 20 miles from East St. Louis and practically the same distance from St. Louis, which is just across the Mississippi River, and that the rate of 91c. per ton, now charged, is unreasonable and discriminatory. Eighty per cent of the coal used in St. Louis comes from the district in which the complainants are situated. A similar suit was filed some time ago by the St. Louis Coke & Chemical Co., of Granite City, against 26 carrier lines.

The application of the Toledo, St. Louis & Western R.R. asking permission to continue the rates on anthracite and smithing coal, coke dust and screenings from points in Illinois and Ohio to points in Illinois, Indiana, Michigan, Ohio and to St. Louis, without observing the provisions of the long and short-haul section of the Interstate Commerce Act, **has been denied,** effective July 16.

The application of the Delaware & Hudson R.R. for authority to continue the rates on anthracite coal from points in Pennsylvania to points in New York and Vermont, without observing the provisions of the fourth section of the Interstate Commerce Act, **has been denied,** effective July 16.

The Coal, Coke & Iron Ore Committee, Central Freight Association Territory, announces a public hearing, 10 a.m., March 29, Chamber of Commerce Building, Pittsburgh, **to consider advance in rates on bituminous coal,** carloads, from mines on Sandy Valley & Elkhorn, Long Fork and Millers Creek railroads, to stations on T. St. L. & W., Trilla, Ill., to East St. Louis, Ill., inclusive, from $3.72 per net ton to combination of locals, on account of no movement.

The Coal, Coke & Iron Ore Committee, Central Freight Association Territory, announces a public hearing, 10 a.m., March 29, Chamber of Commerce Building, Pittsburgh, on **cancellation of rate on bituminous and cannel coal,** carloads, to Carbondale and Anna, Ill., for Illinois Central R.R. delivery, from mines in the Cumberland-Piedmont and Gauley regions of the B. & O., on account of no movement of coal. The present rate is $4.54 per net ton.

The Coal, Coke & Iron Ore Committee, Central Freight Association Territory, announces a public hearing, 10 a.m., March 29, Chamber of Commerce Building, Pittsburgh, **to consider advance in rate on bituminous coal,** carloads, from mines on the Sandy Valley & Elkhorn,, Long Fork and Millers Creek railroads, to Pt. Pleasant, W. Va., via the B. & O., from $3.14 per net ton to combination of locals, on account of no movement and rates are obsolete.

The Coal, Coke & Iron Committee, Central Freight Association Territory, Pittsburgh, announces a public hearing, 10 a.m., March 29, Chamber of Commerce Building, Pittsburgh, **to consider advance in rates on bituminous coal,** carloads, to Bartles and Superior, Ohio, via Detroit, Toledo & Ironton R.R., from mines on Sandy Valley & Elkhorn, Long Fork and Millers Creek railroads, from $1.70 per net ton to $2.14 per net ton, to eliminate Fourth Section violation.

An embargo placed Jan. 19 by the **Philadelphia & Reading Ry.** against shipments of bituminous coal for various consignees at Port Richmond Piers, Philadelphia, Pa., was **entirely canceled** March 9.

An embargo placed Feb. 15 by the **New York Central RR.** against all shipments of coal for the New York & New England Cement & Lime Co., Hudson, N. Y., was **entirely canceled** March 10.

The Salt Lake & Utah R.R. (Orem line) has filed a complaint with the I. C. C. **asking that the road be made a party to a tariff under which coal from Utah Railway points is shipped to Nevada and California.** It is charged that at present shippers and receivers of coal in Utah, Nevada and California are subject to unjust, unreasonable, prejudicial and disadvantageous situations, which constitute violations of Sec. 2 and 3 of the I. C. C. Act. The complaint goes on to say that the Utah railway, which terminates at Provo, refuses to grant the complaining company permission to enter into the haul of coal from mines in the Castle Gate district. It is charged that there is an agreement between the D. & R. G. Western Ry. and the Los Angeles & Salt Lake road by which these companies are to haul coal to Salt Lake City and Ogden for routing to Nevada and California points. The petitioning company requests as equal chance at a routing with the Utah railway and proposes that the routing from the coal field be the Utah Railway to Provo; Salt Lake & Utah Railroad to Salt Lake; Bamberger Electric to Ogden and the Southern Pacific to points farther West.

Asserting that the assigned-car practice on the Monongah division of the B. & O. is playing havoc with commercial coal operations five coal companies have addressed an appeal to the I. C. C. charging that **their mines have been supplied with only 30 per cent of their requirements for several weeks** and that mines with contracts for railroad fuel are being favored. The petitioners are the Lambert Run Coal Co., the Delmar Coal Co., the Hughes Coal Co., the New Superior Coal Co., and the Charles D. Robinson Coal Co. The petition sets forth that as a result of insufficient cars operating cost has increased, customers have become dissatisfied and miners are leaving to seek steadier work.

The I. C. C. on March 16 declined to support the contentions of the Weirton Steel Co., which had assailed the rates on coke from Thompson No. 1 ovens in the Connellsville region to Weirton, W. Va. The commission, in a formal opinion, held that the rates are not unreasonable.

Association Activities

Monongahela Coal Association

At a meeting held in Morgantown about the middle of March the Monongahela Coal Association re-elected C. D. Junkins as secretary for another year. John H. Jones, of Pittsburgh, was unable to be present, W. E. Watson, president of the Fairmount & Cleveland Coal Co., presiding in his stead. There were about twenty members at the meeting. Operators in attendance expressed the opinion that the lake season gave signs of being a good one in so far as mines in the Monongahela Valley were concerned.

Smokeless Coal Operators' Association Of West Virginia

Much of the time of the March meeting of the Smokeless Coal Operators' Association of West Virginia held in New York was consumed in the consideration of transportation questions. It was developed during the meeting that in what is known as general order No. 28, the Interstate Commerce Commission put the double advance upon the rail haul so that the total advance on Lake coal amounted to $1.74 and the total advance on southern Illinois coal was $1.17, a difference of 57 cents per ton against the West Virginia coals. To take care of this matter proper committees have been appointed.

Obituary

Thomas McLaughlin, for many years superintendent of the Rugby Coal Co.'s operations at Rugby, Colo., died March 6 of pneumonia at St. Luke's Hospital, Denver. While attending the Rocky Mountain Coal Mining Institute the previous week, Mr. McLaughlin contracted a cold which developed into pneumonia, quickly causing his death. Though a native of Scotland, he came to the United States when only ten years old. He served as superintendent for several of the Colorado Fuel & Iron Co. mines. For the last 10 years he occupied the position he held at his death. Mr. McLaughlin is survived by a wife, three daughters, two sons, and a brother.

Robert H. Gruschow, 58, of the Gruschow-McCabe Coal Co., wholesalers, of Chicago, died suddenly of heart trouble March 6 at his home in a Chicago suburb and was buried March 9. He was well known in Chicago coal circles for more than 20 years. He began as cashier of the Fairmount Coal Co. in 1900, was manager of the jobbing department of the old Chicago, Wilmington & Vermilion Coal Co. from 1903 to 1907, when he became vice-president of the Eureka Coal & Dock Co. In 1913 and 1914 he was president and general manager of the Eureka Company until April of 1914, when he formed a jobbing business of his own. In 1916 J. N. McCabe joined him and in 1921 the name of the concern became the Gruschow-McCabe Coal Co. It has been announced that no important change is to be made in the company. The name and business are to be continued.

Frank Colby, of Noblesville, Ind., 65, president of the Sheridan Gas, Oil & Coal Co., died recently of heart disease in Los Angeles, Cal., according to a telegram received at his home. The body was taken to his home for burial. He is survived by a daughter, Florence, and two sons, Ted and Clark.

Coming Meetings

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The Virginia Coal Operators' Association will hold its annual meeting on April 21 at Norton, Va. Secretary, G. D. Kilgore, Norton, Va.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24. Secretary-treasurer, J. G. Crawford, Chicago, Ill.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Indiana Retail Coal Merchants' Association will hold its annual meeting April 25 and 26 at the Severin Hotel, Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Another Coal Crisis Passed

A NEW coal year is about to open, and with the passing of the old goes the "coal crisis" of 1922-23. In regard to bituminous coal this crisis has been a tame affair compared with some others of the recent past. Hard-coal shortage has been real, however, for production in the coal year approximated but 54,000,000 net tons—less by some 35,000,000 net tons than the mark of 89,000,000 tons in the previous year—and the demand for and consumption of hard coal is fixed largely by the more or less rigid household requirements of half of the people of this country. It was a case of 60-per cent production and therefore of 60-per cent supply. Those who would keep warm perforce must have taken substitutes to make up the 40-per cent deficit. Much criticism and complaint was lodged with the hard-coal industry, which is to say with the whole coal industry, on this account. People are averse to change and especially a forced change. Nor do they always seek and find the real cause of some of their difficulties, as for instance the relation of the strike of hard-coal miners last year to their coal shortage of this past winter.

An evidence of the coal crisis was the springing up of the state fuel administrations, and just so the closing of their offices is evidence of the passing of the trouble. After April there hardly will be a single official to look after the coal troubles of the people, for there will be no coal troubles. But there is danger of a multiplicity of coal investigations and commissions. Legislatures in the Eastern states are deluged with bills of that sort. Efforts are being made locally to have such measures held in abeyance pending the outcome of the U. S. Coal Commission's findings. It will be noted that these aftermaths of the coal shortage are confined to the hard-coal burning territory.

Altogether, with no one wanting coal that he can't get day before yesterday and with Congress home until December, it appears that the summer will be quiet, with nothing for the coal men to do but fill out questionnaires for the Coal Commission.

Come and Hear George and Henry

NO more fortunate subject than that of the solution of the coal problem by "economic rather than legislative means" could have been selected for the national resources group of the Chamber of Commerce of the United States meeting in New York in May. We are told that two speakers—names not announced—will cover the subject, the first reviewing the work of the U. S. Coal Commission and the second presenting an analysis of the coal-mine labor situation and its effect on the cost of coal. Having put this over, there will be presented THE suggestion for "seeking an economic solution." The announcement of these plans is so cleverly done that everyone is on the *qui vive.* Rumors have it that George Cushing is to take on the first part of the program, giving a complete inside view of what the Coal Commission has been doing. It also is pretty generally conceded that Henry Ford will take on the second skit, dealing mainly with the labor situation and the cost of industrial coal.

Just who is framing the economic solution for presentation to an anxious world, NO word (the emphasis is Mr. Brooking's) is vouchsafed. Guesses are divided between Joe Frelinghuysen, Bob LaFollette, Jim Reed and John Lewis, with odds on the first named as the one who now has the most free time on his hands.

It also is reported that seats in the front of the house have been reserved for the U. S. Coal Commission and its staff, but the latest reports are that the commissioners will stay in Washington on the important job of digging up facts about coal.

The National Chamber is extending a hearty welcome to all coal men, whether they have or have not sent their questionnaires to Washington. Engraved invitations are to be sent to those who since last spring, have put themselves out of the way of going in June to Atlantic City, where the National Coal Association holds forth in annual convention this year.

Guilty or Not Guilty?

MANY acrobatics of publicity have been performed in the past by the United Mine Workers of America. Now that the official publicist of the miners' union organization has declared he never condoned the bloody acts of violence against the crimes of non-unionism and the right to work committed at Herrin, Cliftonville and Willis Branch, it would be interesting indeed to witness the union at the task of convincing the American public that it, as well as its press agent, believes in law and order.

Now that the National Coal Association, in a published statement, charges the union with condoning these horrors, the time certainly is propitious for the union to clear itself of all these "calumnies" that have been cast upon it. It would do the cause of labor unionism in the United States a great deal of good if an explanation were advanced just now to show why organized union defence has been provided for every man—whether a member of the union or not—charged with murder and inciting to murder at Herrin. There must be some laudable purpose behind such a stanch defence put up without question by the United Mine Workers. There must be some legitimate reason why union officials told the hardware-store keepers in the neighborhood of Herrin to "give the boys the guns. We'll see that you get your money," or words to that effect, as has been testified under oath. There must be some reason why the United Mine Workers made every effort to prevent prosecution at Herrin, even to a drive against the special appropriation by the Illinois Legislature for the carrying on of the case

against scores of men indicted for murder last winter.

Above all, there must be some good reason why the union has never exercised its righteous power in the punishment of any union man guilty of various non-union murders.

In a large section of the public mind the United Mine Workers stand convicted of condoning murder and of striving to shackle the law-enforcement machinery of this country where that machinery was crushing down on members of the union. And this conviction in the public mind has held for months. There has been no official defence offered. Has this silence been maintained merely pending a formal charge of some sort? The charge has now been made in the court of public opinion by the National Coal Association. What is the plea of the defendant—guilty or not guilty?

Consolidation and Clinchfield

ANNUAL reports of two coal companies were published last week. They are interesting principally because of the contrast offered in the amount and kind of information conveyed to the shareholders for whose benefit they presumably were written.

The annual report of the Consolidation Coal Co. for the year 1922 is a statistical summary of the financial operations and position of the company—the history of the year as seen through the eyes of the auditors. The president, C. W. Watson, who signs the report, does not offer even the usual remarks as to whether or not, and why, the year had been a successful one for the company. Save for a fine-print footnote attached to one of the tables following the signed report, there is no reference to the coal strike. Production, it appears, was the lowest since 1901, or in twenty-one years.

Whether the year's operations were profitable must be inferred from the financial data presented. Earnings from operations are recorded as $22,464,911.76; operating expenses, insurance, royalties, taxes exclusive of federal income tax, depreciation, and depletion at cost as $19,365,303.80, and net earnings from operations as $3,099,607.96. Against these figures appears a production "mined by the company" of 5,694,256 net tons, from which it can be calculated that realization averaged $3.94, cost $3.40 and net income (for dividends and interest) 54c. per net ton. Adding to net income from operations, profits from other activities of the company and deducting interest, it appears that net earnings before deducting federal income tax were $2,733,445.66, or 48c. per ton, or about 45c. per net ton over and above all outgo, including federal taxes.

These and other calculations may be made from the financial data presented, but there is nothing to tell the stockholders what the management thinks of 1922, the strike, car shortage or prices. It is disclosed that certain moneys were used in the acquisition of the Rivesville and Stafford mines of the Monongahela Power & Railway Co., the minority stock interest of the North Western Fuel Co., and the properties of the Carter Coal Co. Nothing is vouchsafed the shareholder, however, as to the significance of these purchases. The report is a cold-blooded financial statement wherein accountants auditing the books chronicle the stewardship of dollars and cents. The president does not even "take pleasure in expressing appreciation to the officers and employees for loyal and efficient service," to quote Judge Gary in his recent report to the stockholders of the Steel Corporation.

Stockholders of the Clinchfield Coal Corporation are differently informed with respect to the operations of their company. The president, C. E. Bockus, in his report for 1922 briefly but clearly and interestingly sets forth the chronicle of 1922. His report is mainly text, with views of the new camp of the corporation at Clinchco, and a diagram showing monthly variations in output, costs and sales realization. Causes of variation in production are discussed, the effects of the strike in the union fields—the Clinchfield is a non-union operation and "no time whatever was lost from any troubles with employees"—on rate of production and on costs are described. Distribution, treatment of contract customers, wages, average costs and prices are all covered. The impression on reading this report is that an effort has been made to tell the whole story and that if anything has been overlooked, the information may be had on application.

Mr. Bockus evidently appreciates the value of presenting information in the three ways—namely, by text, diagram or picture and statistical table—certain that one method at least will appeal to every reader. Incidentally Clinchfield averaged net earnings of 38c. per net ton before deduction of interest, dividends and federal income taxes, as against 54c. for the Consolidation.

Flotation in an Oil Foam

WHEN particles become small their surfaces are unduly large compared with their weight and in consequence their relations to any surrounding medium become of more importance than their specific gravities. A fine unwetted heavy dust will float on the surface of the water, and a colloid will sink only with great difficulty, even when wetted.

For this reason the flotation experts believe that coal, which so freely floats on an oily froth, can be best separated by that method. Of course, a particle of coal with a thin ashy exterior may tend to sink, which we might not want, and one with an ashy heart may float satisfactorily, despite the fact that it should be rejected, but these conditions are so infrequent that the difficulty rarely would be encountered.

One great advantage claimed for the flotation method is that with it fusain, or mineral charcoal, will be rejected if the right flotation medium is used. Fusain is regarded as the substance which interferes with coking. It is said that many non-coking coals would coke if their fusain were removed and that coals that refused to coke have made good metallurgical coke when this deleterious material was eliminated.

Little claim is being made for the removal of pyrite by flotation. It is found that the pyritic content of coal can be slightly lowered thereby, but the reduction is not large. Perhaps a combination of flotation and gravity methods may solve the difficulty, the gravimetric methods removing the sulphur and the flotation eliminating the ash after the coal has been crushed.

Another feature with flotation is that oil covers the mineral substance with a thin film. As a result any water mixed with the coal can be eliminated in the briquetting press, and coal, it is asserted, can be briquetted with less binder and with binders of a less expensive character than is possible where the flotation method does not precede briquetting.



Maintenance and Repair Methods in the Shops of the Consolidation Coal Co. at Jenkins, Ky.

How Split Gears Are Welded Solid—Locomotive Tires Rebuilt by Welding at Cost About Half That of New Tire—Restoring Rail Benders—Protecting Edges of Concrete Floor in Motor Barns

By Alphonse F. Brosky*
Pittsburgh, Pa.

EXTENDING along the main street at the lower end of the town of Jenkins are the shop buildings in which are made practically all repairs for the mines at Jenkins and McRoberts and some for the Millers Creek Branch of the Consolidation Coal Co. at Van Lear, Ky. As is customary with most isolated coal-mining operations, the shops are equipped to make almost any kind of repair, and consequently the department includes a carpenter shop, a blacksmith shop, a plumbing shop, a welding shop, an electrical repair shop and a brass foundry.

In the carpenter, or wood-working, shop finished lumber is manufactured for houses from rough lumber obtained in part from the sawmills of the company and in part from the open market. Not only is the wood for building prepared and cut to proper sizes in this shop but here also are made brake shoes for mine cars, tamping rods, trolley poles, stakes and plugs for the engineering department, motor bumpers and other miscellaneous materials. Occasionally in slack times small pieces of furniture are made so as to keep the working force intact.

Wood-Working Machinery Unusually Complete

The equipment in the wood-working shop includes a tenon-making machine, three planers, an auger press, two lathes for turning wood, one band saw and two disk saws. An interior view of the carpenter shop with its machine equipment is shown in Fig. 1.

In the blacksmith shop, adjoining, several men are employed rebuilding wagons and repairing their wheels.

Note—The headpiece of this article shows the shop buildings of the Consolidated Coal Co., at Jenkins, Ky., in which is repaired the machinery from fourteen mines in and about Jenkins and in which special work is done for the mines at Van Lear, in the same state.

*Assistant editor, *Coal Age*.

An adjacent building houses the brass foundry and the welding shop. In the foundry, castings of all descriptions are poured. The jobs include the making of journal brasses for locomotives, bearings, bushings, adjusting nuts, quill bushings and other pieces which might be needed in an emergency. As an example of the variety of work done in these shops it may be noted that when the management found that the filter pumps, which carry the water from the lime tank to the clarifying tanks in the filtration plants, required frequent repair it decided to make these pumps and parts in the company's own shops.

Split Gears Waste Time and Come to Grief

Disregarding the customary jobs of the welding shop the process of welding split gears for mine locomotives is worthy of particular note. Though split gears have been welded by companies for years, the method of procedure of the Consolidation Coal Co. gives so strong and true a gear that a description of the work should be of value.

It has been calculated that at a mine of 2,000 tons daily capacity having locomotives equipped with split gears the machine boss or his helper spends 6 to 8 hours each week in tightening loose gears. Aside from the saving of this time, split gears should be made solid because a gear which is loose on the axle will spoil the retaining pin and slots and ruin the axle.

It is not difficult to weld a split gear so that it will have the necessary strength but it is not easy to do it and at the same time maintain the hub, or bore, so that it will fit the shaft correctly and the teeth so that they will be truly centered during the welding and after the piece has cooled.

The edges of the split gear are beveled with an

acetylene welder, as illustrated in Fig. 2, thus providing a larger bonding surface. Sometimes the bore of the hub is cut out in a V-shape at the split; especially is this done when stock must be added to the bore in any event to take up the play caused by wear. Then the exposed surfaces are ground to insure a good bond between the metal of the gear and the filler. A mandril of a diameter exactly that of the axle of the locomotive is fitted in the hub of the split gear, and the bolts are tightened up so as to assure that the gear will not be of variable diameter, as there always is some clearance between the two halves which must be adjusted by holding open the hub of the split gear. Otherwise the bonding metal, applied with an electric-resistance welder, would contract and draw the two halves together. Then the gear would not fit over the axle nor would it mesh properly with the drive pinion. Sometimes also the nuts and projecting bolt ends are fused together by means of the torch.

The gear is forced on the axle with a pressure of 50 tons. If the bore is worn and has to be built up, the time required to complete the job is about 4½ hours. If no stock is added to the bore, the work is accomplished in 2½ hours. Of forty-eight gears made solid in the manner described, only two have been known to fail.

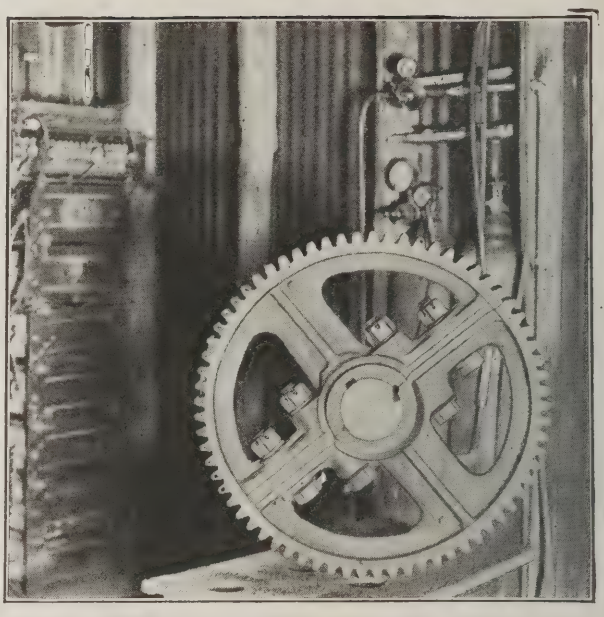


FIG. 2—WELDING SPLIT GEAR OF LOCOMOTIVE

The edges of the surfaces where the two halves come together are beveled with an acetylene welder, and the bore of the hub may be beveled also at the split. The edges are then ground. The wheel is fitted on a mandril, and the bolts are tightened so as to make the gear of the exact diameter designed. Then the wheel is welded by electricity, which makes a true gear with all teeth of equal pitch.

Machine Shop Builds Up Worn Locomotive Tires

Several interesting repair jobs are done in the machine shop, most important of which is the building up of worn locomotive tires, using a motor-generator welding apparatus. The general arrangement of the revolving holder for the tire being repaired is shown in Fig. 3. The wheel holder consists of a horse which is pierced by a threaded shaft on one end of which is a spoke cross which holds the tire. The tire is made to encircle the spokes and is then held by two wooden wedges.

In applying the iron to the tread of the tire one complete revolution of the wheel moves it toward or away from the operative through a distance equal to the lead of the thread, which also is its pitch, as the thread is single. Thus the electrode is relatively the same distance in front of him whether he is applying the metal at the flange or on the opposite edge of the groove in the tire. This gives him greater support for his hands and a more facile control of the molten metal which is being threaded around the tread, because he moves the electrode across the tire in practically the same path at all times.

He revolves the wheel slowly by pressing his foot against the spokes. The thickness of iron applied to the tire depends upon the wear to which the tire was subjected. A considerable saving in the maintenance of locomotives is effected in this manner.

When the tires of railroad locomotives were first



FIG. 1

Carpenter Shop

Modern woodworking machinery eliminates in this shop much of the handwork otherwise necessary in jobs of all kinds, especially cabinet work. The auger press in the foreground and center bespeaks how modernly this shop is equipped. Brake shoes are made for mine cars, tamping poles for loading auger holes, trolley poles and bumpers for locomotives and stakes and plugs for the engineers. In slack times even pieces of furniture are manufactured. The shop contains, in addition to the auger press, a tenoning machine, three planers, two wood-turning lathes, a band saw and two disk saws.

built up by electric welding, several of the carriers put the tires back in service without surfacing the tread. The Interstate Commerce Commission ruled that all tires which are rebuilt must be ground. Some men in the coal industry are of the opinion that tires which are rebuilt by electric welding may be put back into service without surfacing the tread. This is a mistaken belief, at least the Consolidation Coal Co. thinks so. Accordingly, behind the welding operative in Fig. 3 may be seen a 76-in. wheel lathe that will be equipped with a small grinding wheel shafted to a specially improvised turnstock. This will be used to true the tires after their treads have been welded.

New tires give about fifteen months' service and form a $\frac{3}{8}$-in. groove before they are repaired. If the false flange is turned in a lathe, the Consolidation Coal Co. has discovered, the tire will give further satisfactory service but for no longer than four months. Then the tire must be discarded. On the other hand, a built-up tire can be used daily for ten months without needing rebuilding, and there is no limit to the number of times this can be done.

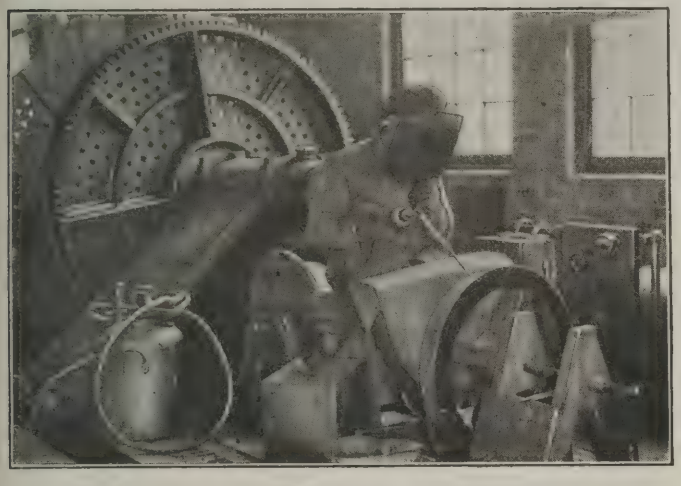


FIG. 3—BUILDING UP WORN LOCOMOTIVE TIRE

Tires at the Jenkins mines, when worn, are built up by electric welding. The illustration shows the way in which the point at which the welding is being done is kept at a uniform and convenient distance from the welder. The large wheel lathe behind the operative will be used to grind the tire after it is built up.

Another interesting repair job is that of overhauling worn rail benders. Due to the enormous pressure which necessarily is placed upon the threads of a 40-lb. rail bender, the nut wears down until it will no longer hold the screw. Then the bender either must be repaired or else thrown on the scrap pile. The screw is not worn out at the same time as the nut, because the former has many more threads than the latter and thus is able to withstand the wear.

One of the methods commonly employed in repairing a worn rail bender consisted in cutting off the claws from the shoulders at *A* and *B* (see Fig. 4), plugging the hole, boring the plug and cutting a thread in it. Afterward the claws were welded onto the shoulders. This method was abandoned because the cost of the repair was almost equal to that of a new bender.

The method used by this company at Jenkins is simple and low in cost, yet the rail bender is made "like new." Referring to Fig. 4, one may see that all that is necessary is to ream out the nut, insert a machine-cut steel tube that is threaded on the inside and has a collar on one end and weld the collar and the protruding end to the body of the rail bender.

Thus far twenty 40-lb. mine rail benders have been remade as specified and all these are still giving satisfactory service after a period of time long enough to make a fair test of the quality and suitability of the work, and quite a saving has been realized.

Periodical Repair a Guarantee of Service

How frequently it happens that companies are entirely pleased with the performance of their underground equipment until it ceases to be new! Then they complain that the machine does not "stand up"? Of course it does not if it receives little or no care. Observations over a period of a few years have brought us to a realization that daily inspections (during which times minor repairs are made if necessary) and periodical overhauling are needed to obtain maximum efficiency and real economy in operation.

In an article dealing with the mines of the Consolidation Coal Co. near Jenkins the methods of maintenance of the arcwall cutting machine will be explained. The moving parts of all mining machines will wear, some parts in a short time and others after a longer period of service. When the parts are thus worn the machine no longer functions correctly. The coal cutters used in the mines of this company are taken one at a time to the shops, where they are torn apart from end to end, so that no two fitting parts are left engaged. This gives the machinist an opportunity to clean the parts thoroughly and at the same time inspect each part for wear. Worn parts are replaced, or if the piece is large it is built up with a welding outfit and then machined. An arcwall coal cutter thus torn down and being repaired is shown in Fig. 5.

Track Laying Usually Faulty in Motor Barns

A great mistake has been made throughout the coal fields in the laying of track or, if you will, in the placing of the concrete floor in motor barns. Rails are laid on cross ties as usual, and concrete is then poured flush with their treads, a slot being left, however, on either side of the rail. This construction is objectionable, for sharp corners are left at the edges of the slots. These soon chip off and break as shown in Fig. 6.

The Elkhorn division of this company has two solutions for the problem presented by this breakage. In its No. 201 mine at Burdine the rails are spiked to 8x8-in. oak sills as shown in Fig. 7. It will be noted that the sills rest in a right-angle cutout so as to lie

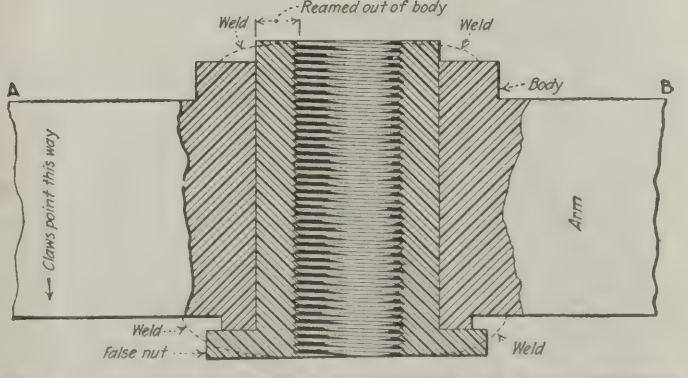


FIG. 4—METHOD OF RENEWING SCREW OF RAIL BENDER

The screw threads on rail benders wear out rapidly in working on heavy rail and become inoperative. The hole can be plugged, the plug bored and the hole threaded, but to do this the claws must be cut off, and when the job is done they must be replaced by welding. To avoid this the nut is reamed out, a machine-cut steel tube is inserted and welded into place, greatly reducing the time needed.

FIG. 5

Overhauling Arcwall Cutter

Too many operators seem to imagine that their machine cutters will go on operating without any attention other than the rewinding of an armature or the replacing of a gear now and again. They need, however, much more considerate attention. The Consolidation Coal Co., at Jenkins, tears its machines down completely and reassembles them, replacing worn parts and building up large pieces, such as the bedplate, where badly worn.



flush with the concrete floor and the walls of the pit. The rails project above the floor. At points away from the pit the sills are cross-braced by wood ties.

The second solution is perhaps the better of the two, as the method of construction is quite simple. At the same time it accomplishes the purpose of protecting the corners of the concrete without elevating the track. Track and concrete flooring thus laid is illustrated in Fig. 8, which is an interior view of the motor barn at No. 214 mine. The work is done as follows: The tracks are laid in the barn on wood ties as on surface and underground tramroads, except that greater care must be taken to put the surfaces of all tracks in the plane of the floor. Oak stringers are spiked to the ties on either side of the rails, leaving approximately a 3-in. slot. The stringers should be flush with the tops of the rails; then the concrete may be poured and readily surfaced, as the stringers act as forms to keep the concrete away from the track. They also aid the men in finishing the floor.



FIG. 6—HOW NOT TO LAY CONCRETE FLOORS IN MOTOR BARN

The floors in most motor barns have broken along the rails just as this has. It shows how with almost perfect tracks locomotives wander around on the rails. To avoid this breakage the Consolidation Coal Co. has made the provisions described in this article.

Figs. 8 and 9 indicate the types of motor barn which this division of the Consolidation Coal Co. believes are best suited to its needs. Though the barn is not an expensive structure, it meets the conditions of these Kentucky mines, for the winter seasons bring more rain than cold. Nor are the barns uncomfortable in the summer, as a pleasant current of air blows through them when the doors and windows are open.

One sometimes wonders why in mild climates motor barns are so frequently built of brick. Where winters are severe a brick structure certainly is necessary to protect the men from the cold. But it appears that brick is preferred also because it is permanent. That would seem a good reason but if a corrugated sheet-iron barn will last half as long as a mine, would it not be better to erect the less expensive structure, when its cost is not more than half that of a brick barn of similar proportions?

With a concrete flooring properly elevated from the ground and drainage facilities provided around the outside there is no reason why the structure of sheet iron should not stand for many years, providing it is given the proper attention, which includes periodical painting of the metal siding and roofing. At the halfway mark in the life of a mine circumstances may warrant a change either in the design or location of the barn. The

old building may then be used for storage or for some similar purpose and a new one erected. The cost of both is no more than the cost of one made of brick, of concrete or of hollow tile plastered with cement mortar.

Sometimes doors are placed on both ends of the barn, and a run-around track allows motors to enter from either end, but the location of the barn in Fig. 9 is such as to prohibit the use of two entrances. Too often motor barns are not kept in an orderly condition but those shown in the two illustrations show the benefit of the stringent rules laid down by the management in this regard.

The barn shown in Fig. 8 will house three cutting machines and seventeen locomotives. Upon close inspection of the illustration one will notice several resistance grids suspended above the right-hand track. These are especially useful to provide a slow charging rate for one or two battery locomotives that may have



FIG. 7—LOCOMOTIVE PIT WITH UNBROKEN CONCRETE EDGES

Careful inspection of the illustration will show that the track rests on wood sills. These sills, which are of oak, measure 8x8 in. and the concrete is run up to them. The rails, however, project above the floor, which is not a desirable arrangement though less objectionable at the pit. The sills are braced by wood ties wherever the absence of the pit makes this practicable.

been in hard service on a slack day. It is not economical to keep a man on night duty when only a few locomotives have to be charged, and consequently it is well to provide means whereby batteries may be charged at such a slow rate that no supervision will be needed.

Fig. 6 shows a 6-ton General Electric cable-reel gathering locomotive which has been equipped with a new type of reel manufactured by the maker of the locomotive and now being tried at the mines of the Elkhorn division. The reel is driven through a reduction pinion and ring gear. The positive drive provides a satisfactory means of taking up the cable. The old type disk-driven reel causes trouble because it is likely to slip, in which case the cable is not picked up as fast as the locomotive progresses. Because the reel is constructed of steel the electrician at this mine has grounded the reel frame and shaft to the base of the locomotive. Hence if the copper of the cable becomes exposed and comes in contact with the metal of the reel, as it sometimes does, the men will be guarded against shock.

The trolley gate shown in Fig. 10 is located on a

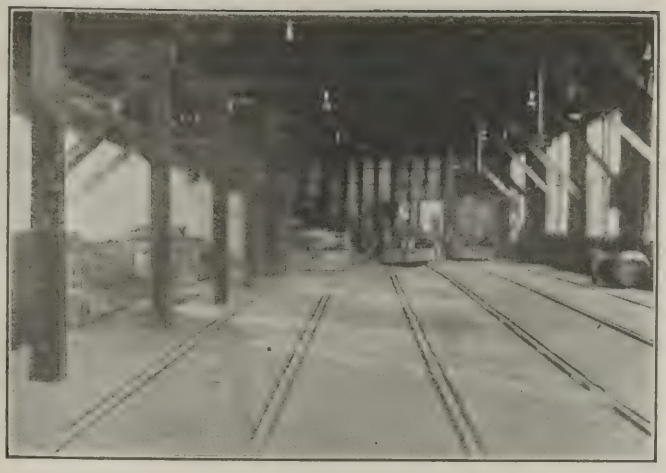


FIG. 8—LOCOMOTIVE BARN WITH WELL-LAID FLOOR

The concrete lies flush with the top of the track and its corners are protected by oak stringers on both sides of the rails, providing a slot approximately 3 in. wide. The stringers are of such a depth that their tops will be level with the running surface of the rails.

tramway connecting No. 204 and No. 207 mines, at a point where it crosses a public road at Dunham as part of a continuous track from Jenkins to McRoberts. During the war, when coal was sometimes hauled on the public road where it crossed the track, a gate keeper was stationed here to prevent accidents.

Such a trolley gate should find application at many mines. Wagon roads, both public and private, often cross the tramroads of mines and the loads on trucks and wagons using the road generally project above the level of the trolley wire. With a trolley gate similar to the one shown the trolley wire is almost continuous, yet the road which crosses the tramroad is not blocked against road traffic.

The manner in which the gate is constructed is quite obvious. Two converging angles are tied together by strap steel and form the bridge. Five angle brackets carry a trolley guard of wood and trolley clamps, to which is attached a bridge wire which merely guides the wheel of the harp across the gate and is not meant to close the circuit. The circuit is diverted to a line carried up and across the poles as shown. Though the wire on the bridge is not part of the regular circuit current can be taken from it by making a connection between it and the ground. Consequently it is necessary to provide a trolley guard.

Mechanical men about the mines have not as yet come to a conclusion regarding the relative merits of

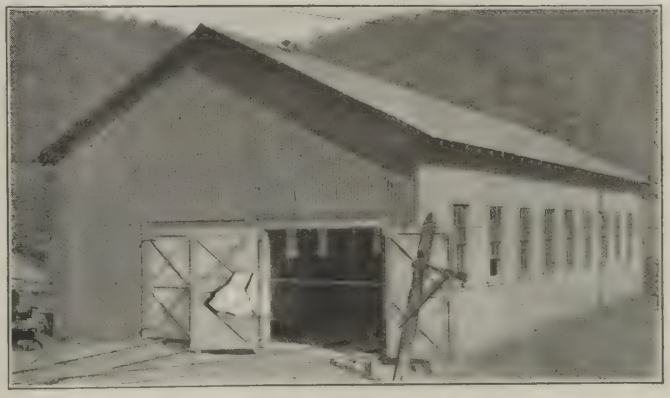


FIG. 9—CORRUGATED SHEET-IRON LOCOMOTIVE BARN

A barn of this type serves every purpose where the winters are not severe and costs about half that of a brick, concrete or stuccoed-tile barn.

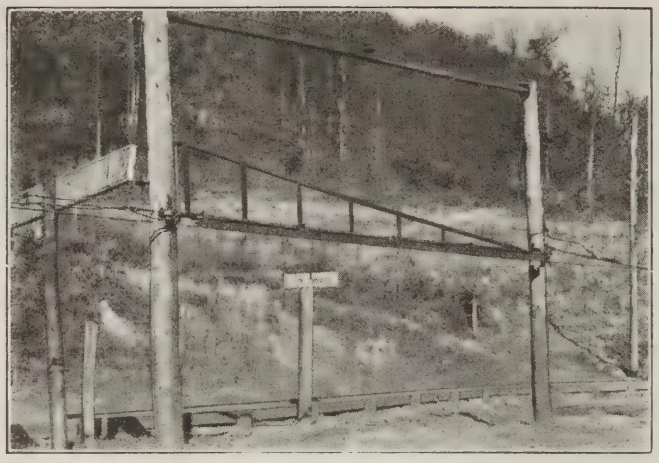


FIG. 10—TROLLEY GATE OVER PUBLIC ROAD

This is a device for swinging the trolley line over places where traffic has to cross the tramroad. The opening of the gate does not break the circuit for that passes at all times through a conductor placed at a much higher elevation. However, when the gate is closed the locomotive gets power throughout its travel and does not have to depend on the momentum of the trip as it does where there is no gate but merely a gap in the trolley line. Besides the gate guides the trolley wheel so that it picks up the wire on the far side of the road.

direct-connected and gear-driven centrifugal pumps as against those for which a belt drive is provided. Many arguments may be made in favor of each type of drive, but the pump operatives of this division of the Consolidation Coal Co. like the belt drive the better because it is more quiet and because the pump may be reached more readily when repairs are to be made. Good belting will last many years even when used in a small pump station hollowed out of the coal and rock. What little take-up is required is adjusted easily. In such a place ordinary steel gears are prone to rust, and then they do not function efficiently. In Fig. 11 is a centrifugal pump of 250-gallons capacity which is belt-driven by a 25-hp. direct-current motor. In rainy weather this pump runs continuously throughout the 24 hours of the day and sometimes for days at a time. About 90 per cent of the pumps are, however, direct-connected.

Slate is disposed of at most of the mines of the Elkhorn division by an endless-rope aërial tramway which carries two 1-ton drop-bottom steel buckets from which the slate is discharged automatically by the tripping of the gate. Two 1½-in. round track steel cables are used for suspending the buckets and a ⅝-in. stranded steel cable which is endless is the motive agent. The endless rope is moved by a horizontal finger sheave which is driven through a pinion and ring gear by a 25-hp. induction motor. The sheave at the upper end of the dump is counterweighted to keep the rope taut.

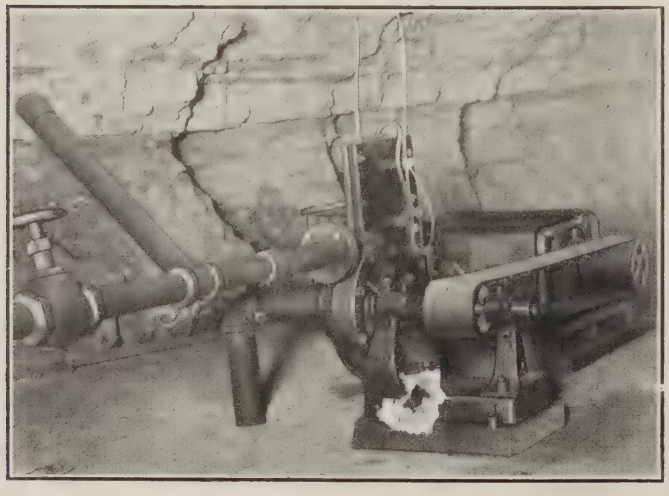


FIG. 11—BELT-DRIVEN CENTRIFUGAL MINE PUMP

Gears underground are likely to rust whereas a belt thrives in these mines, as the air is damp and the temperature never hot. This installation is at Mine No. 201, Burdine, Ky.

Slate from the mine is deposited in a 100-ton bin by a kickback dump and is fed into the buckets through the manipulation of a control lever at the bin which operates a counterweighted sliding gate. The slate is carried from the lower bin over two or more towers to the top of a hill. It is further disposed of by one of three methods: It may be dumped from the rope; it may be dumped into a bin on the hill, in which case it may be either distributed by an electric larry of about 8-ton capacity having a revolving body which discharges to either side by gravity over an inclined floor, or it may be slid over the slate bank by means of sheet-iron chutes, as at No. 206 mine, where the slope is approximately 50 deg.



FIG. 12—AERIAL TRAMWAY FOR DUMPING WASTE ROCK

Two buckets carry the slate from a 100-ton bin up the mountain side. The slate can be dropped on the way or dumped into a bin near the top of the hill. In the latter case it is handled either by an 8-ton larry which discharges entirely by gravity or it is dumped from the bin and slides down the slate bank with the aid of sheet-iron chutes.

The general arrangement of the aërial tramway at the joint tipple of No. 207 and No. 208 mines is illustrated in Fig. 12. Here the slate is deposited in a bin at the top and is removed from it for disposal by means of an electric larry. The slate bank in the illustration has just been started. Any one of the three methods of disposing of slate by means of an aërial tramway requires the services of two men.

COMMENTING ON THE VERDICT in the miners' case an Eastern editor says that "Herrin is a sick community." Maybe that's why they write it Herrin, Ill.—*Nashville Southern Lumberman.*

FRANCE'S NEW SLOGAN seems to be, "They shall not pass—their payments."—*Birmingham Post.*

ALL THAT GLISTENS IS NOT GOLD. Neither are all the black lumps in the bin combustible.—*Boston Transcript.*

Outbursts of Gas and Coal at Cassidy, B. C.

As Much as 1,500 Tons of Coal and Over 1,200,000 Cu. Ft. of Gas Disengaged by a Single Blowout—Mine Has Had 160 Outbursts —Boreholes of No Avail—Wide Places Prevent Recurrence

By J. B. Touhey*
Cassidy, B. C.

THE Cassidy slope is working in what is know as the Douglas coal bed. In order to provide liberally for its ventilation, two intake and two return airways are provided. The main slope or haulage road is driven 12 ft. wide clear of the timbers, the height above the rail being nowhere less than 6 ft. The second intake is used as a manway or traveling road and is driven 9 ft. wide inside the timbers and has a minimum height of 6 ft.

The return airways, of which there are two, one on each side of the intakes, are separated therefrom by a 150-ft. pillar of solid coal, except every 1,000 ft., where the main levels cross them from the main haulage roads. Each district is ventilated by a separate split from the main current, and overcasts conduct the return air over these main levels (Fig. 1).

A splendidly installed Sirocco fan with a capacity rated at 150,000 cu.ft. per minute with a 6-in. water gage is used as an exhaust. It is so located as to make intakes of the haulage road and manway. The volume of air specified is being provided already, but the water gage as yet has reached only 4½ in., principally because of the large size of the airways traversed.

Tests with the Burrell gas detector, which has been found to check up fairly accurately with laboratory tests under normal conditions, show from 0.2 to 0.7 per cent methane in the returns. The slope and manway are driven on the full pitch of the seam, which averages 18 deg., and have been extended about 5,600 ft.

The main levels in No. 1 are driven about every 1,000 ft., and slopes and inclines are driven off these levels from the intermediate panel haulage roads. From these entries level rooms are driven. The output is about 1,000 tons per day. No horses or mules are used underground. The thickness of the coal varies from 1 ft. to 30 ft., the undulations being mostly in the floor and in the middle of the seam, the condition of the roof being fair.

The inclines and slopes are driven 10 ft. wide, and the rooms turned off them have a width of 15 ft. Two certified miners are allowed to each room, no miner's helpers being employed. Permissible electric cap lamps are used for illumination to the exclusion of all other lights. For testing purposes Wolf safety lamps are employed, but they are used solely by firebosses and the management.

The Douglas seam, which, as already stated, is developed at this mine, is the uppermost of the three that are being worked in this district. The Newcastle seam, the existence of which is problematical at this mine, is separated from the Douglas bed by about 175 to 200 ft. of strata which consist chiefly of sandy shale and sandstone in massive formation.

The seam has been subjected to a great geological thrust from the south which has caused the floor and coal to buckle, but the roof apparently has resisted the thrust, hence its fairly normal condition. In consequence of the buckling and sliding of the seam the upper portion of the bed is slickensided and the bedding planes, or stratifications, have been destroyed. The slip planes in the coal sometimes start at right angles to the floor, curving upward, and as these are mostly slickensided it is probable that the slip planes are coated with a clay that is impervious to gas.

In some areas the coal has been thrust or squeezed into irregular and thick masses, these thick coal areas being surrounded by others where the coal has been rendered thin by rolls or even squeezed out altogether. These barriers vary from 100 ft. or so square to several

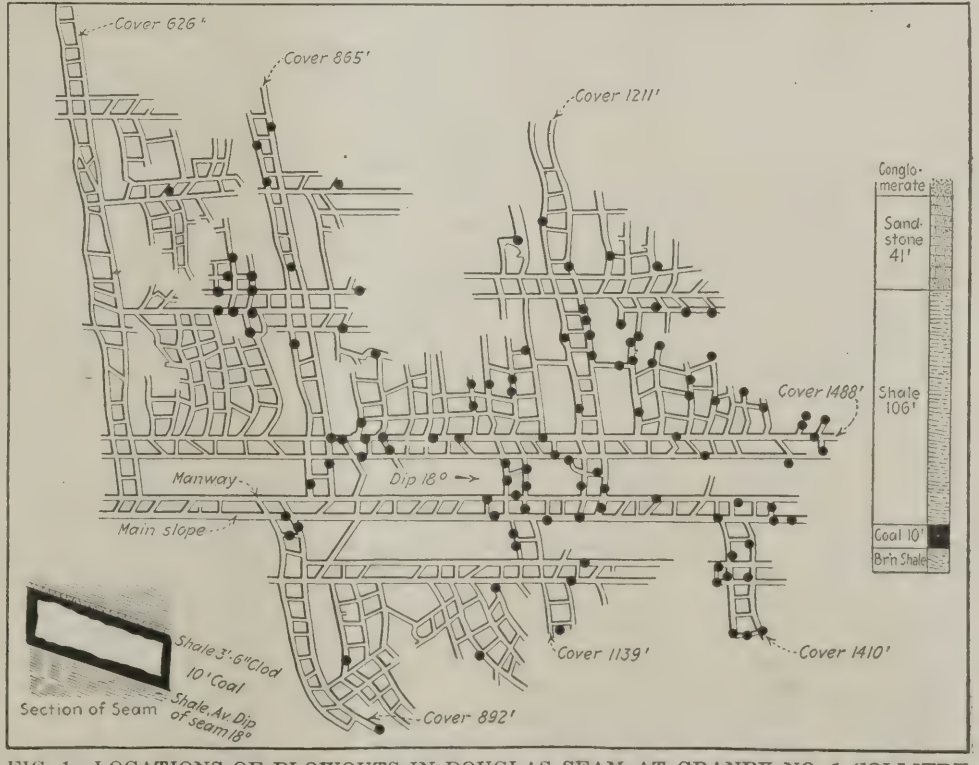


FIG. 1—LOCATIONS OF BLOWOUTS IN DOUGLAS SEAM AT GRANBY NO. 1 COLLIERY

About 160 blowouts have occurred in this mine. It will be seen that they frequently occurred at depths of less than 800 ft. Every evidence points to something other than the present weight of cover as the cause of these blowouts. As in Belgium, the blowouts neither liberate much methane nor relieve the seam of pressure. This map shows only the inner part of the mine.

*Mine manager, Granby Consolidated Mining, Smelting & Power Co.

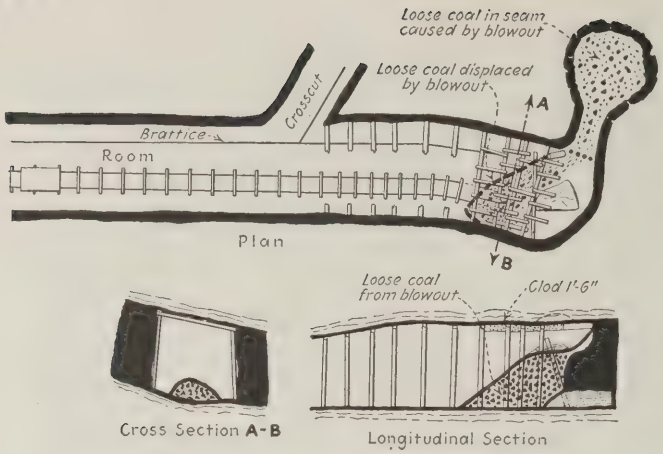


FIG. 2—BLOWOUT IN THE FACE OF A ROOM

This is one of the smaller outbursts. Note the bottle-shaped mouth of the cavity it has formed in the seam. What seems so extraordinary is the fact that areas so different from other areas are to be found in the coal seam. It is a difficult speculation to imagine how they may have been formed.

acres in extent. Careful study has been made to ascertain the relations, if any, between the outbursts of gas and these rolly barriers, but no relationship has been found. The outbursts occur both in thick and thin coal, the geological aspect of the squeezing not seeming to have any effect on the gas pockets.

The outbursts first made their appearance in January, 1921, and from that date until the present about 160 outbursts have occurred, each displacing from 50 to 1,500 tons of coal. The depth of cover under which the first outbursts occurred was about 350 ft., whereas at our lowest present development the cover is about 1,500 ft.

All Blowouts Occur At or Near Coal Face

The accompanying plan (Fig. 1) shows the positions of ninety of the largest outbursts. In studying these it is necessary to remember that, with two exceptions, the outbursts occurred at what was then the working face. These two exceptional blowouts happened after the face had advanced about 40 ft. All the outbursts to date have given premonitory sounds of warning, the coal breaking and cracking at the face. At times this warning will continue for two or three days intermittently; at other times the warning is of only a few minutes' duration. Two forces oppose one another in every outburst: the gas pressure, which exerts a bursting force on the coal, and the strength of the coal resisting movement. As the resistance is reduced by removing the coal, a time comes when the strength of the coal is slightly the lesser force of the two, and from that moment the coal moves. The motion may be only slight and of short duration, as was the case in July, 1922, when two fatal accidents occurred in which men working at the face were buried by coal from two blowouts. The surviving miners in each case testified that a slight warning had been given, but not sufficient to afford them time to get away from the flying coal.

In November, 1921, it was decided that blasting should be dispensed with in the blowout area, but as the coal was fairly soft that revision in practice did not materially reduce the earnings of the miners. After the two fatal accidents mentioned above it was decided to discontinue one of the shifts and put three boreholes at least 20 ft. deep and 2 in. in diameter in every place in the affected area, these holes to be kept 20 ft. ahead of the face. This method has now been employed over three months, but the outbursts are still happening, and up to the present time no pressure has manifested itself in any of the exploratory holes.

The number of outbursts decreased during the month of December owing to a large reduction in the number of places being worked in that area. On the other hand we decided to widen out the rooms to 35 ft. and it is gratifying to know that during the three months in which experiments have been made in this system we have not had a single blowout in a double room, which also accounts for the reduced number of outbursts in December. Our blowouts are unique, as sometimes a second blowout will occur within 20 to 25 ft. from the point where the first one occurred.

The gas would seem to be pent up in in a large number of small pockets under enormous pressure. The liberation of the gas is not instantaneous although the volume given off is extremely large. An outburst on March 20, 1922, displaced 1,000 tons of coal and emitted approximately 1,200,000 cu.ft. of methane in 10 hours. The gas continued to flow in steadily lowering quantity for a further 36 hours.

Much Gas from Blowout; None from Borehole

It is true that sometimes a little gas issues from the mouth of some of the exploratory holes, but at no pressure. Had the gas emitted by the blowout recorded in the first ten hours passed off from three exploratory holes of 2 in. diameter tapped in the seam and had the gas come out of each one of these at 50 lb. pressure per square inch, it would have taken more than five months to drain off the gas that was emitted, but, as previously stated, we have not yet tapped any pressure of gas, and yet the blowouts are still occurring wherever the places driven in the coal are narrow.

A blowout can sometimes be heard 500 ft. away through the solid coal. The sound in most cases resembles the noise made by a rapid-fire or machine gun, and sometimes it lasts three or four minutes. The districts on each air split being small, the miners are enabled to get to fresh air quickly, and they are daily instructed by the officials not to place any confidence in the boreholes but to withdraw to fresh air at the first sign of warning.

As previously stated, the outbursts at this mine are unlike any of the blowouts that hitherto have come to my knowledge. At Fernie, B. C., for instance, the enormous volume and weight of gas constantly escaping from the advancing coal face may cause a shrinkage in the thickness of the coal, which in turn may bring about roof readjustments causing undue pressure and consequent larger outflows or outbursts. Exploratory holes may be of value in such a case.

In the mine under consideration no great volume of gas flows from the coal under ordinary conditions, and the probability of roof readjustments due to disengagement of gas may be safely dismissed. These gas pockets have been formed by the squeezing and crumbling of the coal, the grinding and crushing of which has evolved the gases which are then pent up behind an impervious coal stratum with clay slips. Another peculiarity is the fact that no matter how large the displacement of coal from these outbursts no cavity ever is found large enough to have held such a large quality of coal as has been forced into the workings.

The two following blowouts are typical of these occurrences in our mines, both large and small. An outburst

occurred at 9:30 p.m., Oct. 17, 1922, in No. 7 Level. This level was 14 ft. wide from rib to rib and 13½ ft. high. Timbers were set at 4-ft. centers and 12 ft. between the notches. The face was 55 ft. ahead of the last crosscut. Three exploratory holes had been drilled in advance of the face, the center hole 24 ft. deep and the flank holes 20 ft. deep. The fireboss, on making his inspection, could not get a trace of gas in the place, neither could he get any from the boreholes, though he tried them as late as 8 p.m.

At 9:30 p.m. the face began to be uneasy, and the miners decided to withdraw. They had left the face only 3 minutes when the outburst occurred with a heavy boom, momentarily reversing the air current, raising curtains and opening doors within a radius of 500 ft. When at last an inspection could be made, which was about 12 hours later, the entire level from the center of the crosscut, a distance of 55 ft., was completely blocked with fine coal with the exception of a space about 18 in. square along the higher side rib. Here methane was issuing at great velocity. The outburst came from the direction of the level and right rib and knocked out twelve sets of timbers. After loading out a little more than 800 tons of coal and replacing the timbers the original face was reached, and loose coal was encountered for another 15 ft., but no appreciable space could be discerned from which such a large quantity of coal could have come.

A general sample collected from this outburst screened as in Table I.

TABLE I—SIZES OF COAL EMITTED BY OUTBURST

Screen	Per Cent	Screen	Per Cent
Plus ¼ in.	0.0	Plus 80-mesh	9.3
Plus 20-mesh	13.4	Plus 100-mesh	4.8
Plus 40-mesh	26.8	Minus 100-mesh	24.3
Plus 60-mesh	21.4		

Ash content of sample, 30.18 per cent.

An outburst of gas and coal occurred in No. 1 Room, No. 6 North Incline (Fig. 3). This room was 24 ft. wide and the outburst violently displaced 1,500 tons of coal and gave off approximately 1,200,000 cu.ft. of gas in 10 hours. For the next 72 hours the gas continued to be emitted, but at the end of that time the mine was again in such condition that it could be operated. No space that could hold such a large volume of gas could be found.

In order to test the efficiency of exploratory holes a place was chosen that was giving signs of an outburst. This place on Sept. 29, 1922, had three exploratory holes 20 ft. deep. With the exception of a ¼-in. cap of gas coming from the flank hole on the right rib not a trace of methane could be found. The place was stopped and remained idle until Oct. 3, or more than 100 hours.

In the meantime eighteen additional holes, 2-in. in diameter and from 20 to 24 ft. deep, were drilled in an effort to tap the gas. With the exception of very slight gas caps at four of the holes no gas was tapped. A test with the Burrell gas detector at the highest point in the roof showed 1.4 per cent methane. The place was allowed to work on Oct. 3 and after 5 hours' work, when about 10 tons of coal had been mined, an outburst occurred which was unusually violent, displacing 250 tons of coal and knocking out nine sets of timber.

An enormous quantity of gas was liberated for the next 36 hours. On a return to the original face it was found that from 3 ft. to 6 ft. of three of the center holes were in perfect order. Other experiments with exploratory holes have given the same results. Fig. 2 shows a small outburst from the face and high-side rib.

Having witnessed a number of these outbursts and listened to the evidence given by officials and workmen, I have come to the conclusion that not only is the gas under compression but that the coal itself also is equally compressed, the coal acting as a sponge containing the gas. On liberation the coal expands with a consequent effusion of the gases.

Sometimes the loose coal, after it is loaded into the mine cars, is so impregnated with gas that a safety lamp will be extinguished if put on the car. The driving of double rooms 30 ft. to 40 ft. wide has reduced the number of outbursts. In the places where conditions were such that rooms of this width could be driven we have not had a single occurrence of this sort for the three months during which we have been driving them.

In conclusion, from my experience here I believe that

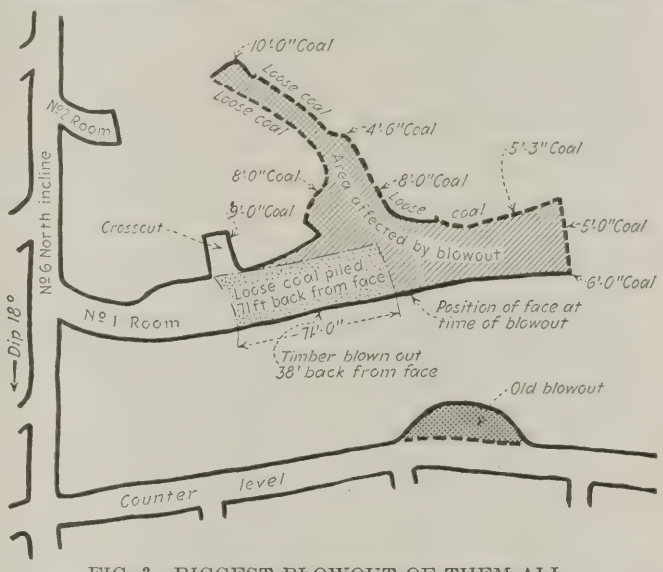


FIG. 3—BIGGEST BLOWOUT OF THEM ALL

In this blowout 1,500 tons of coal was discharged into the heading from an area of weakness of a peculiar shape. Note how the thickness of the coal varies from 4 ft. 6 in. to 10 ft. and quite irregularly. More than 1,200,000 cu.ft. of methane escaped from the self-excavated area.

any mine subject to blowouts of the same nature as at Cassidy should be worked either in double rooms or longwall, where suitable, as this allows the spongy coal and gas more room to expand and the gases will gradually bleed off and prevent sudden liberation.

In places where conditions would not allow either longwall or wide double rooms I would recommend shooting the coal after it is well prepared, either firing one place at a time commencing on the return side of the faces or blasting all shots at once from the surface wherever this would not be contrary to existing mining laws, no one but shotfirers being in the mine at the time.

The great danger we have to guard against, apart from the dangerous condition of the atmosphere after a blowout, is the occurrence of outbursts with only slight warning, which might come suddenly and bury the miners digging the coal. But it might be well to mention what is being done to prevent blowouts or indeed other occurrences from producing an explosion that would involve the whole mine. Districts are small and each district is ventilated by a separate split. No electric signal wires or electricity of any kind are allowed in an affected area.

Barriers of inert dust (flue dust) taken from the

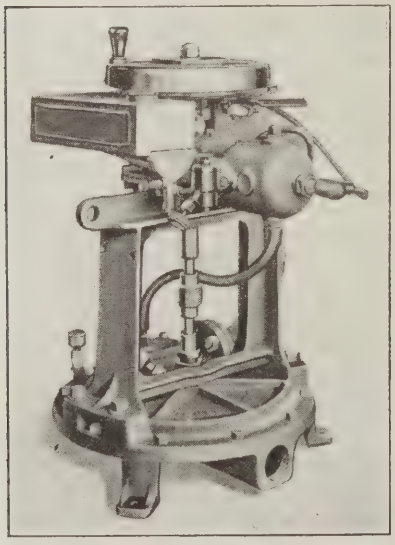
bottom of the smokestack at the boiler house are installed in every level and in the manway and main slope above it. These barriers consist of two 12-in. boards placed side by side and suspended by suitable hangers from the roof timbers at right angles to the roadway. They are placed 4 ft. apart and 6 ft. above the rail. From sixty to ninety of these form a battery of barriers, and each barrier contains 5 cu.ft. of inert dust. In addition to this, at every stopping in the crosscuts between levels and slopes are three of these barriers, each containing 5 cu.ft. of inert dust.

The flue dust has a specific gravity of 0.66 and more than 50 per cent will pass through a 100-mesh screen. In addition to this the intake air is heated on entering the mine by coils or radiators consisting of 4-in. pipe through which exhaust steam from the hoisting engine outside flows into the mine. By means of a bypass, arrangements have been made so that when not hoisting sufficient live steam is allowed to pass through the radiators and enter the intake airways. The steam on the intake does not interfere with the rope runners, for it is arranged so that these men do not come outside with the cars. A man stationed outside detaches the trip and sends the empty cars back into the mine.

A number of very fine fog sprays are placed at 100-ft. intervals on the main haulage roads. These are operated automatically by a large cistern and float arrangement by means of which the sprays are in operation 20 minutes out of every hour. This time for automatic spraying may be arranged at will. The flue dust also is scattered by hand on the ribs and timbers, and of course in applying it a large quantity is deposited on the floor. The fine coal from some of the outbursts assays 50 per cent ash.

Direct-Connected Centrifugal Pump For Construction Work

CONSTRUCTION is the one part of the mining problem to which in many instances but little care and attention is given, and many an operation is started without much equipment other than a few picks and shovels, an auger, a stump puller, a few wagons and some dynamite. One of the first troubles is water, which soon makes its appearance, perhaps in some prospect hole, a waterline trench, the excavation for a bridge pier, an engine or building foundation or a cellar. To remove this water the Evinrude unit centrifugal pump of the Evinrude Motor Co., Milwaukee, Wis., is well suited by reason of its extreme simplicity and the ease with which it is set in operation. The magneto is set at the top of the unit and is of the built-in flywheel type. The power is generated by the explosion of gasoline, the engine being of the same build as has been used for years for motorboat propulsion. A universal joint connects the engine to the shaft, on the end of which is the centrifugal pump. There is but one moving part, the impeller, rotating in perfect balance and at high speed. This will take water either under pressure or from a lower point, the suction lift being arranged not to exceed 20 ft. The pump being free from valves, gears and sliding parts and the passages being large and unobstructed, water can flow through it in great quantity.



HANDY PUMP FOR NARROW QUARTERS

To support the pump shaft at the lower end, a ball thrust bearing has been provided.

The great simplicity of the equipment makes it so light that it can readily be transported by automobile and handled by two men. It weighs only 115 lb. As the motor uses gasoline as the propelling force it is necessary to use the equipment where the ventilation is such that it will remove rapidly and completely any carbon monoxide that may be formed. The 2-hp. type will deliver 6,800 gallons per hour on a level and 6,150 gallons against a 10-ft. head.

Precautions of New York Gas Company To Avert Coal Shortage from Strike

IT MAY be of at least local interest to learn a little of what the gas companies affiliated with the Consolidated Gas Co. [of New York City] have been doing to meet the very exacting demands which the public has been making on them—representing as they do, in a large measure, the most convenient and ready to hand substitute for anthracite coal for the household.

Notwithstanding that 400,000 tons of gas and hard coal were provided to meet strike conditions in April 1, 1922, all of which was New York Tidewater coal, it became clear that coal supplies were necessary from other sources in order to insure a supply of fuel for the winter of 1922-23.

Accordingly contracts were let for a coal bridge of 208 ft. span, using a three-ton bucket and having a capacity of 400 tons per hour, and also for an elevated locomotive crane for cleaning up large cargo sea-going vessels. A dock with 29 ft. at mean low water was constructed for receiving 6,000-7,000-ton vessels, an existing bulkhead was raised and strengthened and construction begun on June 1, while contracts were let for coal from Hampton Roads, first delivery to be Aug. 15.

This coal unloading and storing plant, located on Luyster Creek, Astoria, about three-quarters of a mile from the gas plant, was actually unloading coal from barges a few days after Aug. 15.

It was quite clear that sufficient Hampton Roads coal would not be forthcoming, so that 113,000 tons of "Wear Specials"—England's best gas coal—was contracted for f.o.b. piers England, deliveries in August, September, October and November. About 7,000 tons additional was later ordered. All the English coal but 5,000 tons has been received; 113,000 tons of it in U. S. Shipping Board vessels, with less trouble than one could have imagined possible, and at prices very favorable, considering American spot prices.

So promising had the prospect become for other than New York Harbor coal that additional wharfs and docks have been constructed, and two additional 208-ft. span bridges ordered, so that the wharfage will be 1,600 ft. long.

*From address by J. W. Lieb, vice-president, New York Edison Co., before the New York Electrical League, Feb. 28, 1923.

Chromium, Nickel and Silicon Alloys Best Resist Acidulous Mine Waters

THE results of corrosion tests on forty-five different metals and alloys in the acid mine waters from coal mines, made in the course of a co-operative investigation by the Carnegie Institute of Technology, the U. S. Bureau of Mines and an advisory board of coal-mining engineers are summarized in Bulletin 4 of the Coal-Mining Investigations series, just published by the Carnegie Institute of Technology, Pittsburgh, Pa.

Water from coal mines usually is decidedly acid in character and causes much trouble and expense by its corrosive action on mine equipment. These waters contain free sulphuric acid, and ferrous, ferric and aluminum sulphates, sulphates of calcium, magnesium, sodium and potassium, and in addition silica and usually some chlorides. On standing, dilution, aëration or warming, insoluble iron compounds tend to precipitate, principally as hydrous ferric oxides. The presence of iron sulphates and free sulphuric acid is due to the action of water and air on the pyrite or marcasite associated with the coal. These substances are oxidized to ferrous sulphate, ferric sulphate and sulphuric acid.

In the co-operative investigation made by the U. S. Bureau of Mines and the Carnegie Institute of Technology three test specimens of each of forty-five metals and alloys were completely immersed in flowing water at each of three coal mines in western Pennsylvania for periods ranging from 98 to 135 days. The waters from these mines covered a wide range of acidity, from one considered to be below the average of that region to a water which is considered to be extremely acid. Inspections were made at regular intervals, and the degree and nature of corrosion was noted. At the completion of the test the specimens were removed, cleaned and the extent and nature of the corrosion recorded. Samples of the mine waters were collected at each inspection and the degree of acidity determined. Complete analyses also were made on the waters from the three mines.

Copper-Tin Better than Copper-Zinc Alloys

All the alloys of the brass type, which contained much zinc, when tested, were corroded extensively by the mine waters. Bronzes, containing much tin, also were corroded, but less than the brasses. Evidently copper-zinc alloys are less desirable for use in mine water than copper-tin alloys. Copper-nickel alloys were corroded about as much as the brasses. Nickel-silver alloys, which contain copper, zinc and nickel, also were corroded extensively. Aluminum alloys showed a marked tendency to pronounced pitting.

The materials which showed a marked resistance to the corrosive action of the acid mine waters include a high-chromium steel, two highly alloyed chromium-nickel-silicon steels, a high-silicon cast iron, and a nickel-chromium-iron alloy. All these materials, except the high-silicon cast iron, contain large quantities of chromium. These resistant materials have certain disadvantages for general use in coal-mine equipment, such as brittleness and hardness in case of the high-silicon cast iron and relatively high cost in case of the others; nevertheless, these resistant materials should prove satisfactory for use in pump parts and other equipment where these factors are not a serious consideration.

Economic considerations, such as cost, ease of fabrication and physical properties, will be factors in determining the suitability of a metal or alloy for use in equipment exposed to the action of acid mine water.

Bulletin 4, which has been prepared by W. A. Selvig, assistant analytical chemist, U. S. Bureau of Mines, and George M. Enos, research fellow, Carnegie Institute of Technology, may be obtained from the Carnegie Institute of Technology, Pittsburgh, Pa., at a price of 40c.

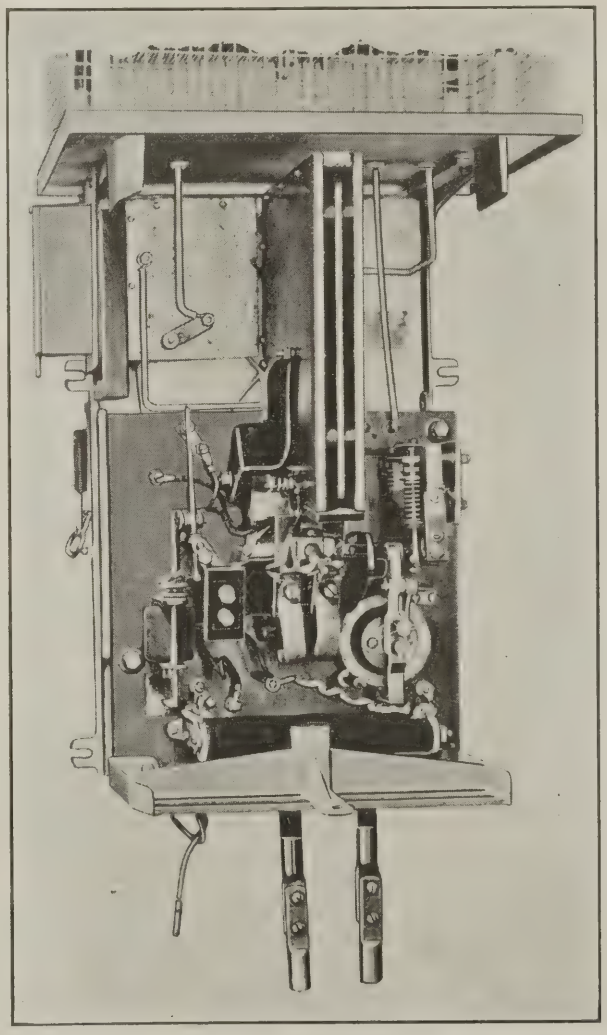
Self-Acting Reclosing Circuit Breaker With Arc Chute and Blowout Coils

By D. J. Baker*
Charleston, W. Va.

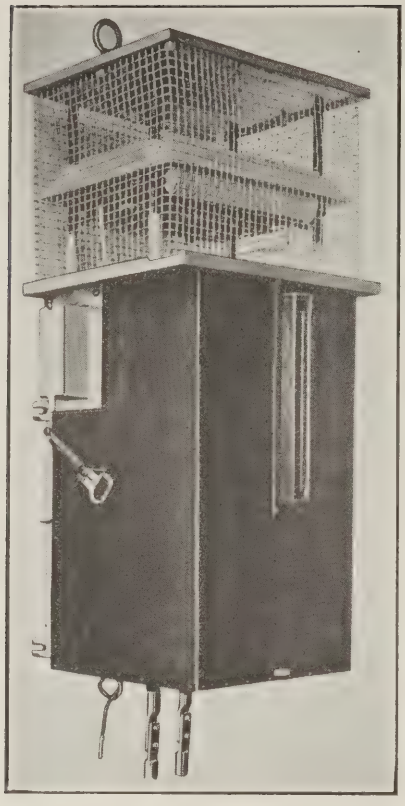
A NEW type of automatic reclosing circuit breaker known as the "MSB" and having all of the operating characteristics of the familiar tie-feeder switchboard instrument is now available for mine-sectionalizing service. The new automatic circuit controller which is being manufactured by the Automatic Reclosing Circuit Breaker Co., of Columbus, Ohio, was designed exclusively for outside- and inside-mine duty.

All of the operating parts are front-connected on an ebony-board panel and are so related as to be easily accessible. The panel and a wire-enclosed nichrome resistance unit are mounted on a cast-aluminum frame

*West Virginia manager, the Automatic Reclosing Circuit Breaker Co.



BREAKER PARTS READILY ACCESSIBLE
All parts are arranged on the front of the panel, thus giving easy access for adjustment and quick repairs without any undue inconvenience.



ENCLOSING CABINET WITH SCREEN OVER RESISTANCE
Proper protection is afforded by safety, and resistance unit is well ventilated.

so that the complete outfit may be both compact and light in weight. Two resistance tubes at the bottom of the panel liberate sufficient heat to assure that the operating mechanism will be prevented from rusting or corroding regardless of where the installation may be made. The instrument is rated at 60 amperes for either 250- or 550-volt service but ranges in its overload calibration from 300 to 1,200 amperes. On opening the breaker the arc is broken in an asbestos chute near a magnetic blowout coil. The unit is provided with a black-enameled sheet aluminum enclosing cover which may be locked. A push-button control switch is located in a housing on one side of the cover whereby means is provided for locking the breaker out permanently when desired. The new instrument permits of an exceedingly easy installation, as only three connections have to be made, two of these being positive. These two are used to connect the sectionalizing breaker in series between two sections. The third connection is bonded onto the rail or into the return circuit. Another important feature of the breaker is that it may be used for stub-end or independent feeder service.

An exceedingly wide field of application is being found for the new circuit breaker, which is about half as elaborate as one of the regular switchboard breakers of the same rating. It permits of an automatic sectionalizing scheme being adopted within the mine so that power disturbances in the troubled section do not affect the entire distribution system and thus cause the breaker to open at the substation, with the subsequent stopping of operations from face to tipple. Overloads and short-circuits are automatically confined to their points of origin.

The breaker further permits of feeder and trolley lines being tied together wherever possible for the purpose of boosting the voltage back at the working places, yet giving the various load centers an entire freedom from trouble in event of line or feeder disturbance in another section of the mine.

The instrument opens on a current value corresponding to the setting on the overload adjustment bracket, remains out a definite and adjustable time interval, and then operates to reclose, providing the cause of the overload has been removed from the line. If a short-circuit has opened it, the breaker "locks out" until the "short" has been cleared up. In this connection the instrument also is adjustable so that it may be set to reclose against a predetermined legitimate dead load on the section it controls.

Selective service on various feeders may be obtained by employing the breakers in conjunction with overload relays of either the instantaneous trip or time-cycle type. In this case, when it is desired to divert a high current value to a particular section in order to handle a peak load over a definite or indefinite time cycle other and lesser important sections may be dropped automatically and picked up again when the demand is over. This is especially desirable in plants having heavy grades along their main haulageways where peak loads on these main haulageways combined with other loads would otherwise result in opening the breaker in the substation and thus suspend operations throughout the mine.

Several installations of this nature already made have precluded the immediate necessity for purchasing additional generating equipment, and have maintained higher all-day load factors.

Morbidity Studies as an Aid in Preventing Illness Among Miners*

By R. R. Sayers†

NINE operators and managers for a number of years have known that the maintenance of the health among the workers has an appreciable financial value. In order to maintain the health, it has been found necessary to know: (1) The health hazards existing in the industry as a whole and the specific hazard in the individual mine. (2) The physical condition of applicants for employment as well as that of the old employees. This can be determined only by systematic physical examination of all applicants and of regular employees at intervals of at least once a year thereafter. (3) All cases of sickness that occur among the workers.

No operator or manager, or personnel, medical or safety organization can control or prevent sickness without knowing where, when and under what conditions the sickness actually occurs. In order to obtain information as to the hazards of industry, investigations have been and are being made of the effects of the conditions both in the field under usual working practices and in the laboratory. In the field several factors generally are present which affect the health. The effect of these factors may be determined by studying each of them separately in the laboratory. However, both the field and the laboratory studies are limited in value in that such studies usually have been made over a comparatively short period. While we have some information as to their immediate effect, we do not know to what extent extreme heat, humidity, the presence of dust or other health hazards are the cause of disability.

TABLE I—MORTALITY AMONG INDIANA COAL MINERS (a)

Year	Persons Employed At Coal Mines	Deaths	Rate per 1,000
1916	21,300	260	12.21
1917	23,940	323	13.49
1918	27,932	515	18.44
1919	28,673	291	10.15
1920	27,076	348	12.85

(a) Data taken from the annual reports of the Indiana Industrial Board.

*Report of Subcommittee on Prevention of Illness of the American Institute of Mining and Metallurgical Engineers, New York meeting, Feb. 19-22, 1923.

†Chief Surgeon U. S. Bureau of Mines; surgeon U. S. Public Health Service.

TABLE II—PERCENTAGES OF TOTAL DEATHS IN INDIANA AMONG COAL MINERS, FARMERS AND ALL OTHER MALES, GROUPED ACCORDING TO CAUSE, 1916-1920

Cause of death	Miners	Farmers	All Other Males
Typhoid fever	1.15	1.39	1.19
Influenza	11.10	6.34	5.60
Pulmonary tuberculosis	6.45	7.71	12.90
Other tuberculosis	0.86	1.49	1.19
Other respiratory diseases	9.15	9.10	10.08
Diarrhea	0.75	1.57	1.23
Syphilis	0.63	1.11	1.52
Cancer	3.51	7.10	5.16
Alcoholism	0.63	0.08	0.53
Apoplexy	3.28	9.32	7.43
Other diseases of the central nervous system	1.67	4.19	2.97
Diseases of the heart	8.75	15.71	14.05
Other circulatory diseases	1.15	3.56	3.03
Append. & Int. Obstruc.	1.50	1.62	1.77
Cirrhosis of the liver	1.09	0.78	1.64
Nephritis	5.00	11.52	9.64
Suicide	1.73	1.14	1.48
Mine accidents	26.20	.....	.....
Other accidents	9.78	5.18	7.87
All other causes	5.64	11.12	10.60

Mortality statistics probably are the most easily available indices as to the hazards of industry. As an example, a study of such statistics among coal miners of Indiana shows a marked increase in the death rate in 1918.

The increase in the death rate in 1918 was not entirely due to the industry but to the general epidemic of influenza. However, the proportional death rate of miners for the five-year period 1916-1920 shows that 11.1 per cent of the deaths were caused by influenza, as compared with 6.34 per cent of the deaths due to the same cause among farmers and 5.6 per cent among all other males.

While the miners had a larger percentage of deaths due to influenza over the five-year period than either of the other groups, the percentage due to accidents was the most striking. More than one-fourth (26.2 per cent) of all deaths among miners was the result of mine accidents, largely falls of roof, coal, rock, etc., and explosions. About 10 per cent (9.78 per cent) were due to accidents other than mine accidents, as compared to 5.18 per cent among farmers and 7.87 per cent among all other males. While proportional death rates may be somewhat misleading, it is quite evident, when almost 36 per cent of all deaths are due to one cause, accidents, where the greatest efforts to save life should be made.

While the data obtained from morbidity statistics are of material aid in the prevention of sickness, they only show the last illness and give no information as to previous health conditions of the individuals. Furthermore, no information is given as to the exact nature of their work other than a general statement as to occupation. It is this limitation of the knowledge supplied by death certificates that makes sickness records so necessary to lessen or eliminate the health hazards of an industry.

All operators are interested in knowing how much working time is lost by the employees and how much of this absenteeism is due to sickness. Many of the larger companies, and some of the smaller ones, have the requisite organization to determine the effect of different kinds of work and working conditions on those exposed in terms of frequency and severity of disability. Some plants now obtain this data and use it; others obtain it but make little or no use of it. One lead smelter in the United States has a full-time medical and safety organization which makes physical examinations of all applicants for employment and at intervals thereafter. Sickness records are kept of all illness. This company decreased the yearly incidence of lead poisoning from 87 to 35 cases in four years.

Usually there is no valid reason why companies having a full-time plant or mine physician cannot record what is happening to the health of the population in which they are interested. Records of sickness, of course, are kept in practically all establishments which provide medical service for employees, but usually they cover only those cases that are treated in the plant dispensary or company hospital. Obviously, a record of *all* the cases occurring in the population under study is necessary for determining the relative frequency and severity of disease according to occupation. It also is necessary to have available the same set of facts for the persons not sick as for the persons sick so that comparisons can be made in terms of rates per 100 or 1,000 persons in any given period. A card (5x8 inches), used by the U. S. Public Health Service and several large industrial plants, is suggested as being suitable. Reprint 573, Public Health Reports, gives an explanation of the terms used on this card.

Name ..... No. ..... Sex ..... Plant .....
Address .....
Race ..... S M W D .....
Country of birth (of self) ..... Yrs. in pres. occ. prior to date this record begins .....
Country of birth (of father) ..... Previous occupation and industry .....
Country of birth (of mother) ..... Years in previous occupation .....
Age in 1923 ..... Length of service with Co. prior to date this record begins .....

DEPARTMENTS AND OCCUPATIONS WORKED IN SINCE DATE THIS RECORD BEGINS

From	To	Days ex	Dept.	Occ.	From	To	Days ex	Dept.	Occ.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Defects—1st. Ex .....
Defects—2d. Ex .....
Defects—3d. Ex .....
Defects—4th Ex .....
DATES: 1st. Ex..... 2d. Ex..... 3d. Ex..... 4th Ex..... 5th Ex.....
PEC. 1st. Ex..... 2d. Ex..... 3d. Ex..... 4th Ex..... 5th Ex.....
Date Employment Ended .....

INDUSTRIAL MORBIDITY FORM A, STATISTICAL OFFICE, U. S. PUBLIC HEALTH SERVICE

Name ..... No. ..... Sex ..... Plant .....

Date Absence Began	Date Returned To Work	Cal. Days Lost	Cause	Diagnosis of Sickness or Injury	By Whom Diag.	Termination
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
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INDUSTRIAL MORBIDITY FORM A, STATISTICAL OFFICE, U. S. PUBLIC HEALTH SERVICE (REVERSE SIDE OF CARD)

The card shown will serve as a record of personnel and of sickness among the personnel. To be of current value it is necessary to put in monthly tabular statements the number of personnel, the number of cases of sickness occurring among them, and the sickness rate per thousand persons for any group desired. The record of sickness may be obtained from the card without difficulty if signals distinct from personal signals be attached.

The Public Health Service,‡ in co-operation with the U. S. Bureau of Mines, is prepared to assist companies which wish to inaugurate a system of morbidity records by sending a representative to confer with the company and to help revise a plan of records. The co-operation of the employment department and the medical department of the company in the keeping of

‡Information supplied by D. K. Brundage, assistant statistician U. S. Public Health Service.

morbidity records is essential. There must be a card for each employee, whether he is ever sick or not, containing much the same personnel data as are recorded in the employment department: Age, nationality, length of service with the company, etc. These facts about the employee must appear on the same card showing the chronological record of disability in order to make possible the correlation of cases of sickness with age, length of service, etc.

Canadian Mining Institute Discusses National Fuel Supply of Dominion

By W. A. Lawrence
Montreal, Can.

CANADA is perplexed over its fuel supplies from the United States and, as a result, there is an insistent demand from some of the leading dailies that she take time by the forelock and either insure a sufficient supply without depending upon the coal fields of the United States, or, better still, find substitutes for the fuel now being used.

That the matter is one of grave concern to the Canadian people was borne out by the fact that the Canadian Institute of Mining and Metallurgy, at its annual meeting in Montreal, March 7-9, devoted the entire session, extending over three days, to a discussion on the fuel situation. Many of the leading fuel experts of the United States were in attendance and presented well-considered views on the relation of the United States to Canada in so far as fuel supplies are concerned.

Undoubtedly the Canadian consumers—they purchase 22,000,000 tons a year from the American coal fields—are seriously perturbed; so much so that they have even gone to the limit of accusing the American operators of discrimination. In this unqualified charge, however, they have lost sight of several important facts, as papers, delivered by American experts, indicated.

United States Giving Canada Fair Quota

For instance, George H. Cushing, of Washington, in his paper on "United States Bituminous Coals Available for Canada," pointed out that the recent shortage in Canada was not due to a malignant desire on the part of United States operators to hold up their Canadian customers. Rather it was due to factors over which they had no control, and, further, it amounted, in the opinion of Mr. Cushing, to an almost unpardonable libel to suggest that American dealers were unfair.

As he pointed out, the coal shortage was due to the simultaneous expiration of the contracts between union miners and union operatives, "a combination of circumstances which is hardly likely to recur."

When the coal situation as between Canada and the United States was brought down to the fine point, as Mr. Cushing explained, it was essentially a matter of transportation. As he said, "I believe it is going to prove easier to buy coal than to have it carried," which disposed of this matter almost in a nutshell.

Enlarging on the problems facing the American operatives, he recalled how, in the earlier stages of the war, the United States inevitably was forced into supplying the needs of the allies as a result of which it accumulated a large working surplus. This was invested in the ownership of mines and factories. Unfortunately, one fatal mistake had been made; rail transportation had not been developed commensurately with the progress of industry. The merchant marine, however, had been greatly overdeveloped.

"Putting it bluntly," he said in his summary on this point, " we have far and away enough coal productive capacity to satisfy all Canada's demands for fuel but we have such comparatively small rail transportation facilities that we cannot take care of our own needs and Canada's unless we both apply ourselves assiduously to the development of our water-borne traffic."

American operators, he contended, were forced to select customers who were so situated as to assure the quickest return to the mines, but, he thought, Canadians could help by insisting upon a quick return of coal cars.

Must in Future Do with Less Anthracite

J. F. K. Brown, chief engineer of the Hudson Coal Co., dispelled a few illusions also in his paper on the "Relationship of the Anthracite Fields to Canada," the first one of which was that there had been no progress in coal-mining operations. He pointed out that, owing to the diminishing supply of anthracite, it was likely to be extensively supplanted by soft coal and other fuel. As regards this possibility, he thought any change will come about gradually and it will be taken care of by the consumer, who, as time goes on will create a demand for another and more economical method of heating as he finds that the cost of his present system slowly increases.

Costs of production naturally will increase because the best coal has long since been mined and, of necessity, operators now have to dig deeper and use more expensive machinery to meet their requirements.

R. J. Lee delivered an address on the "Lignites of Saskatchewan." He stated that the deposits were discovered in August, 1857, by Dr. Hector and Captain Palliser, of the Palliser expedition, who had heard reports as to the presence of the mineral from Indians and half-breeds. In 1880 Hugh Sutherland shipped coal by barge down the Souris River and other waterways to Winnipeg.

The principal lignite mining region in the province of Saskatchewan is around Bienfait, Estevan and Roche Percée. Here are four seams varying from 3½ to 15 ft. in thickness, the average being 8 ft. From this area 90 per cent of the present lignite production of Saskatchewan is produced.

Roof Too Weak for Longwall Workings

Longwall has not been found successful, probably because there is no solid rock formation between the tops of the seams and the surface. No difficulty has been experienced, however, in working rooms to a width of 25 ft. No inflammable gas has been encountered, but fires, says Mr. Lee, have broken out at several of the mines and, in the spring, water is a source of trouble, as it readily enters the mines through the light surface cover. The plants in aggregate could produce 3,000 tons per day if they could find a market for their product. When the lignite is dried and pulverized it is extremely liable to spontaneous combustion, which makes it difficult to store. It also reabsorbs moisture freely. This interferes with its use pulverized. Certain technical difficulties have been found to interfere with the briquetting of dried lignite. Briquets have been made containing: Moisture, 6 per cent; ash, 14 per cent; volatile matter, 16 per cent; fixed carbon, 64 per cent. The fuel gives 11,700 B.t.u.

D. B. Dowling, of the Canadian Geological Survey, adds Mr. Lee, estimates the total lignite resources of

Saskatchewan at 58,000,000,000 metric tons. This estimate includes all coal seams of 1 ft. or over and to a depth of 4,000 ft. The lignite has 33 per cent of moisture, 27 per cent of volatile matter, 7 per cent of ash, 33 per cent of fixed carbon and 9.5 per cent of sulphur, and delivers 6,500 to 7,500 B.t.u. The lignite is sold at a low figure, for whereas the average selling price of coal at Canadian mines is $4.97 per ton the average selling price of Sasketchewan lignite is $2.40 per ton. So far the field has conducted its operations without lengthy strikes.

Ontario Has the Most; Quebec the Best Peat

B. F. Haanel, in an exhaustive paper on the "Peat Resources of the Central Provinces and Their Utilization for Fuel Purposes," said:

"The peat resources of Ontario are estimated to cover approximately 10,450, those of Manitoba 500, and those of Quebec 500 square miles, but of this large area only a very small portion, favorably situated with respect to inhabited communities and transportation facilities, has been surveyed and examined in detail. Only this portion, therefore, will be considered in discussing the value for fuel purposes of the peat in the central provinces.

"Eighty-eight peat bogs situated in this part of Canada, with a combined area of 330 square miles and representing 114,000,000 tons of standard peat fuel, have been examined in detail. Forty-six of these bogs are situated in Ontario, 27 in Quebec and 9 in Manitoba.

"The calorific value of the bogs examined so far in the Province of Ontario varies between 7,000 and 9,000 B.t.u. per pound. It is noteworthy that the peat of the bogs so far examined in Quebec appears to be of a better quality than that found in Ontario, the heat content varying between 9,000 and 9,760 B.t.u. per pound. In every case the heating value refers to absolutely dry peat. This is a very high heating value for Canadian peat and compares favorably with that of the peat found in Ireland. The ash content of the Ontario bogs so far examined varies between 4 and 26 per cent, but a large number of the bogs have an average ash content around 6 to 7 per cent. Here again the advantage appears to rest with the peat bogs of the Province of Quebec; their ash content is exceedingly low, varying between 2 and 8 per cent, and the average percentage of ash in all the bogs of that province is considerably below 8 per cent.

Low Ash and Sulphur and High Nitrogen

"Chemically, peat differs markedly from solid fuels in that it has a high percentage of oxygen—about 33 per cent—a high content of volatile matter, a low content of fixed carbon, and generally a comparatively high content of free nitrogen. The latter makes peat fuel especially valuable for utilization in a byproduct-recovery gas producer, in which over 70 per cent of the nitrogen of the fuel may be recovered as ammonia. The sulphur content of peat is very low; almost negligible.

"Peat coke for this reason is a most desirable metallurgical fuel. The ash content is not only low, as a rule, but non-fusible under ordinary conditions; therefore high temperatures can be maintained without the production of troublesome clinkers. The heating value, as already stated, is determined for absolutely dry peat, but when peat is used as a fuel its moisture content varies up to 40 per cent.

"If the raw-peat substance contains 88 per cent water and 12 per cent combustible substance—that is, 240 lb. of combustible matter and ash per 2,000 lb. of raw peat—and if the heating value in the absolutely dry state is 9,000 B.t.u. per pound, there would scarcely be sufficient heat available to evaporate the moisture content, assuming perfect drier efficiency and that this heat could be made available.

"The evaporation of the total water content by the application of artificial heat has not proved economic, and it has been amply demonstrated that the bulk of the associated water must first be removed by other means before artificial heat can be employed for removing the remaining moisture. In drying at atmospheric pressure, the larger part of the heat required is represented as latent heat of steam, namely, 970 B.t.u. per pound of steam formed, and this heat in practice is totally lost.

Drying by Artificial Heat Unprofitable

"Several attempts have been made in Canada and other countries to briquet raw peat when dried below 10 per cent moisture, without the employment of a binder, the object being to produce a compact and more attractive fuel and one in which the rate of combustion would be less rapid than is the case with ordinary air-dried machine peat. The reduction in volume, it also was realized, would be a great advantage; but in order to furnish the dry peat for briquetting, the original water content had to be partly removed by artificial heat, as in the case described above. Much money has been expended in an attempt to perfect a process for manufacturing peat in this manner, but this money was lost, due entirely to the cost of drying and briquetting.

"Based on the performance of the experimental combination plant at the Alfred (Ont.) bog and the estimated cost of an entirely new and remodelled plant, complete with an efficient power unit and larger macerator, the production and other costs of the finished peat per ton are estimated to be:—

	10-Hr. Day	20-Hr. Day
Production costs	$2.00	$2.00
Overhead costs	2.48	1.50

"Thus the total cost of finished peat fuel on board cars at the siding of the plant would be $4.48 for a 10-hr. day, for a season of 100 days, or $3.50 for a 20-hr. day during the same season. The total production of salable fuel in the first case would be 10,000, and in the second case 20,000 net tons. Overhead costs, however, increase rapidly as the production decreases; consequently the committee recommends that plants of this type be operated for twenty hours per day. The figures for production costs include an ample allowance for cost of raw fuel, paid for on a royalty basis, and for clearing and draining the bog.

Has Half as Much Heat as Anthracite

"Standard peat fuel, as manufactured at Alfred, has a heating value of about 6,500 B.t.u. per pound, whereas the average anthracite now coming into Canada has a heating value of about 12,500 B.t.u. per pound. Standard peat fuel has a moisture content of 30 per cent.

"Theoretically, therefore, it takes about 2 lb. of peat to give the same heating value as 1 lb. of anthracite. This is based on a comparison of the theoretical heating values of the two fuels. In practice, however, a comparatively large portion of coal passes through the grates unburned, and is entirely lost, whereas the peat is entirely consumed. In mild weather, owing to the difficulty in controlling a coal fire, much heat is wasted or the fires go out. With the peat fuel this is not the

case. This is a distinct advantage which peat has over anthracite.

"The value of the nitrogen contents of our peat bogs will be better appreciated from the following calculation: The fuel content of the peat bogs examined in detail in Manitoba, Ontario and Quebec is estimated at 114,000,000 net tons of fuel having a 25-per cent moisture content. This reduced to the dry state is equivalent to 85,500,000 tons, and if the average nitrogen content is 1.75 per cent, the total quantity of free nitrogen available will be approximately 1,500,000 tons. From this quantity of nitrogen 4,900,000 tons of ammonium sulphate could be produced, assuming a recovery efficiency of 70 per cent, which would represent a total value of about $200,000,000, depending on the market price."

G. B. Saunders, a Winnipeg coal merchant, dealing with "The Problem of Replacing Foreign Coals on the Manitoba Market," strongly boosted Canadian coal, asserting that Canada should be entirely independent of American supplies. That the Canadian mines are doing better business was obvious from figures; in Manitoba alone, he declared, fully 75 per cent of the domestic coal used this winter was from Canadian mines. The Western dealer was particularly bitter toward the attitude of some of the leading institutions in the country who, with their preference for American fuel, ignored the home product.

That the American coal business was operated on ruthless lines in order to retain the Canadian market was stressed by Mr. Saunders, who spoke of price cutting by importers of American coal and dealers in order to defeat the Canadian sellers. Many of the assertions about the superiority of American over Canadian coal were fallacious, he declared, instancing several tests that have been made with the two fuels in which the Canadian product made the better showing.

Spontaneous Combustion of Stored Coal And the Conditions That Favor It

THAT the tendency of coals to fire spontaneously differs with their age, the younger coals being the most dangerous, is one of the conclusions of Joseph D. Davies, fuel chemist of the U. S. Bureau of Mines, and John F. Byrne, research chemist of the Carnegie Institute of Technology, as expressed in a bulletin published as the result of experiments and inquiries cooperatively conducted by these two institutions. No case, say they, has been recorded in which anthracite fired spontaneously; even fines and slack can be safely stored. At the other extreme is lignite, which cannot be stored, even in lumps, with safety, except under water. Between these two extremes are the various grades of bituminous coals, the class most commonly stored.

The liability of different bituminous coals to fire varies widely on account of differences in the coal; but, broadly speaking, the bituminous coals of the eastern part of the United States store better than the coals of the Middle West. These, in turn, are safer to store than the sub-bituminous coals of the Intermountain region. Though the tendency to fire will vary widely in any one class of coal, generally speaking, the higher the rank the less the danger of fire and the less the deterioration in storage. The classification as to self-heating coincides with the classification of coals, beginning with lignite as the most dangerous, ranging through sub-bituminous, bituminous, semi-bituminous, to anthracite, which is the least prone to spontaneous combustion.

The solution of the problem of spontaneous combustion may lie in the microscopic examination of coals and its correlation with the rate of heating. Coal is composed of three parts, namely, anthraxylon, or bright coal; attritus, or dull coal, and mineral charcoal, and may be separated into almost pure samples of each. These three constituents differ in their ease of oxidation and rate of heating. Tests indicate that in the spontaneous heating of coal the anthraxylon is the constituent that first rises in temperature.

As the results of the experiments of Messrs. Davis and Byrne it is stated that the presence of fines in a coal pile should be avoided. Coal should be handled as little as possible and should be screened wherever practicable before storing. Coal coarser than ¼ in. showed no rapid self-heating throughout the experiments.

The experiments show that with the same coal, moist air will give a lower "critical" or spontaneous combustion temperature than dry air. Therefore, wetting the coal pile to retard heating is not good practice unless the coal is completely immersed.

Instead of hastening spontaneous combustion, partly oxidized coal seems to act as a deterrent when mixed with fresh coal. It appears that the danger in mixing two grades of coal, or in storing coal on the same pile at different times, arises from physical rather than chemical causes. If no heating has occurred at the surface of the heap, it is safe to pile more coal on top, provided there is no accumulation of fines at the contact of the new and old coal. A mixture of two kinds of coal will heat more rapidly than either one of them.

Artificial mixtures of coal and pyrite in various proportions showed a critical temperature no lower than that of the coal alone, whereas pure pyrites had a critical temperature 26 deg. C. higher than the coal. From this it appears that massive pyrite or "brass lumps" are not dangerous in a coal pile.

Better Isolated from Air than Ventilated

On account of the low conductivity of coal, cooling by artificial ventilation is almost impossible unless the air reaches every part of the pile. Generally the air travels through the stack in currents and exerts no cooling effects on parts a short distance away from its channels. It is easier to exclude air so completely as to retard oxidation than to ventilate the pile so thoroughly that the heat developed will be dissipated.

Coals have been tested under various physical and chemical conditions to determine the temperature at which they generate heat so rapidly that, provided no deterrent is applied, the coal will eventually ignite. This temperature has been arbitrarily called the "critical temperature." Under similar conditions of heating and aërating, this critical temperature is an index of the liability of a coal to fire spontaneously. The "critical temperature" method of testing coal may be applied to the various coals of the country for grading their relative tendencies to fire spontaneously, and the U. S. Bureau of Mines expects to develop this method further and apply it in a survey of the coals of this country.

The results of these tests are summarized in Bulletin 3, Coal-Mining Investigations series, which is distributed by the Carnegie Institute of Technology, Pittsburgh, Pa., at a price of 25 cents.



Problems of Operating Men

Edited by James T. Beard



Room-and-Pillar Work in the Miller or "B" Seam

Knowledge of Conditions Needful—Soft Bottom, Characteristic of This Seam—Uniform Pillars Essential to Successful Work

REFERRING to the question asked by Robert Holt, *Coal Age*, Feb. 1, p. 226, as to whether it is better to delay the drawing back of pillars when a room has reached its limit, in the working of the Miller or "B" seam; or whether better results can be obtained by starting the work of robbing at once, allow me to submit the following:

My understanding is that the purpose of delay would be to permit all the rooms on a producing entry to reach the limit and then pull back the pillars in one continuous line. The inquirer further draws attention to the timbering being in good condition when the room reaches the limit, but fears the effect of the soft bottom, if the work of robbing is delayed.

My experience tells me that soft bottom is characteristic of the Miller seam, at least throughout the Somerset County field in Pennsylvania, which limits my acquaintance with this seam. In some instances, however, I have known the fireclay underlying the coal to be of such a composition that it will not disintegrate as rapidly as it does in other localities. A thin stratum of coal underlying the clay, in places, gives a greater firmness to the material and enables it to better resist the increasing pressure when the coal is taken out.

Development of Mine Is Invariably Accompanied by Squeeze

However, in every instance in my experience, a fairly extended development has been accompanied with a more or less pronounced squeeze. This fact has led me to conclude that it is always safe to anticipate the occurrence of a squeeze, in working this seam, and to adopt every precaution to reduce its effect to a minimum.

Assuming that the mine is worked advancing on the room-and-pillar system, as I believe is the case in this instance, the tendency to squeeze can be considerably reduced by the maintenance of uniform pillars throughout the mine, particularly the pillars between rooms. While this is easy to suggest and in strict conformity with the principles of good mining practice, its application is not so easy in the working of this particular seam.

Unfortunately, the Miller seam is characterized by numerous rolls, which make it absolutely necessary, at times, to narrow the width of the rooms, or even change their direction, in order to overcome this obstacle. In other words, it is difficult to always drive the rooms on sights, under the conditions that prevail in the Miller seam.

Let me suggest, here, that it is always advisable to adopt a uniform system of posting that will make it possible to maintain the prescribed width of the room and thickness of pillars. My experience has proved that such a regular system of posting distributes the roof pressure more uniformly and the posts will continue to support the roof a longer time without breaking, and there is less evidence of coming squeeze than when the timbers are set in a haphazard way.

A seam of this thickness, 3½ ft., will not develop a surface break, until a large area has been extracted, if it does then. Extracting pillars as the rooms are finished, will throw a great weight on the remaining room stumps as well as on the chain or barrier pillars, and a squeeze will be almost inevitable. If that occurs an unavoidable loss of coal will follow as many of the remaining stumps and pillars cannot be taken out with safety.

On the other hand, if the pillars be left until the roomwork is completed on an entry, the chances are more strongly in favor of an extended squeeze occurring very shortly after the work of drawing the pillars is commenced. Unless very wide pillars are left, there will be no solid coal of sufficient dimensions to cause a break that will relieve the pressure and avoid the squeeze that is imminent and certain to prove disastrous to the future working of the mine.

Choice Lies Between Two Evils

Out of two evils, therefore, we will choose the least. My judgment is that there is less danger to be anticipated, under these conditions, if the work of robbing the pillars is commenced at once when a room reaches its limit. It is always a judicious course, however, in a case like this where it is necessary to choose between two evils, to carefully explain the possibilities in each proposition. It should be understood, beforehand, that the method chosen will not eliminate loses that are sure to follow, in the working of the seam by reason of conditions that cannot be wholly overcome.

A study of these conditions that so generally prevail in the Miller or "B" seam, has shown to me that one thing liable to occur is the sudden breaking of the roof strata where it might be least expected: namely, in advance and isolated narrow work. Such has been my personal experience, on several occasions, and I have discussed the cause of these sudden breaks with a number of mining men.

Those with whom I have conferred have expressed themselves as believing that the cause of such breaks was either gas or water pressure, though neither of these were manifest, at the time of the occurrences or later, in sufficient volume to warrant this conclusion. It would be of interest to learn the thoughts of others regarding the cause of these sudden breaks, in driving advance headings in this seam.

I. C. Parfitt.

Washington, D. C.

Electric Cap Lamp in Firebossing

Lamp has no value for testing for gas—Bright light blinds the eyes—Requires too much time to screen light when making a test.

IT HAS been a surprise to me that so many of the writers in *Coal Age* have professed a preference for carrying an electric cap lamp on their heads when making their rounds as firebosses in mines. I heartily agree with O. G. Sharrer, whose letter appeared in the issue Nov. 30, p. 779, when he says: "Any official whose duties require him to test for gas in the mine should carry no other lamp than an approved testing lamp."

The electric lamp has no value for making a test for gas. It is my belief that should a fireboss carry such a lamp in his cap when making his early rounds in the morning it would prove a menace in more ways than one. It is well known that most firebosses have large districts to cover, which keeps them on a constant run.

Reasons Why Fire Bosses Should Not Carry Electric Cap Lamps

On account of the limited time for making the examination, the fireboss has no time to spare to hide his cap lamp when wanting to make a test. The bright glare of the electric lamp obscures his vision and he is unable to see the faint gas cap that may form in his safety. Many firebosses will take chances, under such conditions, and not make any effort to screen their electric lamps, which thus become a menace to safety.

Taking these things into consideration, I consider it both wrong and dangerous for any fireboss to carry an electric lamp in his cap when examining a mine for gas. He should have with him, in his morning examination, no other than an approved safety lamp. This conclusion is the result of a wide experience in firebossing, first in England and then in West Virginia mines.

As fireboss, I never used any other lamp than a safety lamp of approved type. In the examination for gas, I have always regarded an electric lamp as a menace to the safety of everyone employed in the mine.

In some mines where I have firebossed, it was necessary for me to shed my coat, vest and overshirt while making my run of the district in my charge. Even then my undershirt and trousers would be wet from the perspiration that poured from my body.

Bay City, Mich. William Dickinson.

Working Coal with Soft Bottom

Must guard against squeeze and creep—Two methods of working proposed—Retreating panel system—Narrow rooms with wide pillars—Longwall conveyor face.

WITHOUT a more intimate acquaintance with the situation, it is difficult to give an intelligent answer to the inquiry of Robert Holt, *Coal Age*, Feb. 1, p. 226, regarding the working of a coal seam having a soft bottom and a fairly strong roof, such as he describes in reference to the Miller or "B" seam, in Pennsylvania.

Experience teaches that the main things to guard against in the room-and-pillar method of working under the conditions described, is the occurrence of creep or squeeze. Creep is the result of leaving too small pillars for the support of the roof, in the first working, when either the roof or floor, or both, are soft and of a yielding nature.

As the work of extracting the coal proceeds, the pressure on the supporting pillars is increased in the ratio of the area being worked, to the area of the pillars that remain. If half the coal is taken out in the first working, the pressure on the remaining pillars is doubled and, as a consequence, they are forced into the soft bottom. The roof sags and the bottom heaves.

Difficult and Often Impossible to Stop Squeeze When Once Under Way

Mining men who have had these conditions to contend against know that when a squeeze is once started it is difficult to control. Timbers are broken and the pillar coal crushed, making it difficult or impossible to recover that coal with safety.

Following these general remarks, I have two propositions to present in respect to working a seam of coal under the conditions named. They are: 1. The adoption of a modified panel system on the retreating plan, employing the room-and-pillar method of working out the panel. 2. Arranging a conveyor face, say 500-ft. in length, in working out the panel.

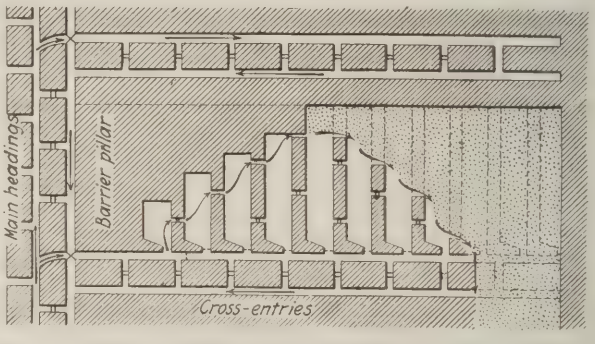


FIG. 1. ROOM-AND-PILLAR SYSTEM, PANEL METHOD

Describing Two Methods of Working a Panel

As shown in Fig. 1, the room entries are driven up to the boundary line of the panel, or a distance that will allow of driving, say thirty rooms in the panel. No rooms are turned, however, until the entries reach the boundary where the first rooms are started, the plan being to work out the panel on the retreating system.

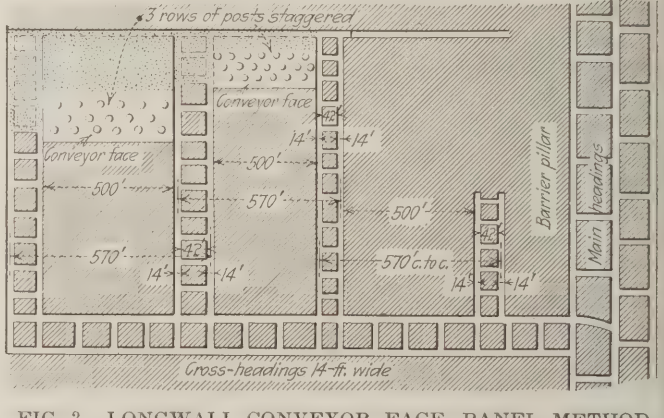


FIG. 2. LONGWALL CONVEYOR FACE, PANEL METHOD

As each room reaches the limit, the work of drawing back the pillar is begun at once. If the pillars are left to stand there will be danger of starting a squeeze, which would hinder the work and cause a loss of much coal. As each pillar is finished, the work of taking out

the entry pillars and stumps should follow immediately, care being taken to keep the line of pillar work uniform across rooms and entries.

In Fig. 2 is shown the method of working out the panel by establishing a longwall face, using a conveyor to transport the coal along the face. As before, the entries or headings are driven the length of the panel. At that point, two rooms are turned and driven up to the full depth of the panel, say from 60 to 75 yd., depending on the conditions in the roof and floor.

At the same time, two other rooms are started at a distance of 500-ft. outby. Like the first, these rooms are driven up to the limit of the panel. The two pairs of rooms are then connected by driving across the face of the coal.

When this connection has been made, a conveyor is installed and the entire block of coal between the two pairs of rooms worked back to the headings. As shown in the figure, while this is being done another pair of rooms is started and driven up to the limit of the panel, Here, a second longwall conveyor face is formed and worked back in the same manner as the first.

In closing, let me say that it is important to keep in mind that success in mining coal under the conditions mentioned, depends on driving narrow places with wide pillars and working back on the retreating system, whether the coal is worked out on the room-and-pillar system or by a longwall face. Every precaution must be taken to avoid starting a squeeze or creep. In no case, should the work of drawing back the pillars, as each room reaches its limit, be delayed. In my opinion, this would be particularly disastrous to the roads and timbers where the bottom is wet.

In adopting the longwall plan, the face of the coal can be worked out square with the panel, or on a diagonal line, as may best suit the conditions in the coal. In any case, the small pillars formed, in driving each pair of rooms when laying out the panels, should be brought back in line with the longwall face. Either of the plans proposed, will, in my judgment, require less narrow work and result in a larger extraction of coal than is possible otherwise, while at the same time making a squeeze less liable. W. DICKINSON.

Bay City, Mich.

Inquiries Of General Interest

Making a Test for Gas in a Room

Dispute with Reference to Being Able to Find a Few Inches of Gas at the Roof of a Room When the Layer of Gas Is Too Thin to Feed Into the Lamp

A FEW days ago I was an interested listener to an animated dispute between two men who bore reputations for being practical mining men, but who appeared to hold radically different views on a matter pertaining to the testing for gas in a room or chamber.

For the purpose of the argument, we will assume the coal seam was flat. The question in dispute had reference to a thin layer of gas at the roof of a room. It was assumed that the test was to be made with a bonneted Koehler lamp. One of the men claimed that, with this lamp, he could detect the presence of any gas at the roof, although it might be but a thin layer extending an inch or so below the roof.

Both men used the term "inches of gas," in its general acceptance in the practice of firebosses. Six inches of gas would mean that the lamp flame gave the first indication of the presence of gas at a point six inches below the roof line. The first man's theory was that the gas, even if but a thin layer was there, would naturally descend and enter the lamp and its presence would be manifest on the lamp flame.

The second man claimed, on the other hand, that the gas being lighter than air would not naturally flow down and feed into the lamp, as such action would be contrary to physical law. He stated that unless the layer of gas was 9 in. in thickness, so that it would reach the ports where the air and gas fed into the lamp, a proper test could not be made that would show the presence of the gas.

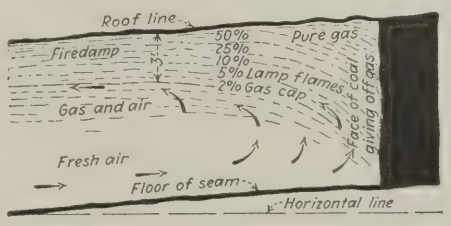
Judging from the conservation, both men appeared to understand the situation alike; but, while one claimed that the gas would descend from the roof far enough to feed into the ports of the lamp designed for the entrance of air, the other claimed that this would be contrary to the laws of nature, inasmuch as the gas was lighter than air.

The fact that these men are both regarded as authorities on such a question, leads me to ask the opinion of *Coal Age* regarding the question presented.

Pittsburg, Kan. AN ANXIOUS LISTENER.

While it is true that the lighter density of the gas gives it a tendency to ascend and causes it to follow the roof line as closely as possible, it is likewise true that there is taking place a constant diffusion of the gas into the air below. As has often been explained in the columns of *Coal Age*, this diffusion of the gas into the air makes it impossible to maintain a definite line of separation between the gas and the air.

Assuming a generally flat seam, gas that may issue from the face of the coal at the head of a room or



SHOWING MOVEMENT OF GAS AT WORKING FACE

chamber will rise and travel along the roof as a thin layer of gas. But, at the same time, diffusion is constantly taking place between the gas and the air, so that there is no marked line of division between the two. A common practice among firebosses is to report a certain number of inches of gas found at or near the face of a room. This method of reporting the gas, however, is only suggestive of the condition that actually exists in the room.

In order to make more clear the situation, we here repeat an illustration that has been shown in previous issues of *Coal Age*. The dotted lines shown in the figure make plain the movement of the gas from the

face in a generally upward and forward direction and the decreasing percentage of gas from the roof downward is likewise indicated.

In reply to the question in dispute, it can be said that it would be generally impossible to walk under a layer of gas in a room or chamber without disturbing the gas more or less and causing it to descend in the wake of the person as he moves toward the face of the chamber.

Assuming, however, a still quiet condition where there is no appreciable disturbance of the layer of gas, it would be hard to detect, say two or three inches of gas at the roof, using the Koehler lamp and holding it in an upright position. A common practice among firebosses is to blow gently toward the roof, which disturbs the gas and causes it to descend and enter the lamp.

Examination Questions Answered

Examinations Under the Mines Act, Alberta, June, 1922

(Selected Questions)

QUESTION—*The quantity of air entering a mine at the intake is* 150,000 *cu.ft. per min., at a temperature of* 40 *deg. F., barometer* 28 *in. The quantity leaving the return is* 178,000 *cu.ft. per min., at a temperature of* 70 *deg. F., barometer* 28 *in.; what is the percentage of gases in the return air?*

ANSWER—For the same barometric pressure, the volume of air and gas is proportional to the absolute temperature, which gives for the expanded volume of the air current, in this case, 150,000 (460 + 70) ÷ (460 + 40) = 150,000 (530/500) = 159,000 cu.ft. per min. In this case, the volume of gas given off in the mine is 178,000 — 159,000 = 19,000 cu.ft. per min. The percentage of gas present in the return current is, therefore, 100(19,000/178,000) = 10.7 per cent, nearly.

QUESTION—*What are the chief causes of accidents from blasting in mines where shotfiring is done and the mine is known to give off methane* (CH_4) *and where a considerable amount of coal dust is produced? What steps would you take to prevent them?*

ANSWER—The chief causes of accident in blasting coal, in mines generating gas and dust, are the failure to make and enforce strict rules and regulations regarding the kind and weight of powder used and the inspection, charging, tamping and firing of shots. The excessive use of powder or the mixing of different grades of powder in the same hole; the firing of two or more shots at the same time in a close place; shooting in the presence of gas or accumulations of dust at the working face; the misplacing of shots, or shooting coal off the solid and many other causes give rise to blownout shots and produce local explosions of gas and dust that are dangerous.

Under the conditions named a maximum degree of safety is derived by the employment of shotfirers who shall examine charge and fire all shots drilled by the miners, after the men have left the mine for the day.

Shotfirers should be authorized to refuse to fire any shots that, in their judgment, are unsafe.

QUESTION—*What are the causes of the production of coal dust in mines, and what steps would you take to reduce it as much as possible?*

ANSWER—The production of fine coal dust is most serious in the mining of coal by machines. Large quantities of fine dust are also produced by the excessive use of powder, in blasting a soft friable coal. In the mining of coal by machines, the fine cuttings or "bug dust," as it is called, should be carefully loaded and taken out of the mine in dust-proof cars. No accumulations of these cuttings should be allowed at the working face and they should not be thrown back in the gob.

In respect to blasting a soft friable coal extra care must be used in the placing of the shots and the charging of the holes. All holes should be examined by competent men appointed for that purpose, before the holes are charged or fired. Strict regulations should be enforced and violations of the rules promptly punished.

QUESTION—*What are the chief dangers of coal dust and what steps would you take to counteract them?*

ANSWER—The danger arising from the presence of dust in mines is dependent on the fineness and inflammability of the dust and the manner in which the dust question is handled. The danger is imminent where dust is allowed to accumulate, in quantity, on the roads and timbers of all air-courses, travelingways and working places. Also, when all needed precautions are not taken to prevent the suspension of the dust in the mine air, by humidifying the mine by steam introduced into the intake current, or by spraying or watering the roads and working places. The methods employed in the working of the seam and the mining of the coal are largely responsible for the degree of danger from dust.

QUESTION—*Explain the difference between a force fan and an exhaust fan.*

ANSWER—As far as the fan itself is concerned there is no difference in its action. The revolution of the fan blades develops a centrifugal force by reason of the weight of air revolved within the fan. As a result air is drawn in at the center and discharged at the circumference of the fan. The difference between these two types of fans consists solely in the manner in which the fan is connected with the mine to be ventilated. In a blowing fan the circumference of the fan is connected directly with the fan drift, while the central orifice of the fan is open to the atmosphere. This arrangement permits the air to be drawn in to the fan and discharged into the fan drift by which it is conducted through the mine under the pressure due to the action of the fan.

On the other hand, when the fan is exhausting the central orifice of the fan is connected by a suitable casing with the fan drift, while the circumference of the fan opens into an expanding chimney leading to the atmosphere. By this arrangement the mine air is drawn into the fan and discharged at its circumference into the chimney by which it is thrown into the atmosphere at a low velocity.

In each case the fan acts to produce a depression at its center and a compression of the air at its circumference. When blowing air into the mine the latter is ventilated under a pressure above that of the atmosphere, this pressure being created by the fan is always determined or caused by the mine resistance. When exhausting air from the mine the latter is ventilated under a pressure below that of the atmosphere, the atmospheric pressure then forcing the air through the airways to relieve the depression caused by the fan.

Daily Output of Basic Commodities Higher in February; Retail Sales Keep Pace; Wholesale Price Index Up

Productive activity was maintained in February at the high levels reached during the previous month, according to early figures received by the Department of Commerce through the Bureau of the Census. In many cases declines are shown owing to the smaller number of working days, but when allowance is made for this factor, the rate of production in most of the important basic commodities was slightly larger than in January.

Daily rate of consumption of cotton and of production of fine cotton goods, pig iron, lumber and automobiles exceeded the January rate. In most lines connected with railroad equipment and building, such as locomotives, pig iron, fabricated structural steel, building contracts and oak flooring, the actual February sales were still greater than January orders.

Retail sales kept up to January's mark in spite of the shorter month, while the transportation system showed signs of overcrowding in the large car loadings and increased shortage of freight cars. The wholesale price index advanced one point, and again the decline in coal prices prevented a further rise. Food prices, both at wholesale and retail, declined. Increased prosperity is confirmed by the marked decline in business failures and the continued rise in stock prices.

In the textile field, the increasing rate of cotton consumption reduced total stocks of raw cotton at the end of February to the lowest point reported at this season of the year since 1914. Wool receipts, with one exception, were higher in February than in any month since April, 1921, while silk consumption, also with one exception, was the largest since 1919.

Pig-iron production in February was at a slightly higher rate per day than in January, while steel-ingot production was slightly less. Unfilled orders of the United States Steel Corporation increased to 7,283,989 tons, the highest since January, 1921. Unfilled orders for locomotives made a new high record in February, fabricated structural-steel sales were the highest since last May but orders for steel castings declined.

Production of bituminous coal declined in February to 42,160,000 tons from 50,123,000 tons in January.

Building contracts awarded in February amounted to 41,611,000 sq.ft., showing an increase over January in place of the expected seasonal decline. Shipments of building materials, such as lumber, flooring and cement, showed large increases over January and over February of last year.

A net shortage of 65,000 freight cars at the end of February was the first increase over the recent low point of 45,000 cars short at the end of January.

U. S. Steel Corporation Mines 23,293,471 Tons of Coal in 1922; Wages Fall

The mines of the United States Steel Corporation produced 23,293.471 tons of coal in 1922, as compared with 21,627,939 tons in 1921, an increase of 1,665,532 tons, or 7.7 per cent. Of the tonnage produced in 1922, 16,778,413 tons was used in the manufacture of coke and 6,515,058 tons for steam, gas and all other purposes, as compared with 14,546,103 tons used in the manufacture of coke and 7,081,836 tons used for gas, steam and all other purposes in 1921. Inventory as of Dec. 31, 1922, showed the value of coal, coke and other fuel on hand to be $10,807,030, as compared with $13,054,195 on the corresponding date of the previous year.

There was expended for improvement on the coal and coke properties of the corporation during the past year $5,987,117, of which $1,762,509 was for the acquisition of additional acreage of coking and gas coal in Greene County, Pennsylvania, and in the Illinois and Indiana coal fields. For surface land in Greene County, Pennsylvania, for a shaft and town site at the Dilworth works and for a railroad right of way $171,367 was expended. In the Connellsville district $469,313 was expended for tenement houses and $1,343,828 for facilities to increase the output of Colonial Nos. 1, 3 and 4 works and for underground transportation through Alice Mine to Colonial Dock.

In the West Virginia and Kentucky fields $198,931 was expended for bridges, roads, tenement houses and general construction at works Nos. 30 and 31. On the construction of two new coal-mining plants in Washington County, Pennsylvania, $891,089 was spent.

The corporation had on its payrolls of the coal and coke properties on Dec. 31, 1922, 26,856 persons, an increase of 4,405 over the previous year. Its entire payroll numbers 214,931, as compared with 191,700 in 1921, while the total salaries and wages paid was $322,678,130, as compared with $332,887,505 in 1921, a decrease of $10,209,375. The average earnings per employee per day, including general administrative and selling forces, for 1922 was $4.91 as compared with $5.73 in the previous year, while the average earnings per employee per day in December, 1922, was $5.59 as compard with $4.60 in the corresponding month of 1921.

On Sept. 1, 1922, an increase of about 20 per cent was made in the pay of common labor of the subsidiary companies other than those of the railway companies, the rates for other classes of employees being advanced equitably.

The annual report says that in western Pennsylvania $2,302,503, including the expenditures in Greene County, was spent for opening and developing new coal properties and that further disbursement for the same purposes will be made this year.

Pensions paid to retired employees amounted to $1,266,661 compared with $947,879 disbursed in the preceding year. At the close of the year there were 3,886 names on the pension rolls, a net increase of 449 during the year. Since the inauguration of the pension plan in 1911 an aggregate of $8,095,122 has been paid in pensions. For accident relief $4,170,945 was expended, including accruals not yet actually payable under state compensation laws, compared with $4,409,211 in 1921.

The subsidiary companies of the corporation advanced or lent employees on contracts and mortgages $8,143,005, carrying interest at 5 per cent and payable in installments over a period of years to assist them in acquiring homes under the corporation's home-owning plan. In providing modern sanitary facilities for employees $2,252,975 was spent.

The coal properties owned or leased include 419,286 acres vein area of coking coal, 343,384 acres vein area of steam and gas coal, and 303,097 acres of surface. The corporation has 61 coking plants with 18,532 beehive ovens and 2,992 byproduct ovens. There are 62 coal-mining plants not connected with coke plants and nine coal-washing plants.

The corporation's water-supply plants in the Connellsville coke region have a daily capacity of 18,000,000 gallons, and in addition to furnishing the water necessary in manufacturing coke, serve water to three municipalities.

JOBBERS AND DEALERS in Columbus, Ohio, are discussing a circular letter recently received from the Central Fuel Co., of Cincinnati, which represents the Ford coal-producing company. Among other things in the circular are: "The first and last quotations for March for 1-in. shaker, boom-loaded lump, $4.25. Due to a better car supply and decreased costs we are lowering prices from $4.75 to $4.25. Dealers will always get the benefit of Ford's organization and at a fair price. Good coal for good people at a fair price." Attention is called to the published statement from Henry Ford that when he was asked $4 per ton for coal he closed down his Highland Park plant, contending that the price was too high.

Ford Raises Wages in Pond Creek Mines

A new scale of wages was announced March 20 by the Ford interests, which recently obtained control of the mines of the Pond Creek Coal Co. The new rates are retroactive to March 1. The minimum wage for outside labor is now 75c. an hour. A rate of 95c. an hour has been fixed for skilled inside labor such as that performed by assistant foremen. The rate for motormen, bratticemen, tracklayers, wiremen, pumpers and drivers is now 90c. an hour. Brakemen will be paid at the rate of 85c. an hour. Common unskilled inside labor will be paid 80c. an hour.

An increase also has been announced in the mining rate. Cutters' pay has been increased from 31 to 34c., shooting from 23 to 24c. and loading from $1.15 to $1.20 per car. It also is stated that just as soon as scales can be installed all coal will be weighed. In other words, miners will be paid by the ton instead of by the car. It is stated by officials, however, that the scale weights will figure out about the same as the rate per car for loaders.

It also is announced that in the commissaries of the company all goods will be sold at actual cost, in addition to handling charges. Many articles were already being sold at cost, it is stated.

Interesting Data in Annual Report of West Virginia Department of Mines

There were 888 firms in West Virginia controlling 1,381 producing coal mines, exclusive of small country banks and wagon mines, reporting a total production for the fiscal year of 70,888,203 gross tons, a decrease of 9,873,401 gross tons or 12 per cent, compared with the previous fiscal year, according to the annual report of the State Department of Mines for the twelve months ending June 30, 1922. Coke manufactured was 175,156 net tons, a decrease of 661,572 net tons, or 79 per cent.

The department computes the estimated value of the production of both coal and coke for the fiscal year ending June 30, 1922, to have been as follows.

	Value	Gross Tons
Used at mine for steam and heat	$2,019,362.85	791,907
Sold to local trade and tenants	3,343,004.10	1,310,982
Used in coke ovens at the mines	755,185.05	296,151
Shipped	172,862,365.65	67,789,163
Mined by small country mines	1,785,000.00	700,000
Total produced	$180,764,917.65	70,888,203
Total coal sold	177,990,369.75	69,800,145
Coke sold	1,026,414.16	175,156

PRODUCTION OF COAL IN WEST VIRGINIA, FISCAL YEARS ENDED JUNE 30

(In Gross Tons)

District	1922	1921	Increase	Decrease
Panhandle	3,796,904	4,079,344	.....	282,440
Fairmont	9,625,112	14,666,409	.....	5,041,297
Preston, Barbour	3,066,657	4,917,955	.....	1,851,298
Elk Garden	1,080,042	2,453,986	.....	1,373,944
Mason	48,253	242,480	.....	194,227
Putnam	170,552	260,102	.....	89,550
Kanawha	6,110,150	10,237,876	.....	4,127,726
New River	11,900,162	13,740,070	.....	1,839,908
Logan	13,904,980	10,861,391	3,043,589	.....
Pocahontas	18,354,975	17,449,819	905,156	.....
Mingo	2,130,416	1,152,172	978,244	.....
	70,888,203	80,761,604	.....	9,873,401

It is reported that 3,434 mining machines were in use at 1,028 mines employing 44,070 men and producing 54,459,527 gross tons of coal, which represents 76.8 per cent of the production of the state. In 1897 there were only 16 mines using 55 mining machines and machine-mined coal represented but 5.12 per cent of the production. In 1897 there were 10,971,482 tons of coal produced by the pick-mining method at commercial mines and 13,218 pick miners were employed. In 1922 15,728,676 tons of coal was mined at pick mines. It is estimated that 8,795 acres of coal was mined out and that since 1897 the total acreage exhausted has been 180,227.

The average price received by pick miners throughout the state for run-of-mine coal was 95c., the same as in 1921. The average tonnage produced by each pick miner was 1,111. The average annual wage of pick miners (all pick miners included) was $1,055.45, which was $110.20 less than that of 1921. The average selling price of coal shipped from the mines of the state was $2.55 per gross ton, run of mine, a decrease of $2.10 per ton from the price received the year before. Coke was sold f.o.b. at the ovens during the year at an average price of $5.86 per net ton, which was a decrease from the previous year of $3.72 per ton.

Ford Acquires 120,000 Acres More of Coal Land in Kentucky

Henry Ford purchased 120,000 acres of undeveloped coal land in Kentucky early last week, according to an announcement March 23 from the offices of the Ford Motor Co., Detroit. The property, purchased from the F. S. Peabody interests, of Chicago, is in Bell, Clay, Harlan, Perry and Leslie counties. The purchase price was said to be between $3,000,000 and $4,000,000.

Through his latest purchase Mr. Ford comes into possession of a tract of virgin coal lands with a reserve coal supply of 500,000,000 tons, making 165,000 acres of such land owned by the manufacturer.

From these holdings Mr. Ford hopes that within a year will come sufficient coal to supply all his factories in every part of the country, all factories and mills manufacturing various products for his own concerns, as many of the industries in this district as care to buy coal from him, and have left fuel sufficient to supply a part of the domestic demand of the country.

Mr. Ford, it was announced, will ask all industrial users of his coal to install furnaces that will remove only the gas and similar substances, leaving a fuel unimpaired for domestic purposes. The coal, after this process, would be sold to heat the homes of hundreds of thousands of workers throughout the country. The fuel remaining after the gas had been taken out would be even more valuable for home heating purposes than it was before, it was explained.

The Ford plan will be to supply his own industries first, then the industries of companies that supply the Ford concern with parts or materials, then other companies operating in the Detroit region and lastly the domestic consumer, or home owner.

Mr. Ford, it was explained, recognizes the importance of furnishing coal to the domestic user and in keeping prices for this grade of fuel at a uniform level, but believes that the needs of industry should be met first.

AN ADVISORY COMMITTEE to work with the Federal Fuel Distributor on the matter of co-operative selling of coal has been named by Mr. Wadleigh as follows: George W. Reed, vice-president, Peabody Coal Co.; T. F. Farrell, vice-president, Pocahontas Fuel Co., New York City; W. D. Ord, president, Empire Coal & Coke Co., Landgraff, W. Va.; E. M. Poston, president, N. Y. Coal Co., Columbus, Ohio; F. W. Wilshire, vice-president, Consolidated Coal Co., New York; C. E. Tuttle, president, Tuttle Coal Corporation, New York City; C. E. Bockus, president, Clinchfield Coal Corporation; S. P. Hutchinson, president, Westmoreland Coal Co., Philadelphia; S. L. Yerkes, vice-president, Grider Coal Sales Agency, Brimingham, Ala.; W. M. Puckett, president, Corbin Creek Consolidated Coal Co., Charleston, W. Va.; S. A. Scott, New River Co., McDonald, W. Va.; J. H. Woods, general manager of sales, Pittsburgh Coal Co., and E. L. Douglas, vice-president, First Creek Mining Co., Cincinnati.

ASSEMBLYMAN ESMOND INTRODUCED A BILL (Assembly Print No. 1,841) in the New York State Legislature on March 22 which adds a new section 92 to the General Municipal Law authorizing cities and villages to buy coal and sell it to its citizens.

A MEASURE BY ASSEMBLYMAN VAN WAGENEN (Assembly Print No. 1,855) extends the provisions of the application of Section 78 of the Railroad Law, relative to coal jimmies and caboose cars to July 1, 1924.

National Coal Association Flays Union for Condoning Such Bloody Crimes as Herrin Massacre

In a statement issued last week the National Coal Association flays the United Mine Workers for "condoning" the Herrin massacre and other crimes, closing with this pointed sentence: "Has your union done anything whatsoever in the Herrin case other than to exert all its power and influence to obtain acquittal of every single person indicted?" The statement was a reply to Ellis Searles, editor of the *Mine Workers Journal* and official press agent for the union, who denied he ever had condoned the Herrin massacre.

The association, in its letter to Searles following his denial, says: "It is, after all, of small consequence what your personal views are in this matter. The attitude and conduct of the United Mine Workers, whose publicist you have been, is, however, of the greatest consequence."

The association quotes a local paper of the solidly unionized Williamson County (Illinois) mining field, where the Herrin massacre of June 22, 1922, took place. The paper, in reporting something of the notorious event, in which 22 non-union men were cut and shot to death by a mob after they had surrendered in their besieged strip mine, said this in a style reflecting the public opinion of unionized "bloody Williamson":

> At daybreak the 3,000 armed citizens (surrounding the mine) realizing that the future peace of their county was at stake, formed what has been termed by many one of the neatest columns of troops ever seen in the vicinity, worked their way into the stronghold of the outlaws and captured those that remained alive. Several of those that were taken from the pit alive were taken to the woods near Herrin, where later they were found dead and dying. There were no riots, merely the citizens of the county acting in the only way left them for the safety of their homes. The faces of the men who were killed in the disturbance are horrible sights. Uncouth, as all crooks must be at the beginning, they were doubly unattractive as seen after justice had triumphed and the county had again resumed its normal peacetime behavior.

Proceeding, the association, in excoriating the United Mine Workers, says to Mr. Searles:

"What are the vital elements of this Herrin massacre?

"(1) There had been sedulously instilled into the members of your organization in Herrin the fixed determination that no person not a member of your union, or of a union affiliated with it, should be permitted to mine a ton of coal in Illinois.

"(2) The members of your organization felt themselves a super government authorized and empowered to enforce this denial of the right of any other man to work.

"(3) This super government in the execution of its 'justice,' before bringing the power of its hand and the force of its law to bear, careful in the observance of its own rules, had its district leader Sneed telegraph to its head, your associate, John L. Lewis, to pass on the question whether the workers in the Herrin pit as members of the shovelmen's union were or were not within the ban of this super government as strike breakers.

"(4) Immediately prior to the tragedy your associate, John L. Lewis, International president, telegraphed the fatal words that these men were 'common strike breakers.'

"(5) Your associates in the local organization proceeded in organized, deliberate fashion to accomplish the act of 'justice' upon men who broke its law by working without the sanction of the United Mine Workers of America.

"(6) Since the time the deed was done and the mutilated and insulted bodies of the dead disposed of there has not, as you know, come a single sign of repentance or remorse from your associates in your organization in Herrin. Instead, those who were accused of participation in and responsibility for the occurrence of this execution have been honored. Open satisfaction has been manifested at the vindication of the higher law that no man may work without the permission of your organization. The effort of the state to punish the more immediate participants has been fought by your organization with all its power and might.

"How many of these elements of the Herrin massacre, which are the vital elements to the American people, has your organization, and your paper, as its mouthpiece, denounced?

"Was it such a denunciation to publish in the *United Mine Workers Journal* for July 1, 1922, without a word of disapproval, the statements of Subdistrict President Sneed and District Board Member Willis, in which they sought to shift the responsibility from the murderers to the company which had the temerity to seek to mine coal with members of what Lewis telegraphed Sneed could be treated as 'an outlaw organization,' whose members were to be viewed in the same light as 'any other common strike breakers'? Was it in the interests of law and order for Lewis at that critical moment to send a telegram which carried the word from the highest officer of this super government that these workers of the steam shovelmen's union were under the ban, with all the dread consequences that naturally followed that decision?

"Whenever a strike occurs in territory organized by the United Mine Workers, or in any territory which they are attempting to organize, any miner not a member of the United Mine Workers of America works in a mine under peril of violence. This denial of the right to work is the spirit which flamed up at Herrin.

British Miners Organize as at Herrin

"You doubtless recall an article published conspicuously in the *United Mine Workers Journal* of Feb. 15, 1923, with the following editorial note: 'This article was written by a British miner and tells in a graphic way how the union miners of three districts broke up a nest of "blacklegs" (as British non-unionists are called) who were producing coal while the union men were on strike.' Was it a denunciation of the spirit of Herrin to publish this article describing with evident relish an incipient Herrin in England, where the mine workers organized, as in Herrin, to prevent non-union men from working an outcrop mine, drove them from their work by force and intimidation and committed sabotage and theft?

"To what policy are we to ascribe the fact that in the columns of the *United Mine Workers Journal* we find no mention whatever of the acts of three locals of the United Mine Workers at Cliftonville, W. Va., one month after the Herrin massacre and in emulation of it, in organizing, marching upon and attacking with armed force the Cliftonville mine, where non-union men were employed, this attack resulting in the murder of the sheriff who was attempting to preserve for those workers their right to work? For this conspiracy forty-three members and officers of your union, including Jake Andes, temporary president of Local 1355; Harry Kuhns, secretary of the same local; Antone Salenski, president of the Donahue Local, and Louis Albert, president of the Cedar Grove Local, all at Avella, Pa., have been indicted and either pleaded guilty or were convicted after trial, and sentenced to prison terms. Was it in denunciation of the spirit of Herrin, and was it to promote the interests of law and order and to bring evildoers to justice that your union conducted the defense of these men?

"To what policy are we to ascribe the fact that in the columns of the *United Mine Workers Journal* we find no condemnation whatever of the series of outrages at the Willis Branch mine at Willis Branch, W. Va.? In that case, you will recall, the owner of the mine was willing to employ members of the United Mine Workers of America, pay the union scale of wages and apply the check-off to their pay, but refused to close his mine to non-union workers and to order their pay to be checked off. For this refusal the mine was put under the ban of your organization. It was attacked again and again by armed forces, the workers' community shot up, the stone power house blown up, the headhouse burned, the superintendent's house dynamited, the hoist machinery destroyed, and the tipple burned.

"As a result of these acts of warfare, where the issue was not one of wages, not one of working conditions, not one of whether the members of your organization should be employed, but solely a question of the right to work by miners

not members of your organization, Walter Romine, secretary of your local union, and George Barrett, your international organizer, among others, were tried, convicted and sent to the penitentiary, and David Robb, the financial agent of the union, became a fugitive from justice. Your organization has acknowledged responsibility, after suit, by settling for the damage done.

"And again, to what policy are we to ascribe the silence of the *United Mine Workers Journal* as to innumerable other acts of intimidation and violence the country over which have accompanied attempts to work mines with non-union men in territory organized or attempted to be organized by the United Mine Workers?

"We note in the issue of the *United Mine Workers Journal* of July 1, 1922, describing the details of the Herrin massacre, the following statement: 'The taking of human life through lawless acts cannot and must not be condoned or excused.' But we fail to find therein a single word of denunciation of the organized effort to intimidate those men who were engaged in their right to work. I hope that this editorial was intended to convey something more than a mere regret 'that one of the neatest columns of troops' had committed acts so dastardly as to arouse the public conscience against the principle which the United Mine Workers of America have labored incessantly to enforce, *viz.*, that no man shall work in the mines of the United States who is not a member of their organization.

"Webster in his definition of condone says 'to pardon or forgive, especially *tacitly, by treating the offender as if the offense had not been committed.*' In what way has the United Mine Workers of America treated the local organization in Herrin or its members since the Herrin massacre, other than as if the offense had not been committed? What has the union ever done to discipline this local organization? What has the organization done to assist the Attorney General and authorities of the State of Illinois to bring to justice the men who committed the murders which you denounce? In a mining community completely dominated by your union has it made for justice to have the United Mine Workers put the whole weight of its organization behind the defense of every person indicted? Has your union, in short, done anything whatsoever other than to exert all of its power and influence to obtain the acquittal of every single person indicted for the Herrin murders?"

Federated Engineering Societies to Make Survey of Coal Situation

Cincinnati, March 24.—Still another "careful and painstaking survey of the entire coal situation and especially as it is related to the recent shortage," was started under way at the meeting of the Executive Board of the American Engineering Council of the Federated American Engineering Societies which went into session yesterday at the Ohio Mechanics' Institute in this city.

The plan that was put forth and discussed at its opening meeting would provide for the co-ordination of the federated engineers, the Department of Commerce and the Coal Commission appointed by President Harding with all of the other groups and bodies that are interested in order to prevent duplication and avoid conflict.

During the discussion of this subject a letter from John Hays Hammond, chairman of the Coal Commission, was read and discussed. The prime point brought out in this was that the country at large should be aroused to the necessity of larger storage of domestic coal. The need of greater storage of coal for industrial purposes during the summer months to bring about advantages to the industries also was emphasized.

In drafting the resolution for the survey it was stated that its object would be "to determine the facts relating to engineering, economic and chemical factors involved and their influence upon the coal shortage at the mines and by large and small consumers."

Mortimer E. Cooley, president of the Federation and dean of the School of Engineering of the University of Michigan, was delegated to select the personnel of the committee and will announce their names later. He also will draft the line of procedure that will be followed. Twenty-nine units of the Federation and the Executive Board approved of the action taken and it was stated that $15,000 to $20,000 is available for the survey.

Some of the groups whose help will be enlisted in this work are bituminous and anthracite operators, representatives of the public utilities, equipment manufacturers and railroads.

Bids Submitted for 106,236 Tons of Coal For New York Municipal Departments

Bids for furnishing and delivering about 106,236 net tons of anthracite and bituminous coal to various city departments during the three months ending June 30, 1923, were received by the Board of Purchase of New York City on March 20. The fuel required includes 4,529 tons of screened soft coal, to replace domestic sizes of anthracite.

The specifications for screened soft coal call for the following analysis: Maximum moisture (per cent by weight as delivered), 3 per cent; maximum ash (per cent by weight dry coal), 6.5 per cent; minimum B.t.u. (per pound dry coal), 14,500; maximum volatile combustible matter (per cent by weight dry coal), 27 per cent; maximum sulphur (volatile per cent by weight dry coal), 2 per cent; minimum fusing point of ash, 2,550 deg. F.

The specifications for the semi-bituminous run of mine coal required called for the following analysis: Moisture, 3 per cent.; ash, 9 per cent for run of mine and lump, and 11 per cent for slack; B.t.u., 14,000 for run of mine and lump and 13,600 for slack; volatile combustible matter, 25 per cent; and volatile sulphur, not more than 2 per cent.

For furnishing and delivering 3,020 net tons of run-of-mine soft coal to the piers of the Department of Docks and the Fire Department the bidders were Burns Bros., $7.25, and F. M. A. Leach, $7.43, or at about $4.49 and $4.67 per net ton respectively at the mine.

Under Schedule "G," calling for barge deliveries, the bids on 36,980 tons of buckwheat No. 1 ranged from $5.49 (Steamship Fuel Corporation) to $6.80 (Gavin Rowe) per net ton delivered; on 3,000 tons of buckwheat No. 2, from $4.97 (Steamship Fuel Corporation) to $6.30 (Whitney & Kemmerer) per net ton delivered; on 12,900 net tons of buckwheat No. 3 from $3.26 (Steamship Fuel Corporation) to $4.93 (A. C. Gibson), and on 7,510 tons of soft coal from $5.49 to $7.50 delivered.

The prices submitted on buckwheat No. 1 were on a basis of about $3.17 per net ton at the mine; for buckwheat No. 2, at about $2.65; buckwheat No. 3 at about 94c. and for run of mine bituminous at about $4.75 if brought from central Pennsylvania.

For furnishing and delivering by truck to various points in Manhattan Borough 1,850 net tons of buckwheat No. 2 there were seven bidders ranging from $5.75 per ton by Martin F. Shea to $6.75 by two bidders, Blue Ridge Coal Corporation and Coal Traders, Inc. Three bids were received for furnishing and delivering 1,753 tons of screened soft coal. They were from Martin F. Shea, $11.75; Coal Traders, Inc., $11.50, and W. J. Howe & Co., $12.25. Martin F. Shea submitted a price of $5.37 for furnishing and delivering 3,000 tons of mixed coal (2,000 tons of buckwheat No. 3 and 1,000 tons of bituminous coal) while the Penn Fuel Co. submitted a price of $8.18. There were two other bidders.

There were three bids received for furnishing and delivering 1,433 tons of screened coal in Brooklyn, as follows: Wyoming Valley Coal Co., $7.79; Coal Traders, Inc., $11.50, and Commonwealth Fuel Co., $11.83.

For furnishing and delivering 1,300 tons of run-of-mine semi-bituminous coal to various points in the Borough of Queens the lowest bidder was the Titan Fuel Co. at $6.19 per ton, and the highest was the Wyoming Valley Coal Co., at $7.24.

Bids received for furnishing and delivering 1,800 tons of buckwheat No. 1 by barge and truck to designated points ranged from $6.62 by the Steamship Fuel Co. to $7.67 by Whitney & Kemmerer.

Coal Commission Enlists Services of Other Government Agencies in Investigation of the Industry

By Paul Wooton
Washington Correspondent of *Coal Age*

Evidence of insufficient resort to engineering advice impressed John Hays Hammond on his recent visit to the Alabama coal field. He is of the belief that the situation in Alabama is fairly typical of the entire coal industry. Certain companies, he says, make full use of the best available engineering talent, which, he observes, is one of the reasons for the needlessly wide spread between costs of production at different properties. Not only is the advice of coal-mining engineers needed but there is large opportunity in many coal mines, Mr. Hammond declares, for the profitable employment of mechanical engineers. Many of the problems under ground are mechanical, he pointed out.

In some of the Alabama mines, Mr. Hammond says, serious consideration should be given the relative economies which could be introduced by the improvement of underground haulage, by the sinking of more shafts and by the employment of more cutting machines. These improvements, he admits, involve large initial expense, but he believes they should be considered on the basis of ultimate economy. To save long hauls in metal mines, extra shafts frequently are sunk to great depth. While he realizes that a different problem is involved in coal mines, where the volume of the tonnage is so much greater, he points out that there is a corresponding advantage in that the depth of shafts usually is not great.

Sees Need for Better Engineering

Commissioner Smith also is impressed with the need for better engineering in many coal properties. In an address he delivered last year he discussed some engineering phases of the industry. "What engineering can do for the industry is already known," he said at that time, "for we have today large coal mines well laid out and equipped with modern machinery, which show in actual practice how we can better the business of mining coal. Our chief need in this business, as in some others, is merely to raise the average up to the best. Mines planned by engineers and managed by engineers, with the aid of the coal-consuming public, can come much nearer to giving the mine worker an actual opportunity to work eight hours a day and six days a week. Cheaper coal and larger earnings are two ideals which can be attained by engineering after bargaining has failed utterly. The reform of the coal business must be worked out mostly underground."

The commission, as a part of its efficiency policy, has made the largest possible use of government agencies already at work on the coal problem. The Federal Fuel Distributor, the Bureau of Mines, the Geological Survey, the Bureau of the Census, the Federal Trade Commission, the Interstate Commerce Commission and the Bureau of Internal Revenue all are co-operating to the end of making the commission's investigation accomplish the most good possible with the funds and time at its disposal. The latest development in this line of co-operation is the Public Health Service's assignment of sanitary engineers and physicians to assist in the study of prevailing sanitary conditions in mining towns. A group of these specialists left the first of the week for the field.

Chairman Hammond announced on March 24 that the commission is making a close study of the effects of relationships between the mining companies and the railroads in the anthracite region. He admitted that the commission had conferred with Assistant Attorney General Seymour with regard to the legal phases of the dissolution situation.

So that comparisons can be made of the mining laws of the United States with those of other countries, the International Labor office affiliated with the League of Nations is submitting data to the commission on the mining laws of Europe.

Colonel Edward O'Toole, of the United States Coal & Coke Co., conferred informally with the commission recently and told of conditions in the properties he developed in West Virginia and Kentucky.

Commissioner Wallace, of the Washington Coal Operators' Association, accompanied by Eugene McAuliffe, also conferred with members of the commission. A brief in behalf of the Washington Coal Operators' Association was filed. In it the peculiar position of the industry in the State of Washington is set forth. "A few years ago," says the brief, "all producers of coal within the state were members of the Washington Coal Operators' Association. Finding economic existence impossible under the conditions exacted by the mine workers' union, operators from time to time have withdrawn from the association, establishing a scale of wages below that exacted by the union until today but five producing coal companies remain as subscribers to the operators' association and to the joint wage scale last reaffirmed on Aug. 14, 1922. It is these five companies who still seek to maintain the principle of collective bargaining who now desire to present to the commission the situation which confronts them and the labor in their employ."



Photo Harris & Ewing

WAYNE P. ELLIS

Recently selected as secretary of the Northwest Coal Dock Operators' Association, Mr. Ellis is still serving on the staff of the U. S. Coal Commission as traffic expert.

Coal Commission Takes On Three Engineers

Three engineers have been added to the staff of the Coal Commission. They are Walter M. Dake, Jr., Ellery B. Gordon and H. M. Search. Mr. Dake was born in Nashville and educated at Vanderbilt University. He had extensive metal mining experience in Colorado, Nevada, California, Utah, Oregon, Wyoming and Lower California. For many years, however, he has devoted himself exclusively to executive and engineering work in connection with coal operations, most of which were in Western states.

Mr. Gordon formerly was secretary-manager of the Na-

tional Retail Coal Merchants' Association. During the war he was Assistant Fuel Administrator for the State of New York. During 1916 and 1917 he was with the Federal Trade Commission, having charge of the field work in the Buffalo and the Detroit areas. More recently he has been associated with E. W. Parker on the Anthracite Bureau of Information.

Mr. Search was graduated from Lehigh University in 1915, after having completed the course in civil engineering. He joined the technical staff of the Philadelphia & Reading Coal & Iron Co., where he was engaged until 1917, when he became assistant secretary of the Anthracite Coal Operators' Association. He served with the field artillery during the war. From 1919 to 1921 he was with the Weston Dodson Co. His last connection was with the Coal Service Corporation of New York.

Searles Denies Miners Would Take Wage Cut If Assigned Car Was Abolished

That the United Mine Workers of America will not accept any reduction in the present scale of wages is declared in a letter dated March 21 to the Interstate Commerce Commission signed by Ellis Searles in which he styles himself representative of the International Union. This letter was called forth by a statement on March 2 by J. J. Kintner, an attorney for district 2, in an argument before the commission relative to the abolishing of the assigned car rule, in the course of which he gave the commission to understand that if the commission would abolish the assigned-car rule the bituminous coal miners of the country would be willing to accept a reduction of approximately 20 per cent in their wages.

"As the duly accredited representative of the International Union of the United Mine Workers of America," said Mr. Searles in the letter, "I am authorized and directed by Philip Murray, acting International President of the union, to submit to your honorable body the following statement:

"The International Union of the United Mine Workers of America denies and disavows the statement in question which was made by Attorney Kintner. The International Union was not and is not in any manner responsible for said statement being made to the commission. The International Union here and now declares that it has no purpose or inclination to accept for the coal-mine workers of this country any reduction in wages, neither on account of the assigned-car rule nor any other reason. Any statement to the contrary that is made by any other person must be taken and understood as being an assumption that is not justified nor warranted by the policy of the International Union."

In face of statistics that indicate that the average earnings of miners last year was $700, Mr. Searles said, "it is astounding that any person should even suggest a reduction."

International Railway Fuel Association to Hear Kruttschnitt and Maher

Julius Kruttschnitt, chairman of the executive committee of the Southern Pacific Railroad Co., will deliver the opening address at the convention of the International Railway Fuel Association, at the Hotel Winton, Cleveland, on May 21-24. An address also will be made by T. K. Maher, president of the Maher Collieries Co.

A partial list of the papers to be presented is as follows: "Extension of Locomotive Runs," by C. B. Peck, associate editor, *Railway Age;* "Considerations Covering Use of Oil as a Locomotive Fuel," by M. C. M. Hatch, mechanical engineer, M. K. & T.; "Fuel Saving Aspect of Boiler Water Treatment," by C. R. Knowles, superintendent water service, Illinois Central; "Value of Individual Fuel Performance Records," by L. G. Plant, associate editor *Railway Review;* "Standardization of the Coal Business," by George H. Cushing; "The Other 10 Per Cent," by R. S. Twogood, assistant engineer, Southern Pacific; "Economic Aspects of the Fuel Oil Situation," by C. E. Beecher, U. S. Bureau of Mines; "Economy in the Heating of Stations and Buildings," by Prof. R. W. Noland, Purdue University; "Incentives for Promoting Fuel Economy," by O. S. Beyer, Jr. There also will be a topical discussion of the paper on "The Effect of Tonnage Rating and Speed on Fuel Consumption," presented by J. E. Davenport at the 1922 convention.

Judge McClintic Enjoins Use of Check-Off For Unionization of Open-Shop Mines

Judge George W. McClintic, in the U. S. Court for the southern district of West Virginia, handed down an injunction on March 21 at Huntington under the terms of which twenty companies having an agreement with the union are restrained from paying over to the union any moneys collected through the "check-off." The effect of the decision will be to restrain the use of money derived from the "check-off" for the unionization of open-shop mines.

Judge McClintic's decision was made in connection with a suit instituted several months ago by the Carbon Fuel Co. and twenty-two other coal-mining companies in the Kanawha district against the international organization of the United Mine Workers, its officers and District 17, its officers and local unions, as well as against the Black Betsy Consolidated Coal Co. and twenty other firms or companies now paying the check-off in accordance with an agreement with the union.

One effect of the decision may be to prevent the consummation of a contract now being negotiated with the union covering the year beginning April 1, 1923.

The injunction also prohibits the international organization from sending any money into West Virginia to be used for the unionization of the plaintiff's mines and prohibits the international organization from interfering in any way with the production of coal or with the employees of the plaintiff.

The Black Betsey Consolidated Coal Co. and Edwin Marmet and the nineteen other codefendants are especially enjoined from paying any money to the union for unionization activities against the operations of the plaintiffs. The defendants also are enjoined from doing or causing to be done anything toward the calling or continuance of any strike.

In explaining the effect of the injunction, S. B. Avis, attorney for the plaintiffs, said that "the miner and the operator can get together, but any agreement they may reach cannot be used to force a third party, either miner or operator, to concur in the agreement."

The terms of injunctions granted last summer to the Anchor Coal Co., Dry Branch Coal Co., the Seng Creek Coal Co. and the Raleigh-Wyoming Coal Co. prohibiting trespass and the use of persuasion or violence on employees of the plaintiff are reiterated in the injunction just handed down. Judge McClintic holds that the miners' union is engaged in a conspiracy to restrain trade and production and that such a conspiracy violates the anti-trust laws.

The injunction suit has been pending since last September, when Judge McClintic granted a temporary restraining order which he later extended but allowed to expire before handing down a final decision.

Class 1 Railroads Consume 10,127,000 Tons Of Coal in December at $3.76 per Ton

Class 1 railroads consumed 10,127,000 net tons of coal during December, 1922, as charged to account 394, compared with 9,736,000 tons in November, 1921, according to a report of the Bureau of Statistics of the Interstate Commerce Commission covering 177 steam roads. During the twelve months of 1922 these roads consumed 95,919,000 tons as compared with 91,726,000 tons during 1921. The delivered cost per ton in December was $3.76 or 15c. above that for December, 1921. The per-ton cost for the year was $3.94 as compared with $4.10 during 1921.

Fuel-oil consumption continues to gain. During December 157,380,000 gallons were used, as compared with 126,665,000 gallons in December, 1921. The figures for the twelve months of 1922 and of 1921 were 1,564,872,000 and 1,426,975,000 gallons respectively.

Wages in Harlan Field Not to Be Reduced; Scale Renewed in Western Kentucky

Wages of coal miners in the Harlan field will not be reduced April 1, according to announcement made March 22 following a meeting of the Harlan County Coal Operators' Association. The contract between the miners and operators expires April 1, and it was reported that an effort would be made to reduce wages.

In a statement issued at the close of the meeting E. R. Clayton, secretary of the association, declared that "the coal operators appreciate the fact that the extreme car shortage has worked a hardship on the men as well as on the companies and for this reason they are not going to make any reduction."

The greater portion of the field is non-union, but the non-union sections are affected by the union in that wages usually are based on the rates provided for in the union contract.

The West Kentucky Coal Operators Association and District 19 (Kentucky) of the United Mine Workers of America also have come to a satisfactory agreement for renewal of the old wage scale, which has been in effect for two years. The new agreement starts April 1, for one year, carrying a renewal of the old contract throughout. The conference, which was held at Louisville, was harmonious in every respect.

Harry L. Gandy Named Executive Secretary Of National Coal Association

An executive secretary has been chosen by the National Coal Association in the person of Harry L. Gandy, formerly a Representative in Congress from South Dakota. Mr. Gandy's association with the coal industry dates from 1914, when, on entering Congress, he was made a member of the Public Lands Committee and assigned to a study of the coal-leasing portion of the General Public Land Leasing bill. Since his retirement from the House of Representatives he has been actively engaged in the preliminary financing and other arrangements for the opening of a large coal property in the Huntington canyon of Utah.

Mr. Gandy was born in Churbusco, Ind., in 1881. His higher education was obtained in the Tri-State College at Angola, Ind., from which he was graduated in 1901. Prior to his graduation he had taught school for several terms and followed that profession subsequent to his graduation. He then entered the newspaper field and conducted newspapers at LaGrange and Kendallville, Ind.

Mr. Gandy went to Rapid City, S. D., in 1907 as news editor of the *Daily Journal*. Later he became business manager of the Rapid City Printing Co. and editor of the *Rapid City Guide*. From Jan. 1, 1910, to Aug. 1, 1918, he owned the *Gazette* at Wasta, S. D. In 1910 he was appointed United States Commissioner for the district in which he lived. This post was an important one, due to the large volume of public-land business in that portion of the state. Later he was elected to the State Senate from Pennington County. He is the only Democrat elected from that county to serve in the State Senate either before or since. He served one term and declined renomination. In July, 1913, he was appointed receiver of public moneys in the U. S. Land Office at Rapid City. He served until March 4, 1915, in that capacity.

In 1914 Mr. Gandy was elected to the House of Representatives from the Third South Dakota district. He was reelected in 1916 and 1918, but was carried down to defeat in the Republican landslide of 1920. Even then, however, he ran many thousands of votes ahead of the ticket. He is particularly proud of the fact that during his political experience there was no election in which he did not carry, by a large majority, his home precinct, city and county, each of which ordinarily is overwhelmingly Republican.

It was Mr. Gandy who held out most determinedly on the House Committee on Public Lands for the provisions in the Leasing Act which allow portions of the revenue derived from mineral leases to go to the state and to the reclamation fund.

Mr. Gandy operates a 2,500-acre grain and livestock ranch near Wasta.

Since leaving Congress Mr. Gandy has been associated with J. H. Mays, formerly a member of the Utah delegation in the House of Rrepresentatives, in arranging the financing of and other preliminaries preparatory to the opening of a large coal property in the Huntington canyon of Utah. The proposition, among other things, requires the financing



Photo Harris & Ewing

HARRY L. GANDY

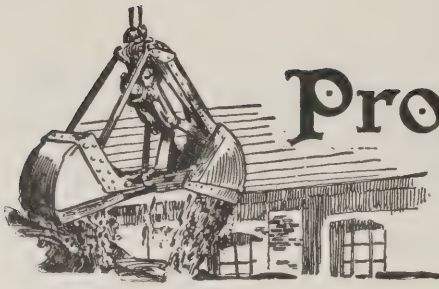
of a line of railway. In connection with these negotiations Mr. Gandy came in contact with a number of Eastern coal operators. The opening of his Utah coal operations must await the construction of the railroad, which led to his being asked to accept the executive secretaryship of the National Coal Association.

Brydon Favored for Presidency

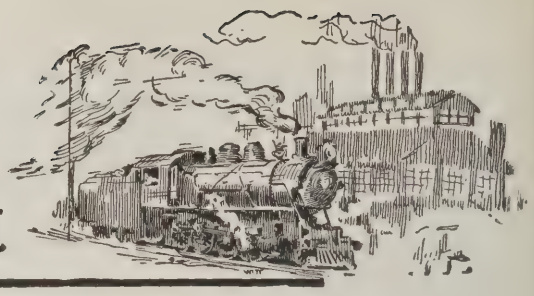
There are indications of widespread sentiment in the National Coal Association favoring the selection of John C. Brydon, of the Quemahoning Coal Co., of Somerset County, Pennsylvania, to be the president of the organization during the coming year. Were Alfred M. Ogle not inclined to insist on the continuance of the precedent established by J. G. Bradley—that presidents serve for one term only—it is certain that he would not be opposed. Since the prospects are that he will decline to be a candidate for re-election, many members of the organization, attracted to Mr. Brydon by his accomplishments as chairman of the special committee, will insist on pushing his candidacy.

Directors of the National Coal Association will meet in New York on April 11. In connection with that meeting, W. H. Cunningham, chairman of the convention committee, has asked his committee to meet to discuss the program for the annual meeting in June. The special committee of bituminous operators, of which J. C. Brydon, is chairman, will meet in New York on April 10.

Owing to its crowded docket and the short time remaining in the spring term the U. S. Supreme Court has notified the Federal Trade Commission that it will be unable to hear the Claire Furnace cost-reporting case before the fall term. The appeal from the Court of Appeals of the District of Columbia to the Supreme Court was granted March 17 and the commission sought permission to argue the case before the summer adjournment. The Court of Appeals on Jan. 2 sustained the injunction against the commission in the lower court.



Production and the Market



Weekly Review

The spot market on bituminous coal has sagged to a point where sales are extremely light. Spring weather and the beginnings of improvement in transportation have taken off the last edge in the East. The trade along the Atlantic coast misses the fairly steady inquiry that was current a month ago from retail dealers who were driven to find substitutes for anthracite. Manufacturers also who were then inclined to hedge against a possible upward swing in prices have now about ceased making their small purchases and are much disposed to await developments. There are shippers who figure a largely increased use of steam coal during the coming season based partly on better business generally and increased traffic.

Production was maintained at around the 11,000,000-ton mark while prices generally showed a decline. *Coal Age* Index of spot prices at the mines dropped to 246, a decline of 17 points from last week's figure of 263, with the average price at $2.98.

Heavy Demand for Coke for Export

The demand for coal for export quieted down considerably notwithstanding the conflicting reports of labor troubles in the British mines, which were largely discounted by New York houses with British connections. The short flurry because of exaggerated export demand had the temporary effect of increasing output, and there were accumulations at the Hampton Roads piers. Even contract tonnage moved rather slowly coastwise and it was only with difficulty that some shippers were able to arrange for disposition of their April coal. A demand for low-volatile coal for export is expected.

Coke continued in strong demand for export, with quotations firm at $12 to $12.50 f.o.b. piers. It was estimated that about 100,000 tons had been contracted for export, while steel companies were taking all they could get. Water freight rates were high, some owners, it was reported, quoting around $4 for April shipment to west Italy. The current rates to Hamburg range were $3.30 @ $3.50 for coal and around $5.50 for coke.

Dumpings at Hampton Roads for the week ended March 22 were 407,234 net tons, as compared with 344,052 net tons during the previous week.

There was a slight flurry in the Midwest due to a sudden but short-lived cold spell. While the larger industries are displaying little inclination to contract it is expected that considerably more tonnage than normal soon will be covered, principally because purchasing agents are fully awake to the danger of a car shortage during the summer and autumn months.

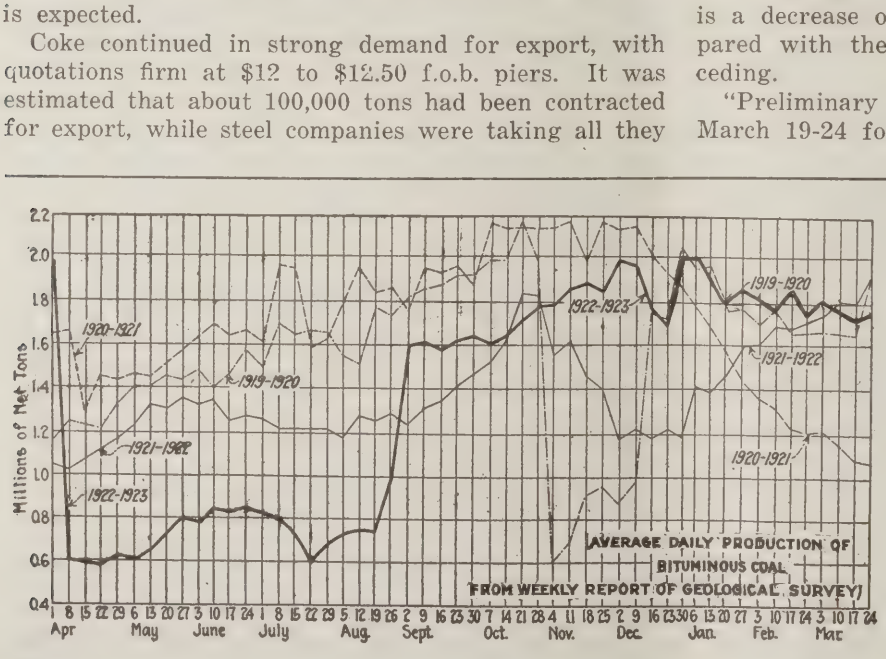
Better Car Supply at Gateway

From the Cincinnati gateway come reports of better car supply in eastern Kentucky and Logan County, West Virginia, simultaneous with a sharp drop in Eastern demand. Buyers large and small in the inland markets are marking time. The market on lump is gone and the prospects for steam coal after April 1 are dubious.

In New England most of the central Pennsylvania coals are a drug on the market. In a few cases the operators are disturbed over possible labor complications, especially in non-union sections, but the majority have been scaling down prices in the effort to enlarge their market.

"Present estimates of the soft-coal production for the week ended March 17," says the Geological Survey, "indicate a total output of 10,424,000 net tons, including coal shipped, mine fuel, local sales and coal coked. This is a decrease of approximately 200,000 tons as compared with the revised estimates for the week preceding.

"Preliminary reports of cars loaded in the week March 19-24 forecast another week's output at about



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Mar. 3	10,541,000	10,946,000
Mar. 10 (*b*)	11,102,000	10,627,000
Mar. 17 (*a*)	10,843,000	10,424,000
Daily average	1,807,000	1,737,000
Coal year to date	412,837,000	398,867,000
Daily average coal year	1,398,000	1,351,000
ANTHRACITE		
Mar. 3	1,913,000	2,104,000
Mar. 10	1,982,000	2,049,000
Mar. 17	1,907,000	2,057,000
Coal year to date	85,316,000	52,652,000
COKE		
Mar. 10 (*b*)	154,000	382,000
Mar. 17 (*a*)	149,000	409,000
Calendar year	1,443,000	3,953,000

(*a*) Subject to revision. (*b*) Revised from last report

10,500,000 tons. Loadings on Monday, March 19, were 39,215 cars and fell on Tuesday to 30,721 cars, and by Thursday had declined to 29,292 cars."

The anthracite situation has eased considerably. Demand is easier and retail dealers have no difficulty in taking care of current needs. Many have discontinued the purchase of independent coal unless they can get it at lower figures than prevailed last week.

Production of coke during the week ended March 17, as reported by the Geological Survey, was 409,000 net tons as compared with 280,530 tons during the previous week.

Demand Sharp in Chicago Flurry

A cold spell early last week brought a sharp but temporary demand for nearly all grades of coal in the Chicago market. Retail dealers showed some anxiety. Car numbers were in demand until the middle of the week, when the market became normal to weak on all steam sizes.

Railroad contract bids are higher in Indiana and West Virginia because of the awakening in export demand.

The situation for domestic coals was easy, but retail dealers everywhere in the midwest territory are slow to stock in spite of the recent reductions all along the line on prepared sizes. The fact that cars have been plentiful throughout the region made it possible for many mines to work four or five days last week, merely supplying immediate demand. Slow steam movement was the principal worry. In the Mt. Olive district most mines have been tied up because of the sluggishness of small sizes. Good Illinois screenings were sold as low as $1.60, though the average was above that figure.

St. Louis Market Brisk Too

The coldest weather of the winter ushered in last week with a temperature of 4 deg. above zero. It found the dealers' yards pretty well loaded and in two days they were cleaned up, principally selling the cheaper grades of Standard and Mt. Olive. For the first time in years the dealers were able to meet an unexpected contingency. This helped to clean up a lot of high-priced coal put in storage several weeks ago. Domestic business for the country was perhaps the most active at any time in the past three months, while country steam was slow.

The terminal situation in St. Louis is bad. The Missouri Pacific, Frisco and Wabash are unable to take care of the

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

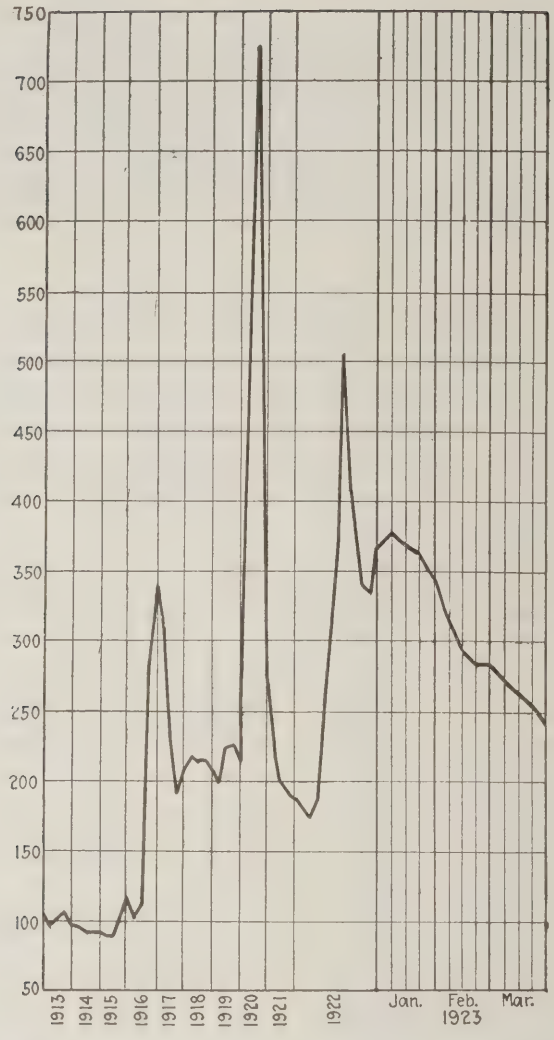
Low-Volatile, Eastern	Market Quoted	Mar. 27 1922	Mar. 12 1923	Mar. 19 1923	Mar. 26 1923†
Smokeless lump	Columbus	$2.75	$7.00	$7.00	$6.50@$7.50
Smokeless mine run	Columbus	1.75	4.50	4.50	4.25@ 4.75
Smokeless screenings	Columbus	1.25	4.45	4.25	**4.25@ 4.75**
Smokeless lump	Chicago	2.70	7.00	6.35	6.00@ 6.75
Smokeless mine run	Chicago	1.35	4.00	4.00	3.50@ 4.50
Smokeless lump	Cincinnati	2.75	6.85	7.00	*6.50@ 7.00*
Smokeless mine run	Cincinnati	1.70	4.85	4.85	*4.25@ 5.00*
Smokeless screenings	Cincinnati	1.15	4.50	4.75	*4.00@ 5.00*
*Smokeless mine run	Boston	4.55	7.00	7.10	*6.25@ 6.75*
Clearfield mine run	Boston	1.95	3.30	3.05	*2.25@ 3.00*
Cambria mine run	Boston	2.45	4.00	3.85	*3.25@ 4.00*
Somerset mine run	Boston	1.90	3.60	3.35	*2.75@ 3.50*
Pool 1 (Navy Standard)	New York	2.85	4.50	4.35	*4.00@ 4.50*
Pool 1 (Navy Standard)	Philadelphia	2.80	4.60	4.55	*4.25@ 4.75*
Pool 1 (Navy Standard)	Baltimore	2.65	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.25	3.80	3.60	*3.25@ 3.75*
Pool 9 (Super. Low Vol.)	Philadelphia	2.15	3.85	3.80	*3.30@ 4.10*
Pool 9 (Super. Low Vol.)	Baltimore	2.25	4.00	3.50	.....
Pool 10 (H.Gr.Low Vol.)	New York	2.10	3.10	3.10	*2.75@ 3.25*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	1.90	3.20	3.15	**3.00@ 3.45**
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.15	3.00	3.25	.....
Pool 11 (Low Vol.)	New York	1.80	2.45	2.55	*2.25@ 2.75*
Pool 11 (Low Vol.)	Philadelphia	1.70	2.70	2.55	**2.30@ 2.90**
Pool 11 (Low Vol.)	Baltimore	2.05	2.25	2.35	.....
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.55	2.20	2.35	**2.25@ 2.50**
Pool 54-64 (Gas and St.)	Philadelphia	1.40	2.15	2.25	**2.15@ 2.45**
Pool 54-64 (Gas and St.)	Baltimore	1.55	2.25	2.40	.....
Pittsburgh so'd gas	Pittsburgh	2.65	3.60	4.05	*3.25@ 4.00*
Pittsburgh mine run (St.)	Pittsburgh	1.85	2.55	2.35	2.25@ 2.50
Pittsburgh slack (Gas)	Pittsburgh	1.55	2.75	2.60	*2.50*
Kanawha lump	Columbus	2.30	4.25	4.25	**4.00@ 5.00**
Kanawha mine run	Columbus	1.50	2.60	2.60	**2.50@ 3.00**
Kanawha screenings	Columbus	1.35	2.10	2.05	**2.25@ 2.60**
W. Va. lump	Cincinnati	2.15	3.75	3.75	*3.25@ 4.00*
W. Va. Gas mine run	Cincinnati	1.95	2.85	3.35	*2.50@ 3.00*
W. Va. Steam mine run	Cincinnati	1.35	2.75	3.00	*2.50@ 3.00*
W. Va. screenings	Cincinnati	1.30	2.50	2.35	2.25@ 2.50
Hocking lump	Columbus	2.55	4.00	3.75	3.50@ 4.00
Hocking mine run	Columbus	1.75	2.40	2.35	*2.35@ 2.60*
Hocking screenings	Columbus	1.45	2.00	1.95	**1.90@ 2.20**
Pitts. No. 8 lump	Cleveland	2.80	4.00	3.70	*2.75@ 3.50*
Pitts. No. 8 mine run	Cleve'and	$1.85	$2.90	$2.70	*$2.25@$2.50*
Pitts. No. 8 screenings	Cleveland	1.70	2.75	2.50	*2.00@ 2.25*
Midwest					
Franklin, Ill. lump	Chicago	3.25	4.60	3.85	3.85
Franklin, Ill. mine run	Chicago	2.25	3.35	3.35	*3.00@ 3.25*
Franklin, Ill. screenings	Chicago	2.00	2.35	2.35	*1.90@ 2.25*
Central, Ill. lump	Chicago	2.60	3.10	3.10	3.00@ 3.25
Central, Ill. mine run	Chicago	2.25	2.60	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.85	1.45	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.15	3.60	3.60	3.50@ 3.75
Ind. 4th Vein mine run	Chicago	2.35	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.15	2.10	2.10	*1.75@ 2.00*
Ind. 5th Vein lump	Chicago	2.85	3.35	3.10	3.00@ 3.25
Ind. 5th Vein mine run	Chicago	2.20	2.60	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	1.75	1.35	1.60	1.50@ 1.75
Standard lump	St. Louis	2.45	3.10	3.10	*2.50@ 2.75*
Standard mine run	St. Louis	1.85	2.25	2.25	*2.00@ 2.25*
Standard screenings	St. Louis	1.35	1.35	1.25	*.90@ 1.00*
West Ky. lump	Louisville	2.35	3.05	2.80	*2.25@ 2.75*
West Ky. mine run	Louisville	1.75	2.00	1.85	**1.85@ 2.25**
West Ky. screenings	Louisville	1.60	1.65	1.65	**1.60@ 1.85**
West Ky. lump	Chicago	.....	3.10	2.85	2.75@ 3.00
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.10	.....	.....	2 50
Big Seam mine run	Birmingham	1.85	2.10	.....	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.60	.....	*2.25@ 2.50*
S. E. Ky. lump	Chicago	.....	4.60	4.60	*3.50@ 4.00*
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.10	5.00	5.05	*3.75@ 4.25*
S. E. Ky. mine run	Louisville	1.55	2.60	2.75	**2.50@ 3.25**
S. E. Ky. screenings	Louisville	1.40	2.20	2.50	*2.00@ 2.50*
S. E. Ky. lump	Cincinnati	2.10	3.75	3.60	*3.00@ 4.00*
S. E. Ky. mine run	Cincinnati	1.30	2.75	2.75	*2.25@ 2.75*
S. E. Ky. screenings	Cincinnati	1.25	2.25	2.35	*2.00@ 2.50*
Kansas lump	Kansas City	4.50	4.50	4.50	4.50
Kansas mine run	Kansas City	4.00	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.60	2.60	2.60

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	March 19, 1923 Independent	March 19, 1923 Company	March 26, 1923† Independent	March 26, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@11.00	8.00@ 8.35	9.25@11.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@11.00	8.00@ 8.35	9.25@11.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@11.00	8.00@ 8.35	9.25@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 9.00	6.15@ 6.30	*6.30@ 8.50*	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	3.75@ 4.25	4.00@ 4.10	*3.40@ 4.25*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	4.00@ 5.00	4.00	4.00@ 5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 3.00	2.75@ 3.00	*2.25@ 2.75*	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.40@ 2.00	1.50@ 2.00	*1.25@ 1.75*	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.40@ 2.00	2.00	1.40@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 246, Week of March 26, 1923. Average spot price for same period $2.98. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the war Industries Board.

tonnage offered and the Terminal Association ties up traffic on the east side. There is no anthracite moving in and very little activity in coke or smokeless.

Screenings Heavy in Northwest

The cold snap caused some suffering in the Northwest. Domestic coals of all sorts sold recklessly. Deliveries were altogether too slow and almost anything burnable was demanded. However, steam coals on the docks moved sluggishly. A price drop of $1 to $1.25 in Youghiogheny and Hocking screenings featured the Head of the Lakes market last week, but despite the off price in screenings, lump and run of pile in Youghiogheny and Hocking remained firm. Lump at Duluth was $8.25@$8.50 and run of pile $7@$7.25. The market was clean of Pocahontas lump and anthracite.

Speculation is rife concerning the probable price of coal after the opening of navigation. It is asserted that bituminous will be at least $1.50 to $2 lower than at present. Bottoms have been chartered to bring up a supply of anthracite as soon as navigation opens, and there has been some chartering for the movement of bituminous. Navigation should open about April 20.

The docks are preparing for a heavy season, providing rates from the mine can be made so as to enable Duluth to compete with the cheaper Illinois coal, which has the advantage now because of the freight rates.

Situation in Milwaukee Nears Normal

The coal situation in the Milwaukee district is rapidly getting back to normal after the worst flurry of the season. Two mid-March blizzards within a week sent people to the yards for fuel of any discription. There was practically no anthracite on hand and not much bituminous or coke were available. The storms seriously impeded rail transportation, but there is considerable coal now coming forward.

Better buying of coal by industrials, byproduct and utility consumers is reported in the Louisville market, and while not much coal is moving to steel industries on open-market orders the steel interests that produce their own coal are not offering it in the open market, which has helped somewhat. General inquiry was better and there was some contract inquiry at prices that seemed attractive. Railroad buying also showed improvement.

L. & N. Issues Shipping Permits

The Louisville & Nashville R.R. has announced that Lake shipping permits are being issued and it is estimated that about 3,500,000 tons will be moved within the next few months. According to a statement issued Kentucky probably will have a larger share of lake business this year than in past seasons. Permits are issued only where the operator has arranged for immediate unloading at lake ports.

Although two snow storms swept down the eastern front of the Rockies the coal trade in that region was not much affected. True, the Kansas City market improved, dealers unloaded a good deal of high-priced coal, and mines picked up in operating time from about 25 per cent to almost 75 per cent. But even that was temporary. In Colorado the new low storage price aimed to stimulate trade has not had the desired effect. About the only mines working anywhere near full time in Colorado are those with railroad contracts. Most lignite operations average three days a week.

Utah business remains unflurried. Lump prices thus far have remained firm but steam coals are difficult to move. Production continues at little better than 50 per cent.

Smokeless Goes All Rail to Milwaukee

Because of the barren condition of the Milwaukee docks some smokeless moved there all rail from the Cincinnati gateway. Lake buyers jumped into the market the early part of the week and filled up with a couple of cargoes for the boats lying at Lake Erie ports, but during the latter part of the week buying was conspicuous by its absence.

The first circular on April prices for smokeless coal shows $6 for lump and egg, $6 for nut and $4.50 for run of mine with no price on screenings. There has been some stocking going on in the smaller towns along the river and some tonnage has been laid away in and around Cincinnati.

Reports from Columbus indicate that prices on contract coal from the Hocking Valley and other Ohio fields probably will range $2.50@$2.75 for mine run although this is not settled. Steam plants have only a fair surplus stock and this is taken as an indication that there will be fair buying later on. Iron and steel plants are buying more actively and orders from utilities are fairly good. The Lake trade is attracting attention.

The Cleveland market has sagged to lower levels, demand has noticeably disappeared and spot prices are lower.

Broadening of the markets for West Virginia smokeless nut and slack coals seems to have been accomplished through buying by some of the steel mills of Pennsylvania and Ohio and quite a large tonnage of this grade of coal it is said, is now being contracted for and shipped.

The Birmingham (Ala.) spot market, while not especially active, is sufficiently strong to move all coal not covered by contract. Bunker coal shipments are fairly good. Production is being maintained at a high level, though car shortage continues bad and is curtailing output to a marked degree.

No Active Buying Foreseen in New England

The trade in New England believes there will be further transportation difficulties. The degree to which this will be felt there naturally will depend upon the volume of coal required, but the outlook is for no such expanded tonnages

as were estimated four and five years ago. Fuel oil has not yet begun to withdraw as an active competitor and last year's experience taught the market that the West Virginia districts, in the absence of any swollen demand overseas, are amply able to take care of this market with only moderate support from central Pennsylvania. Certainly there are no present indications of active buying in this territory.

The contract situation in New England seems to develop very slowly. Aside from factors who have their own wharves there is caution in this respect because of costly experiences at railroad berths during the past season. So much demurrage has been paid that buyers naturally want to make their contracts f.o.b. cars while the agencies are more and more seeking season orders at a fixed price f.o.b. mines plus charges. There is an abundance of shipping and coastwise freights are likely to be on the same moderate basis that prevailed last year. As usual, the great bulk of New England's coal will come forward in steamers, and this situation makes it more and more difficult for the smaller interests to maintain an even flow of coal to New England.

Many Pittsburgh consumers, it is reported, would be glad to make contracts either for short periods or preferably for the coal year to April 1, 1924, but operators have been unwilling to commit themselves. Export demand for gas coal continues heavy.

The outlook in the central Pennsylvania fields is better. Coal operators from that district who have recently visited inland New York and the New England states believe there will be large quantities of coal stored during the summer. Production is increasing.

New York Shippers Are Optimistic

Demand at New York was slow but operators and shippers are optimistic, basing their hopes on low stocks all over the country and the opening of Lake navigation.

Consumers in and around Philadelphia are buying only to meet immediate needs. It is unusual to see a plant with more than an ordinary supply of coal on hand.

Buying at Buffalo is slow. Prices are low and some believe they cannot go much lower. Continued export demand would, it is believed, improve conditions.

Anthracite Trade Expects Busy Spring

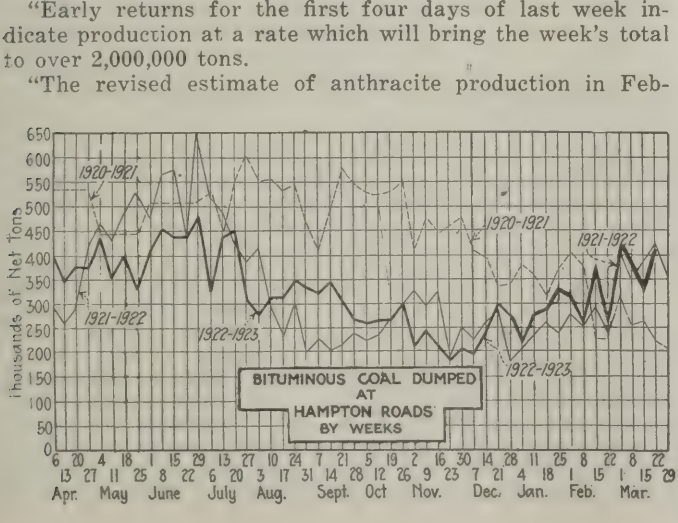
Anthracite producers and retail dealers look for a busy spring and summer. Most yards are without surplus supplies and consumers are anxious, for the most part, to get in their next winter's fuel. Quotations for independent domestic sizes are easier, some retail dealers depending upon the larger companies for most of their tonnage. The steam sizes are moving slowly.

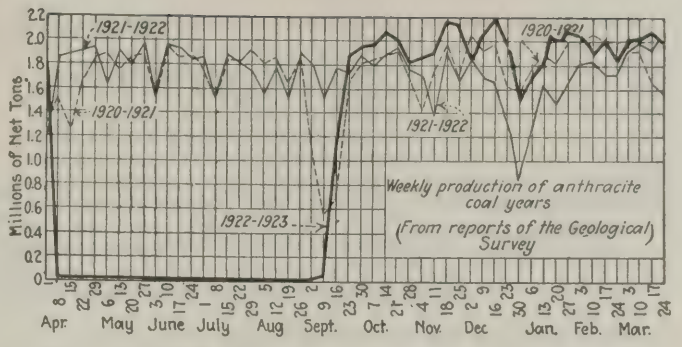
"The production of anthracite in the week ended March 17" says the Geological Survey, "is estimated on the basis of 39,334 cars loaded, at 2,057,000 net tons including mine fuel, local sales and dredge and washery output. This was a slight increase over the week before despite a considerable loss of output on St. Patrick's Day.

"Early returns for the first four days of last week indicate production at a rate which will bring the week's total to over 2,000,000 tons.

"The revised estimate of anthracite production in February, based on final data on shipments in that month, is 7,773,000 net tons, including mine fuel, local sales and dredge and washery output. This amount has been exceeded in only one February (1921) since the beginning of the Geological Survey's record of monthly production,

"The cumulative production of anthracite during the present coal year to the end of February stands at 47,194,000 net tons. This is 41 per cent less than for the corresponding period of the coal year preceding and 44 per cent less than the average for the same period of the past nine coal years."





Kansas Blast Kills 3 and Injures 3

Three men were killed and three were severely injured March 19 in an explosion resulting from an overcharged shot in Thompson, Roberts & Gesslein mine No. 1, Mulberry, Kansas, which the six men were working cooperatively. Thomas Pearson, a veteran miner of the district, who was among those killed, was a candidate in December for secretary-treasurer of District 14, United Mine Workers. More recently he had been considered a possible appointee by Governor Davis to the office of state mine inspector. Richard Medland and Shelton Reeder were the others that were killed. The injured were Dave Curran, Ed Reeder and Loren Reeder. Curran fired the shot.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Mar. 10, 1923 Inclusive	Week Ended Mar. 10, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	28.0	29.4
Panhandle, W. Va.	51.3	57.3	55.3	48.1
Westmoreland	58.8	65.8	52.7	47.8
Virginia	59.9	55.7	53.3	55.1
Harlan	54.8	22.1	21.6	26.4
Hazard	58.4	16.4	18.6	18.7
Pocahontas	60.0	36.6	37.6	43.8
Tug River	63.7	28.8	34.0	35.9
Logan	61.1	26.2	30.8	28.0
Cumberland-Piedmont	50.6	31.7	45.3	47.3
Winding Gulf	64.3	30.4	32.9	37.5
Kenova-Thacker	54.3	42.4	38.7	(a)
N. E. Kentucky	47.7	28.4	28.2	27.7
New River	37.9	31.6	34.3	34.7
Oklahoma	59.6	59.1	42.0	48.1
Iowa	78.4	75.9	80.6	73.8
Ohio, Eastern	46.6	40.8	34.1	35.2
Missouri	66.8	76.3	76.4	70.8
Illinois	54.5	49.9	51.0	42.0
Kansas	54.9	55.9	49.4	39.1
Indiana	53.8	37.7	54.8	(a)
Pittsburgh†	39.8	41.2	32.0	30.5
Central Pennsylvania	50.2	53.4	44.6	53.4
Fairmont	44.0	35.5	36.5	37.8
Western Kentucky	37.7	32.4	33.9	35.5
Pittsburgh*	31.9	56.1	61.4	56.3
Kanawha	13.0	15.6	22.0	27.3
Ohio, Southern	24.3	38.1	32.4	27.1

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded: All Cars	Cars Loaded: Coal Cars
Week ended March 10, 1923	905,219	186,327
Previous week	917,896	193,561
Same week in 1922	820,886	203,815

	Surplus Cars: All Cars	Surplus Cars: Coal Cars	Car Shortage	
March 7, 1923	13,229	4,127	79,270	34,642
Feb. 28, 1923	15,819	4,845	80,633	38,771
Same date in 1923	223,846	86,464	....	....

Foreign Market And Export News

British Production Finds Ready Market; Railroads Increase Orders

Production of British mines during the week ended March 10 reached 5,713,000 tons according to a cable to *Coal Age*. This is 147,000 tons more than in the preceding week and the largest output of any week of the present year.

The threatened trouble among the mine workers is reported to have been settled by the non-unionists joining the Miners' Federation.

According to a newspaper dispatch an inquiry is to be made into the necessity of establishing a third shift of coal tippers and trimmers in the South Wales exporting district.

The pressure on the Welsh market is becoming heavier. Collieries are very well booked ahead.

The Paris-Lyons-Mediterranean Railway Company has ordered an additional half-million tons for delivery over the remainder of the year. Other French railways are also in the market for several months ahead.

From records of weekly shipments it is noticeable that the pre-war export to South America is rapidly being regained.

There has been no weakening in the north of England market in spite of the increased competition from the U. S. The bulk of the American business has been to Italy.

Coal exports officially reported from London for the weeks ended March 16 and March 23 were, in tons:

	March 16	March 23
Mersey	6,415	7,465
Newcastle (Tyne) district	2,110	9,400
Clyde	....	269
South Wales	....	13,881

Dumpings at Hampton Roads Increase

Business at Hampton Roads continued on the upward trend last week with prices firm and with a steady increase in dumpings at all piers. During the first eighteen working days of the month a total of 1,020,000 tons had been dumped, with nine more days to go.

Continued movement of coal to Germany and South America was the main feature of the trade, the outlook for improvement in export business being unusually bright. Coal moved in increasing volume to Dutch ports, also.

Domestic trade is falling off substantially, due to the advent of spring. Improvement in the car situation was shown, and was reflected in the increase in stocks at tidewater, 100,000 tons more than at the end of the previous week being on hand at the piers. The tone of the market was strong, and the general feeling highly optimistic.

Export Clearances, Week Ended March 17, 1923

FROM HAMPTON ROADS

	Tons
For Brazil:	
Nor. SS. Arna, for Buenos Aires	7,150
For Germany:	
Nor. SS. Luise Nielsen, for Hamburg	7,676
Nor. SS. Niels Nielsen, for Hamburg	7,510
For Holland:	
Br. SS. Fullerton, for Rotterdam	4,515
Du. SS. Menado, for Rotterdam	6,513
For Italy:	
Ital. SS. Numidia, for West Italy	7,010
For Spain:	
Br. SS. Lowlands, for Gibraltar	5,016
For West Indies:	
Nor. SS. Alm. for Curacao	1,765
Amer. Schr. Margaret Spencer, for St. Georges	1,232
For ———:	
Nor. SS. Navarra, for Puerto Tarafa	1,526

FROM PHILADELPHIA

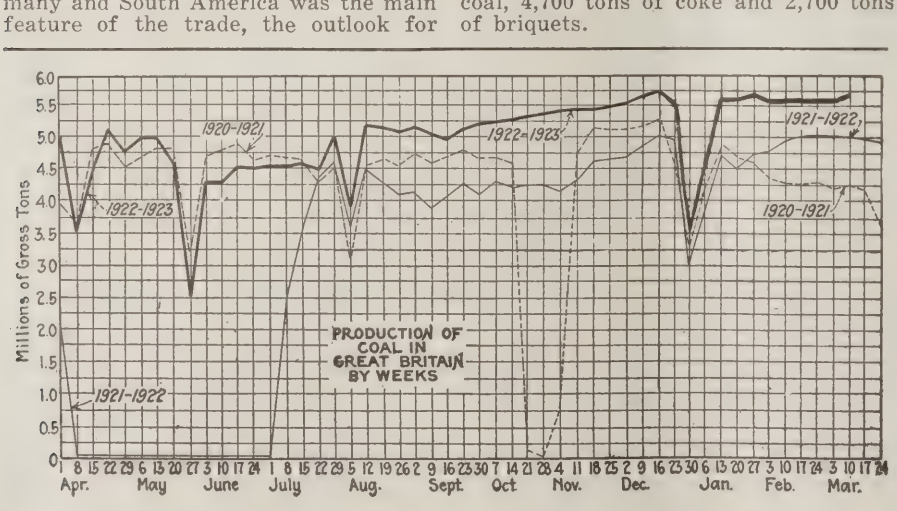
For Cuba:
Dan SS. Phenix, for Havana ...
For France:
Greek SS. Demokratia, for Dunkirk. (coke)
For Nova Scotia:
Br. Scr. James William, for Halifax.. ...

Switzerland Coal Imports

There were imported into Switzerland during the period Jan. 1 to Feb. 15, this year 203,514 tons of coal, according to statistics given out by the Federal Department of Political Economy at Berne. The coal came from the following countries:

	Tons
Germany without Saar	44,373
Saar District	44,070
France	67,354
Belgium	47,717

The imports from Germany without Saar during the first half of February consisted of 2,300 tons of bituminous coal, 4,700 tons of coke and 2,700 tons of briquets.



United States January Coal Exports by Custom Districts

(In Gross Tons)

	Anthracite	Bituminous	Coke
Maine & New Hampshire	8	67	248
Vermont	1,228	938	958
St. Lawrence	108,787	184,166	6,146
Rochester	3,075	43,691	.....
Buffalo	226,379	404,895	40,833
New York	8,408	26	1,536
Philadelphia	3,229	9,853	2,183
South Carolina	3,084	7,512	.....
Maryland	.....	511	.....
Virginia	.....	59,158	227
Florida	146	7,142	1,561
Mobile	.....	320	.....
New Orleans	.....	486	473
Sabine	.....	20	.....
San Antonio	93	42	.....
El Paso	98	4,440	1,324
San Diego	1	29	1
Arizona	1	2,003	4,583
Washington	89	3,872	.....
San Francisco	.....	.....	10
Dakota	1,244	8,064	7,238
Duluth & Superior	.....	5,775	1
Michigan	125	233,072	10,057
Ohio	.....	116,002	378
Porto Rico	31	.....	2
Totals	356,016	1,092,084	77,759

United States January Coal Exports

(In Gross Tons)

	Jan., 1922	Jan., 1923
Coal:		
Anthracite	224,040	356,016
Bituminous	643,913	1,092,084
Exported to:		
Italy	8,206	6,361
Netherlands	.....	1
Other Europe	.....	511
Canada	526,016	1,001,650
Panama	9,625	9,440
Mexico	7,177	6,534
British West Indies	1,751	1,139
Cuba	41,240	59,664
Other West Indies	10,872	6,253
Argentina	14,566	.....
Brazil	12,365	.....
Chile	680	.....
Egypt	7,199	.....
Other countries	4,216	531
Coke	30,732	77,759

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	Mar. 15	Mar. 22
Cars on hand	707	1,479
Tons on hand	49,990	93,400
Tons dumped for week	131,863	121,665
Tonnage waiting	11,475	12,000
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,354	1,672
Tons on hand	78,080	92,560
Tons dumped for week	107,822	108,225
Tonnage waiting	10,697	26,402
C. & O. piers, Newport News		
Cars on hand	1,375	1,891
Tons on hand	75,750	102,680
Tons dumped for week	67,505	133,712
Tonnage waiting	5,620	11,320

Pier and Bunker Prices, Gross Tons

PIERS

	March 17	March 24†
Pool 9, New York	$6.75@ $7.25	*$6.65@ $7.00*
Pool 10, New York	6.00@ 6.40	*5.75@ 6.25*
Pool 11, New York	5.25@ 5.75	*4.50@ 5.50*
Pool 9, Philadelphia	7.00@ 7.40	7.00@ 7.40
Pool 10, Philadelphia	6.25@ 6.50	*6.15@ 6.50*
Pool 11, Philadelphia	5.25@ 5.70	5.25@ 5.70
Pool 1, Hamp. Roads	7.25	*6.75@ 7.00*
Pools 5-6-7 Hamp. Rds.	6.40@ 6.65	*6.00*
Pool 2, Hamp. Rds.	7.25	6.75@ 7.00

BUNKERS

Pool 9, New York	7.05@ 7.55	*6.95@ 7.30*
Pool 10, New York	6.30@ 6.70	*6.05@ 6.55*
Pool 11, New York	5.50@ 6.05	*4.80@ 5.80*
Pool 9, Philadelphia	7.20@ 7.50	7.20@ 7.50
Pool 10, Philadelphia	6.50@ 6.75	*6.45@ 6.75*
Pool 11, Philadelphia	5.35@ 6.00	*5.30@ 6.00*
Pool 1, Hamp Rds.	7.25	*7.00*
Pool 2, Hamp. Rds.	7.25	*7.00*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	March 17	March 24†
Admiralty, large	34s.@35s.	**35s.@ 37s.6d.**
Steam, smalls	26s.@27s.	**27s.6d.@ 30s.**
Newcastle:		
Best steams	34s.@35s.	*33s.6d.@35s.*
Best gas	35s.	*33s.@35s.*
Best bunkers	35s.@37s.6d.	*32s.6d.@35s.*

ances over previous week shown in **heavy** type; declines in *italics*.

News Items From Field and Trade

ALABAMA

The Munro-Warrior Coal Co., Birmingham, is reported to have acquired the No. 2 mine of the Black Creek Coal Co. at Nauvoo, Walker County, and it is understood will build new tipple, washer, etc., and electrify the mine. The property embraces a large tract of Black Creek coal, which is one of the best domestic fuels on the market.

The Kewanee Coal Co., Jasper, has acquired the properties of the Smith-Duffee Coal Co. and contemplates the operation of two or three new mines.

The Brilliant Coal Co., Birmingham, with operations at Brilliant, Marion County, it is reported, is considering the erection of a new washer, tipple and power house at its mines and the purchase of electrical equipment to be used in the operation of its No. 5 and No. 7 mines. These openings are on the Brilliant Black Creek seam of coal, which is a high grade domestic fuel and it is understood the holdings comprise about 8,000 acres.

Charles M. Sartain, F. M. Sartain and Frank Boyer have incorporated the **Sartain-Boyer Coal Co.** at Jasper, with a capital of $150,000.

The Alco Coal Co. has been incorporated at Tuscaloosa, with J. D. Henderson, Fleetwood Rice and Hunter M. Smith as incorporators and with a capital stock of $20,000.

COLORADO

The Colorado Fuel & Iron Co., at the annual stockholders' meeting held March 19 in the company's office in Denver, **with one exception re-elected the old Board of Directors.** Arthur Woods, of New York, was chosen in the place formerly held by Raymond B. Fosdick. The following now comprise the board: George B. Berger, William V. Hodges, S. G. Pierson, J. F. Welborn, Fred Farrar, John C. Mitchell, and Albert A. Reed, of Denver; E. H. Weitzel and M. D. Thatcher, of Pueblo; A. L. Boulware, J. H. McClement, Arthur Woods, and Kingdon Gould, of New York. Following the approving of the report of the officers and the adjournment of the stockholders' meeting the directors re-elected the following officers: J. F. Welborn, president; Fred Farrar, executive vice-president; S. G. Pierson, E. H. Weitzel, Arthur Woods, A. H. Lichty, vice-presidents; Fred Farrar, secretary. Other officials of the company are: R. L. Hearon, traffic manager; Thomas Aurelius, manager of sales; A. W. Sampson, general auditor; J. B. Marks, purchasing agent; F. H. Bentley, statistiican; P. A. Weiting, asst. treasurer; P. E. Thatcher, cashier; Fred Farrar, general counsel; Wendell Stephens, attorney; E. V. Cary, L. B. Rogers, assistant secretaries; F. E. Parks, manager steel mills; D. A. Stout, manager fuel department; L. B. Weed, general superintendent iron mines and quarries; E. H. Weitzel, general manager.

W. D. McCausland, general manager of the Leyden Coal Co., has engaged James Virgin for superintendent of the Leyden mine, near Denver. Mr. Virgin hails from Johnstown, Pa. He had been employed for seven years by Mr. McCausland, when the latter was operating mines in Pennsylvania and West Virginia. **J. E. McLaughlin** has been appointed mine foreman.

Prairie Canon Mine, of the Prairie Canon Coal Co., Vallorso, located in Las Animas County, on the C. & S. R.R., which closed in September, 1921, was reopened in May, 1922.

Sante Fe Mine, of the Sante Fe Coal Co., Denver, located in the Las Animas County, on the A. T. & S. F. R.R., which closed in February, 1921, was reopened in June, 1922.

The Young Mine; Young & Caddell, of Denver, operators; located in Las Animas County, on the D. & R. G. W. R.R., a new mine, was opened in December, 1922.

Piston Mine, Colorado Fuel & Iron Co., Pueblo, located in Huerfano County, on the D. & R. G. W. R R., which closed in December, 1921, was reopened in August, 1922.

Kebler No. 1 Mine, of the Colorado Fuel & Iron Co., Pueblo, located in Huerfano County, on the D. & R. G. W. R.R., which closed in December, 1921, was reopened in August, 1922.

Sunnyside Mine, of the Sunnyside Coal Mining Co., Denver, located in Huerfano County, on the D. & R. G. W. R.R., which closed in November, 1921, was reopened in June, 1922.

ILLINOIS

Work on the **proposed mine of the Illinois Coal Corporation**, which will be sunk in Elk Prairie township, in Jefferson County, is scheduled to begin late in March. The company owns several thousand acres of coal lands in Jefferson County, and it is said the mine will be one of the largest producers in the country.

According to an announcement made at the office of the superintendent of the St. Louis division of the Illinois Central R.R., **construction work on the cut-off from Edgewood, Ill., to Fulton, Ky., will be under way within 10 days.** Work will be started all along the route, according to the announcement, in spite of any action which has been started or may be begun to prevent the construction of the line.

The Harrisburg Fuel Co., Ledford, Saline County, have reopened their mine, closed in April, 1921, located on the Big Four. This company has another mine at Harrisburg.

The Saline Gas Coal Co., at Harrisburg, Saline County, **has opened a new mine** on the Big Four. This company has another mine at Ledford.

William Van Hoose, of Cambria, Williamson County, **has opened a new mine** at that place.

The Franklin Coal & Coke Co., at Royalton, Franklin County, **has reopened mine No. 2**, on the Missouri, Pacific and the C. B. & Q. Rys., closed in May, 1921. The company has two other mines, located at Royalton.

Five of the Old Ben collieries located in Franklin and Williamson counties have been closed indefinitely. While the lack of any market for the coal produced by these mines is given as the primary reason for the indefinite suspension of work, it is also the intention of the company, according to reports, to make some needed repairs and improvements during the suspension. The mines affected are No. 14, at Buckner; No. 15, at Pershing; No. 16, at Rend; No. 17, at Rendville, all in Franklin County, and No. 20, at Johnston City, in Williamson County. At the Buckner mine it is also announced that a considerable amount of work will be done on the shaft, which will be concreted. At Pershing operations will be resumed as soon as a new sizing plant can be installed, and other improvements made which will facilitate greater production.

The Southern Mining Co. has purchased a tract of 555 acres near and to the east of the town of Hegeler, a village in the Danville mining district. The tract is underlaid with coal.

The Rex Coal Mining Co. has reached coal at a depth of 154 ft. on its 600-acre lease near Warner. The vein has a thickness of 4 ft. 8 in. This is the third vein. The first vein, 26 in. thick, was found at a depth of 35 ft., and the second vein, of 14 in., at 95 ft., neither of which will be worked. The company is incorporated for $20,000. Harry E. Bishop is the president; Clarence Hintz, vice-president, and Charles W. Krueger, secretary and treasurer.

The top works of **Wasson No. 1 mine**, near Harrisburg, are to be rebuilt at once.

Railroads operating in the Franklin and Williamson County fields have abolished the position of car distributor because of low business. During the car shortage in the fall and early winter the railroads jointly employed a car distributor apportioning cars to 60 mines.

The **C. B. & Q. R.R.** is doing the preliminary work toward the construction of a double track between Waltonville and Woodlawn. It is said the company is **planning to double track its system in the coal fields.** The **Illinois Central** plans to construct a line from Zeigler, in Franklin county, to a point in Saline county, to connect with the Edgewood-Metropolis cut-off. Articles of incorporation have been filed by the road for the construction of this branch, which will be known as the **Zeigler Junction & Southwestern R.R.**

Mine No. 5 of the Spring Valley Coal Co., located at Spring Valley, will be **closed for an indefinite period.** During the suspension the main shaft will be repaired and other improvements be made around the top works of the plant.

The **first death from the gas explosion in the De Koven mine** of the Madison Coal Corporation, Feb. 24, has occurred. Elmer Scott, 42, a Central City miner, died in Paducah, March 17. He was one of an inspection party caught by a fire caused by a miner lighting a carbide lamp contrary to orders.

Work of **re-equipping the old Milligan mine at Pinckneyville** is under way and coal will be produced at the shaft before many weeks. The mine has not been operated for some time. A switch is now being constructed from the St. Louis division of the Illinois Central R.R. to the mine. The work is being backed and supervised by William A. Lafont, of Pinckneyville, formerly connected with the firm of Dowell & Lafont, of Duquoin.

The **Suburban Coal Co.** of Belleville, is the name of a new concern just formed at that place. The new company has been capitalized at $50,000 and owns properties valued at $30,000. The stockholders are John Henderson, V. M. Henderson, Theodore Michaelis and Louise E. Michaelis. John Henderson, who is from St. Louis, has been at the head of the West Virginia Coal Co., of that city, for years.

The **St. Clair mine at Freeburg**, owned by the General Coal & Mining Co., which was closed down some time ago when the company failed to meet a payroll, **has resumed operations** in full. The mine has been purchased by S. J. Fowler, of East St. Louis, and the name of the company has been changed to the **Free-Belle Mining Co.**

A strip mine near Edgemont owned by the Signal Point Coal & Coke Co., a concern recently organized by Julius C. Miller, of St. Louis, **caved in recently** when operations cut too deeply under the foot of a hill. Jones Brothers, a jobbing concern in St. Louis, selling under the name of the Interstate Fuel Co., are trying in the courts to get an adjustment of their relations with Miller.

The Old Ben Coal Corporation will move its offices from the McCormick Building to the 18th floor of the new Illinois Merchants' Bank Building, corner of Jackson Boulevard and South Clark Street, Chicago, upon completion of the building, which is expected to be ready to receive occupants about March 1.

The M. & B. Coal Co., Danville, **has been incorporated** with a capital of $25,000 by L. T. Mauck, William Mauck, Louis Bock and Paul F. Boch.

The Schuline Mining Co., which recently sank a mine on the J. M. Weir farm, near Sparta, has begun drilling again with the intention of going to the second vein of coal about 110 feet below the surface. The first vein varies in thickness from five inches to five feet, the coal lying in a roll.

The Sackville & Wynn mine at Coal Valley, near Moline, **was closed March 9** for an indefinite period, throwing fifty miners out of work.

The mine at Rutland has been sold by court sale at Ottawa for $16,000. It is said that it was purchased by a group of men including Lee O'Neil Browne, J. L. Bane, former State Senator Cullen and others.

The Glenn Coal Co., of Astoria, has filed articles of incorporation, showing a capitalization of $20,000. The company will mine and deal in coal. The incorporators are E. G. Bader, M. W. Hughes and David E. Thomas.

T. J. O'Gara is disposing of his interest in the **O'Gara Coal Co.**, which operates nine mines in Saline County. Benjamin V. Becker retires with Mr. O'Gara from the board of directors. **Frank H. Woods** remains president, an office he has held since the company was reorganized after bankruptcy several years ago, and **F. A. Manly** continues as vice-president and general manager. Negotiations leading up to the acquiring of the O'Gara holdings in the company by the Woods interests through a New York banking syndicate have been in process for some time.

W. G. Maguire, new president of the St. Louis Coke & Chemical Co., a $17,000,000 corporation, is but 37 years old. His concern is now doing, at its Granite City plant east of St. Louis, a thing that used to be considered commercially impossible—it is coking southern Illinois coal at the rate of about 1,000,000 tons a year.

R. H. Beaumont Co., Philadelphia, announces the appointment of **P. K. Reed as manager of the company's Chicago office**, 760 Monadnock Block.

Plans are being made for the establishment of a mine-rescue and first-aid station at West Frankfort, where 4,000 miners are employed.

Lack of orders caused the **Brewerton No. 2 mine at Lincoln to close down.** This is the largest mine in Lincoln and employs about 300 men. It has an output of slightly over 1,200 tons daily. Its tonnage is handled by the Chicago & Alton R.R. It is also stated that the Riverside mine at Petersburg will soon close.

On the ground that the **Star Coal & Mining Co.,** of Belleville, is insolvent, **D. S. Gent, of Chicago, filed** in the St. Clair County Circuit Court, **a petition for the appointment of a receiver** to take charge of the affairs of the company, of which Anthony F. Jakoubek is president. **Judge George A. Crow appointed Mr. Gent receiver.** Loans totaling $31,830.05, made by Gent as trustee, Feb. 25, 1922, are due and unpaid, according to the petition. The defendants named are the Star Coal & Mining Co., Herman Neff, John Isselhard and F. A. Classen, the three latter having been securities on the notes.

INDIANA

There was a **reduction in the number of miner applicants for certificates and permits in Vigo County** at the March session of the County Board of Mine Examiners. Only 55 certificates and 46 permits were issued, which is **about one-third of the number awarded in February.**

Miners of District No. 11, U.M.W.A., will **seek representation in the Indiana State Federation of Labor** and are planning to nominate a candidate for one of the executive offices. William Schmidt of West Terre Haute is expected to be their candidate.

"If a coal company owning several mines were allowed during a car shortage to receive its combined allotment day by day at one or two mines an enormous saving would result," William M. Zeller, sales manager for the Knox Consolidated Coal Co. told the Indianapolis Rotary Club recently at a dinner. "Under those conditions our company **would close down the higher-cost mines,**" said he, "reducing operating expense so that we could pass on this reduction to coal buyers."

The Columbus Mining Co. expects to expend more than a half million dollars in development of a large area of recently acquired coal land in Indiana and extensive improvements on mine properties in that state and eastern Kentucky. Allen & Garcia, well-known mining engineers, have been placed in charge of the work. A syndicate headed by H. A. Requa, J. B. Hilton and A. L. Allais has acquired what is declared to be 2,500 acres of rich coal land in Gibson County, Indiana, and the Columbus company will develop that field. The company officials have announced that new shaker screens and picking tables at the Shamrock mine at Reilly and the construction of a huge conveyor up the side of the mountains in the Hazard field in eastern Kentucky are among the improvements contemplated. The tipple of Mine No. 5 in eastern Kentucky will be remodeled and shaker screens and picking tables installed.

The General Fuel Corporation of Terre Haute has filed a notice with the Secretary of State showing **an increase of $400,000 in capital stock.** The total capital stock of the company is $2,400,000. The company is opening some mines in the Gibson county coal field. All officials of the company are Terre Haute men. John T. Beasley is president; C. J. Richards, vice-president and general manager; John Hoke Beasley, secretary, and Frank W. Richards, treasurer.

The right of Indiana coal operators to demand the use of permissible powder in their mines was again questioned this month by a strike of about 800 miners at the American No. 1 Mine, near Bicknell. **After a strike of about 20 days the miners returned to work** when the officials of the company stood firm on their right to use permissibles not only because they are safer and had been recommended by the inspection bureau following an explosion Jan. 12, but also because of a joint agreement of miners and operators made in 1915.

A joint conference of members of the executive boards of District No. 11, U. M. W., and the Indiana Bituminous Coal Operators' Association which met in Terre Haute on March 20, **reached a satisfactory agreement concerning the hauling of miners to and from their work in the mines. According to the agreement reached by the joint conference the miners are to be hauled between their work** and the cage by the mine motormen where such action is warranted. The motormen are to receive additional compensation for the extra work.

KENTUCKY

The Big Sandy field of the Northeast Kentucky Coal Association will be a beehive of progressive work for the next few years, according to recent announcements. A number of contractors have made **estimates for bids on several new tracks** and new track scales for the river yards at Ashland. The improvement will be made as soon as possible and will be a great aid in expediting the movement of tonnage west bound. Extensive improvements in trackage facilities will be made over the entire Big Sandy division of the Chesapeake & Ohio Ry. in order to enable them to meet the great demand for the special purpose quality coals of this field which is exceeding by far the expectations of the most optimistic interests.

The Humyar Coal Co. of Lennut, has announced that it will erect a clubhouse and Y.M.C.A. building.

The 1922 coal output of Pike County was a little more than 6,000,000 tons, according to the report of Grant Phillips, inspector for the eighth district. The average days worked by the 84 mines was 161. Fifty-nine mines are electrically equipped and 25 are pick mines. Of the 7,499 men employed, 1,521 are outside men and 5,978 are employed inside.

The proposed branch of the Illinois Central R.R., from Central City to Madisonville, will tap into about 20 large coal mines, now served only by the Louisville & Nashville R.R., while there have been some big deals on coal lands which can be reached by this new line.

The Pond Creek Coal Co. has declared a final dividend of $10 a share in liquidation, payable April 2 upon delivery of certificates to the First National Bank of Boston, or to the Chase National Bank of New York.

MISSOURI

The steady conversion of Southwestern railroads from coal to oil for fuel is cutting deeper into the business of the southwestern coal fields. The Cotton Belt is changing to oil for its lines south of Pine Bluff, Mo.; the Frisco railroad for its divisions in the Tulsa (Okla.) region and the Rock Island for its Louisiana division in southern Arkansas and Louisiana.

Walter A. Zelnicker Supply Co. removed March 1 from 325 Locust Street to new offices in the Chamber of Commerce Building, 511 Locust St., St. Louis.

Mine No. 2, south of Macon, which has been idle since Jan. 22, **has reorganized and started to work.** The mine is leased from the **Home Coal Co.,** by a co-operative organization consisting principally of employees.

Missouri **coal interests were glad to see fail in the state legislature a bill aimed at chain stores.** It would have limited anyone person or corporation to a maximum of 10 places of business within the state.

Walter W. Graham, formerly superintendent of the American Sale & Coal Co., of Kansas, is now general manager and superintendent of the Mosby Coal Co. of Excelsior Springs.

The Blackfoot coal mine, located about four miles north of Columbia, **has been shut down** on account of fire which destroyed the fan and motor and house which contains the fan. The damage to the mine itself was estimated at only $300.

NEVADA

The **discovery of a 5-ft. coal vein** in the hills east of Wells is reported. The discoverer, Martin Elorga, is attempting to obtain funds to finance the exploration and development of the deposit.

NEW YORK

William B. Simmons, for several years connected with the business department of *Coal Age* and more recently assistant to A. S. Learoyd, District Fuel Administrator for Greater New York and Long Island, is now associated with Sidford & Greene, 17 Battery Place, New York City.

Rembrandt Peale, Jr., vice-president of Peale, Peacock & Kerr, 1 Broadway, New York City, **is sailing this week for Europe.** He will spend several months abroad studying industrial conditions and the market for coal in England and on the Continent.

The following **bids to furnish 45,000 tons of three-quarter slack coal** to the Buffalo waterworks will show what shippers think of the coming bituminous market: Valley Camp Coal Co., Cleveland ($2.39 freight rate), $2.50; McVicker Coal Co., Cleveland ($2.39 rate), $2.25; Weaver Coal Co., ($2.09 rate), $3.15; Carson & Co., Philadelphia ($2.09 rate), $2.75; Barnett Coal & Coke Co. ($2.24 rate), $2.39; Link-On Coal Corp. ($2.24 rate), $2.50; Lake Erie Coal Co., Cleveland ($2.24 rate), $2.45; E. L. Hedstrom ($2.24 rate), $2.25. The Hedstrom bid, which is lowest, was received 13 minutes after the time fixed for closing. It is the impression that all bids will be rejected, as they were last year.

OHIO

The Big Six Coal Co., Cadiz, has been chartered with a capital of $500,000 to mine coal and to do a general shipping business. Incorporators are R. H. Anderson, W. C. Clifford, O. H. Finical, J. W. Freshwater and Charles W. Wenner.

The Green Coal Co., Cadiz, has been incorporatted with a capital of $25,000 to mine and sell coal in the eastern Ohio field. Incorporators are Helen Sharon, J. M. Sharon, J. P. Liggett, O. S. Cramblet and B. E. Blackford.

The City Board of Purchase of Columbus has been authorized by the City Council **to purchase 12,000 tons of nut, pea and slack** for the municipal light plant, garbage-reduction plant and other city departments. Advertisements for bids for this coal will be put into the local papers soon.

The Red Bird mine, near Pomeroy, was closed on March 17 because of the lack of miners to operate it. Eighteen miners are in jail on a charge of making moonshine. The miners are alleged to have walled up a section of an abandoned mine with fallen slate and equipped it to manufacture liquor on a large scale. They left a hole for an exit in case of a raid. When half a dozen officers crawled into the mine and, unnoticed, removed enough of the slate wall to admit them, they say they found three stills in operation. The first of the miners to reach the exit hole was so fat that he stuck in the hole long enough for the officers to capture him and those behind.

The Blanchard Coal Co., of Zanesville, **has started to place equipment** at Ellis on the Muskingum River, near Zanesville, where it will develop the 2,500 acres of coal land it recently purchased in that vicinity. This is to be one of the largest stripping propositions in the country, officials of the company have announced.

Tedrow Bros., coal operators of Crooksville, have obtained a lease on a tract of approximately 300 acres of coal land near McLuney which will be developed at once. It is planned to open a mine with an output of at least 500 tons from the start. Electrical machinery will be installed.

OKLAHOMA

The interest of the City of Sapulpa in the Sapulpa Fuel Co. has been sold by the commissioners of that city to the Bartlett Fuel Co. of Sapulpa, for $85,000.

PENNSYLVANIA

The first twenty of 1,000 steel coal cars of the latest type for the Pennsylvania Coal & Coke Corporation **have been delivered** and thirty more are almost ready for delivery. The company will spend approximately $2,000,000 on new equipment. The company also will erect repair shops in the district, but the location has not been definitely decided upon. The corporation owns 8,031 vein acres of coal land in central Pennsylvania and has under lease approximately 36,343 vein acres, with a coal reserve sufficient to keep the company operating to capacity for sixty years or more.

Under the provisions of a bill introduced in the Legislature at Harrisburg by Representative Walter W. Kohler, Lackawanna County, it will be unlawful to convey any illuminating gas through pipes or conduits extending through or over ground under which mining operations have heretofore or are now being prosecuted.

The Denver Rock Drill Manufacturing Co., of Denver, Colo., has opened additional branch offices in Pittsburgh and Pottsville, as well as in St. Louis, Mo. The company also announces that Andrews & George Co., Tokio, is its sole agent in Japan.

A movement has been launched among mining men of the Clearfield district looking to the **establishment of a mining institute** for the purpose of having all the mining men embraced within the territory bounded by Grampian, Snow Shoe, Janesville and McCartney meet at least once annually to discuss the problems encountered in mining, and disseminating information.

Members of the United Mine Workers held a mass meeting in Houtzdale on Sunday, March 18, to consider the situation and attempt to enlist the co-operation of the striking miners of the Berwind-White Coal Mining Co. at Windber for their fellow craftsmen at the company's mines in the Houtzdale region. James Gibson, of the Windber local, spoke, and President John Brophy of District No. 2 and others urged the union men to attempt to influence the Berwind-White miners at Houtzdale to join the union.

Representative Richard D. Burns, Philadelphia, sponsor of a resolution calling upon the Governor to create a permanent Fuel Commission, on March 5 **introduced a bill in the State Legislature amending the Public Service Company Act** of 1913, to provide that in addition to the public utilities now coming under the jurisdiction of the Public Service Commission shall be added coal corporations, coal-producing corporations, coal-selling and coal-distributing corporations. The Burns bill provides that the coal corporations be "declared to be public service or utilities companies within the laws of this Commonwealth." A joint resolution was introduced at the same session of the House by David Fowler, of Lackawanna county, **creating a legislative committee to investigate the coal-supply situation**, defining its powers and duties and making an appropriation of $5,000.

One hundred members attended the March meeting of the Pennsylvania Miners' Institute in Johnstown last week and heard a lengthy discussion on the reliability, safety and illumination of electric cap lamps. Twenty-five new members were admitted. Joseph J. Walsh, the state's chief mining inspector, and Rush N. Hosler, chief of the Pennsylvania coal-mine rating bureau, will be present and address the April meeting.

A meeting of the representatives of 40,000 miners in District No. 2, United Mine Workers of America, has been called for April 18 at Dubois. As the scale and other matters have been adjusted for the year, matters of importance only to the organization will come before the convention, although it was not given out in the call just what would be considered.

Two miners, Ora Clevenger of Houstontown and Samuel Gibson of Ralphton, **were instantly killed in an explosion** on March 17 in No. 4 mine of the Quemahoning Coal Co., at Ralphton. The cause of the explosion has not been determined. There were no other men at work in the vicinity at the time.

A new method of solving the mine-cave problem in the anthracite district is provided for in a bill introduced in the House by Representative Walter W. Kohler, Lackawanna County. The measure authorizes the county commissioners to levy a special tax on coal lands each year after first having made an estimate of the moneys necessary to provide 100 per cent reparation in cases of damage by surface subsidence due to mine caves. A special fund for this tax is created and it would be handled by the county commissioners, the county treasurer and the county controller. The provisions of the bill state that within two years after the measure becomes a law the commissioners are to make an estimate of the total amount of money needed to met a situation that may develop with the exhaustion of the coal supply. Following this the special tax would be levied on all coal in place. This would be made annually and be in addition to the county tax on coal lands.

The House of Representatives at Harrisburg on March 19 **passed the Folwer bill repealing the antharcite coal tax** of 1921 by a vote of 147 to 52. Representative David Fowler, Lackawanna, sponsor of the bill, said it had been amended so that it would not apply until Jan. 1, 1925, and that by that time the Commonwealth would have some financial plan that would not need a tax from hard-coal consumers.

The Burns bill, which gives the Public Service Commission jurisdiction over coal companies, making them public utilities, was **recommitted by the House on** March 19 for a hearing. This will be held March 28.

Representative John E. Stavitski, Luzerne County, **offered a series of three bills** March 20 relative to anthracite mining and miners. One of these measures is for the protection of anthracite coal miners in the **determination of the amount of coal to be used as a basis for calculating compensation** for miners and authorizing the miners to employ a check weighman. **A miners' reserve fund is created by another of the measures.** This bill provides that all coal that has been mined and which is not included in the weights allowed or credited to the miners shall be collected and weighed separately. The amount for which the operators would be liable for the mining of this coal, computed at the current rate of compensation, is to be paid into the fund which is to be used for the benefit of the employees injured in the mines or suffering from disease contracted in the mines or affected by old age. The third bill amends an act of 1891 and its supplements by repealing a provision that relates to certain exceptions in which operators of collieries need not keep at the mine a motor ambulance.

The Mattes mine-cave bills, introduced in the House at Harrisburg March 14 by David Fowler, Lackawanna, were referred March 19 by Speaker Goodnough to the House Committee on Ways and Means. Companion bills introduced in the Senate by Senator Davis, Lackawanna, were sent to the Mines and Mining Committee of which Senator Davis is chairman.

J. R. Robinson, ventilating engineer, 627 Wabash Building, Pittsburgh, on April 1 will sever his connection with the Robinson Ventilating Co., and will give his entire attention to the ventilation of mines. He will open an office at 627 Wabash Building, Pittsburgh.

T. D. Williams, of Johnstown, mine inspector for the Sixth Bituminous district, reports **3,874,786 tons of coal mined** in that district during 1922. Of this tonnage Cambria County mines produced 3,304,786 tons and Somerset County mines produced 570,154 tons.

UTAH

All efforts to abolish or restrict the powers or activities of the Public Utilities Commission—and they were many during the two months' session of the late Legislature—failed. At the close of the session President Thomas E. McKay, a Huntsville resident, who has presided over the Senate twice now, was appointed a member of the commission.

WEST VIRGINIA

Charles K. Francis and Harry M. Mohler, investigators representing the U. S. Coal Commission, **were in northern West Virginia inspecting mines about the middle of March.** Such an inspection is being made with a view to submitting a report on the efficiency of mining methods in northern West Virginia. The inspection is being made solely with reference to the physical aspects of mining and the investigators are not concerning themselves with the financial end of the industry at this time. Among other mines visited was one of the Hudson Coal Co. in Harrison County which is operated on a non-union basis. Mines of the Hutchinson Coal Co. also were visited by the federal investigators.

A bill introduced in the West Virginia House of Delegates by Representative Estep of Logan County and in the Senate by Senator McClaren of McDowell County, upon request **would make voluntary associations suable.** It simply provides that any voluntary association of seven or more members may sue and be sued in the name of the association and that service of process upon any officer, manager or business agent of such association shall constitute service upon the association.

The proposal to create a school of mines in West Virginia is incorporated in Senate Bill No. 348, introduced by Senator A. L. Helmick of Tucker County, who is engaged in the mining business. The bill prescribes that the West Virginia School of Mines shall contain departments of mining engineering, mining extension, mining geology and chemical engineering as well as the mining experiment station already authorized under existing law. The departments of mining and chemical engineering and mining extension at present a part of the College of Engineering in the West Virginia University would be transferred to the West Virginia School of Mines. It also is prescribed that the West Virginia School of Mines shall be organized as a part of the West Virginia University.

Capitalized at $75,000, the **Preston Smokeless Coal Co.** of Fairmont has been organized for the purpose of operating in the Preston County field. Active in organizing this company were J. S. Mallory, Gertrude W. Mallory, of Shinnston; H. S. Keister, Toyle A. Keister and M. B. Simmons, all of Fairmont.

The White Rose Coal Co. is the name of a new company with headquarters at Shinnston, organized for the purpose of operating in the Harrison County field. It has a capital of $75,000. Incorporators of the new concern were Urvin Smith, H. J. Wagner, George Beck and William Beck, all of Smithton, Pa.; John Parachino, of Greensburg, Pa.

George S. Connell of Charleston, has been appointed by President J. A. Clark, Jr., of the Northern West Virginia Coal Operators' Association as a member of the scale committee for the ensuing year. This committee negotiates wage scales for the Fairmont region with the United Mine Workers.

WYOMING

Frank Turner, of Rexburg, Idaho, is authority for the report that the **Blazon Coal Co.** is negotiating for the Star mine at Glencoe, near Kemmerer. L. F. Rains, president of the Blazon Coal Co., also operates the Carbon Fuel Co. and is identified with the newly organized Columbia Steel Corporation, both of Utah.

WASHINGTON, D. C.

Postmaster Merritt O. Chance has resigned as head of the Washington city post office to become first vice-president and secretary of the newly incorporated **Griffith Coal Corporation** of Washington. W. W. Griffith, incorporator of the new concern, is one of the oldest and largest coal dealers of the city.

Plans are being perfected whereby **coal-mining companies may obtain a lower rate on their group insurance** based on the percentage of their men who have been trained in first-aid and safety work by the Bureau of Mines. A further reduction is being arranged at those points where there is an active chapter of the Joseph A. Holmes Safety Association.

The U. S. Supreme Court on March 19 affirmed the decision of the Court of Claims **sustaining a demurrer entered by the government to the petition of the J. M. MacDonald Coal Mining Co.** for the difference between the price it received for coal under the Lever act and the price it claimed would have yielded it cost of production plus a just and reasonable profit. The government had demurred to the claim on the ground that the MacDonald company had no just claim as it had not complied fully with the regulations under the Lever act. The decision follows precedents in other cases arising out of this act.

CANADA

At a conference at Calgary, Alberta, on March 14, the Western Canada Coal Operators' Association and the miners of District 18, United Mine Workers of America, **renewed for another year their wage-rate agreement,** which terminates on March 31.

The charge before Judge Taylor, in the Criminal Court, at Edmonton, Alta., against W. M. Ryan, of the United Mine Workers of America, and 137 men for unlawful assembly having been dismissed, **the strike in the northern Alberta coal field has petered out,** though a little desultory picketing is still maintained. All the mines are being operated and the output is as great as it was before the strike was attempted.

The Illinois-Alberta well, in the Okotoks field, 35 miles south of Calgary, where a heavy flow of wet gas was struck recently, **caught fire on March 14,** and the derrick and equipment were completely destroyed, causing a loss estimated at $25,000. The fire was extinguished on March 16. The well was capable of producing about 40 barrels of gasoline and 3,000,000 cu.ft. of gas daily.

Sympathy toward the unionization idea but **distinct disapproval of any connection with the United Mine Workers of America** appears to be the attitude of miners in the Clover Bar and Edmonton fields. A new union has been formed, affiliated with the Canadian Federation of Labor, but not with the United Mine Workers.

The Dominion Government is to be asked to probe the whole question of coal mine operating costs and sales prices by the Associated Boards of Trade of Eastern British Columbia, which recently adopted this resolution "that this convention is of the opinion that price adjustments in the coal industry are long overdue and that in the interests of that industry itself, dependent industries, and the general public, such adjustments should be made forthwith, and that the Dominion Government should probe the whole situation."

The coal operators of the Province of Alberta are protesting against a proposed increase of compensation rate under the Alberta workmen's compensation act of from 55 to 66⅔ per cent, but there is no indication that Premier Greenfield's government is prepared to make any concessions. Representatives of the collieries admit that the change would appear to bring Alberta's rate on the same plane as that of other provinces, but they assert that comparisons are not fair because of the high wages paid in that province. In Ontario 66⅔ per cent is the basis, but there metalliferous miners receive $4.50 a day while in Alberta mines the wages are $7.50 a day and upward.

Association Activities

Pittsburgh Section of A.I.M.E.

On March 15 a dinner was held by the Pittsburgh section of the American Institute of Mining and Metallurgical Engineers, at which Chairman Crabtree introduced Edward Payson Mathewson, the new president. In his talk to the gathering Mr. Mathewson spoke of the aims of the institute and what each member should bear in mind to aid in its expansion, emphasizing the necessity of interesting young engineers in the work of the organization. He condemned state legislation which, if enacted, would require every engineer to be licensed. Instead of elevating the position of the engineer in public view, he said, such legislation would lower it by causing the masses to believe that every licensed engineer is a capable engineer, else he would not be licensed; that experience and name rather than a certificate of qualification should give rank to the engineer. Graham Bright was elected chairman of the Pittsburgh section for the coming year and the members voted that Mr. Goodale continue in the office of secretary.

International Railway Fuel Association

Periodical meetings in the principal railroad centers to stimulate interest in fuel matters is one of the activities recently undertaken by the International Railway Fuel Association. In December, 1922, President J. N. Clark, acting upon authority of the executive committee, requested members in some of the larger railroad centers to organize district chapters. This work is now being carried forward and the District of Columbia Chapter, which was organized on Jan. 10, 1923, has already held two meetings. The subjects discussed by this chapter included "Forms of Fuel Contracts," "Practicability of Fuel Purchased on Specification Basis," "Methods of Fuel Distribution by Direct Consignment from Mines to Coaling Station and Otherwise," and "Supervision of Locomotive Operation." The Chicago District Chapter held a meeting on March 12, at which W. E. Dunham, assistant superintendent of motive power and machinery of the Chicago & North Western R.R., presented a paper on "Cold Weather Practices as Related to Fuel Conservation." Each section will be allowed to work out its own program for the discussion of problems of local or general interest. It is thought that by holding informal meetings each thirty or sixty days the members will be able to carry out the objects of the organization to better advantage and to promote the best methods for fuel economy in their own territory.

Indiana Bituminous Coal Operators' Association

The Indiana Bituminous Coal Operators' Association, in annual meeting March 14, at the office of Phil H. Penna, secretary, elected the following officers for the year: E. D. Logsdon, president; Paul Zimmerman, vice-president, and P. H. Penna, secretary and treasurer. Executive board members elected were: H. M. Ferguson, Clinton, Ind.; M. L. Gould, Indianapolis; C. Zellar, Brazil; David Engle and James Moore, Evansville; John Connery and G. James Pauley, Chicago, Ill.; J. A. Templeton, Paul Zimmerman, A. M. Ogle, George C. Richards, J. C. Kolsem, Homer Talley, W. D. Freeman, Hugh Shirkie and Robert B. Smith, of Terre Haute.

Traffic News

The Baltimore & Ohio R.R. has just closed contracts for 75 additional locomotives, which it is expected will be delivered next autumn. They will cost approximately $75,000 each. Order for 25 of them was placed with the Lima Locomotive Works at Lima, Ohio, and 50 with the Baldwin Locomotive Works at Eddystone, Del. The plants of both of these companies are located on the lines of the B. & O.

A brief filed with the Interstate Commerce Commission by the Southwestern Interstate Coal Operators' Association and the Oklahoma Coal Operators' Association urges **the commission to prescribe reasonable and just rates on coal** from mines in Missouri, Kansas, Arkansas and Oklahoma to various destinations in Kansas, Missouri, Nebraska and Iowa, particularly to the cities and towns located on or in the vicinity of the Missouri River. The brief states that the Southwestern association is composed of 170 members and the Oklahoma association of 47 members.

The city of Zion City, Ill., has lost its appeal to the I. C. C. suit for cheaper coal rates from the mines. Rates on coal to Zion City have been found to be reasonable in the case filed by Zion City industries against the Evansville, Suburban & Newburgh R.R., Evansville, Ind.

The Coal, Coke & Iron Ore Committee, Central Freight Association territory, will hold a hearing April 12 in the Chamber of Commerce Building, Pittsburgh, Pa., **to consider the proposed establishment of a rate of $1.01 per gross ton on bituminous coal,** carloads, to 26th Street, 33rd Street, Pittsburgh (Duquesne) and Grant Street deliveries, Pittsburgh, Pa., from junctions with the Union R.R. (Pittsburgh, Pa.).

The **Coal, Coke and Iron Ore Committee, Central Freight Association territory,** will hold a hearing, April 12 in the Chamber of Commerce Building, Pittsburgh, Pa., **to consider the proposed establishment of a rate of $1.13 per net ton on bituminous coal,** carloads, to stations on the Baltimore & Ohio R.R. between Pine Grove, W. Va., and Bane, W. Va., inclusive, from origin points between Clauson, W. Va., and Hepzibah, W. Va., and from Limestone, W. Va., including mines and other points intermediate.

The matter of rates on slack from Arkansas and Oklahoma mines to Texas points will be the subject of oral argument before Division 2 of the Interstate Commerce Commission in Washington on April 26.

An embargo was placed March 14 by the Lehigh Valley R.R. against all shipments of bituminous coal for J. Skolik & Sons, Newark, N. J.

The Delaware, Lackawanna & Western R.R. has cancelled an embargo against all freight destined to all points via Delaware & Hudson Company, Binghamton, N. Y.

Embargo placed by the Delaware & Hudson Co., against traffic from Pennsylvania R.R., Lehigh Valley R.R., Central Railroad of New Jersey at Wilkes-Barre and Hudson, Pa., and from Delaware, Lackawanna & Western and Erie railroads at Binghamton, N. Y., and Lehigh Valley R.R. at Owego, N. Y., destined to points on or via the D. & H. Co., **is modified** by cancelling. Paragraph B of Sect. 2 which will now permit acceptance of all carload and less carload freight from D., L. & W. or Erie R.R. at Binghamton, N. Y., and from Lehigh Valley R.R., at Owego, N. Y., when destined to any D. & H. Co. station.

Embargo placed by the Boston & Albany R.R. against all carload freight from connecting lines at Albany, West Albany Transfer and Rensselear, N. Y., destined to points on or via the New York, New Haven & Hartford R.R. when routing via Springfield, Mass., **is entirely cancelled.**

On account of accumulation the Long Island R.R. on March 20 **embargoed all carload freight** for team track delivery at Elmhurst, N. Y., also all freight consigned to or intended for the Elmhurst Coal Co., Elmhurst, N. Y.; exceptions: livestock, perishable foodstuffs, for human consumption, field and garden seed, fertilizer and U. S Government freight.

On account of accumulation the Long Island R.R. on March 20 **embargoed all carload freight** requiring crane delivery at Flatbush Avenue Station, Brooklyn, N. Y.

On account of accumulation **an embargo** was placed March 20 by the Pennsylvania R.R. system **on all shipments of bituminous coal** consigned, reconsigned or intended for **delivery to the American Lime & Stone Co.,** Bellefonte, Pa. Shipments originate principally in the Pittsburgh and Clearfield districts.

Obituary

Charles Stewart Ramsay, for many years superintendent of the Dora division of the Pratt Consolidated Coal Co., Birmingham, Ala., but recently removed to Sanford, N. C., where he assumed the management of the Erskine Ramsay Coal Co., died in Birmingham, March 17, after an operation for appendicitis. Mr. Ramsay was 43 years of age and went to the Birmingham district about twenty years ago from Shafton, Pa., having been connected with the Pratt company since then, and was widely known and considered an able mining man. He was a brother of Erskine Ramsay, vice-president and chief engineer of the Pratt company, an engineer and inventor of national repute. He is also survived by his widow, five children and five brothers and three sisters. The body was sent to Shafton, Pa., for interment.

Calvin Pardee, who with his father, Ario Pardee, and brother, Ario, Jr., had a prominent part in the development of the anthracite industry of Pennsylvania, died March 18 at his home in Philadelphia. He was 81 years old and until a few months ago had been in active charge of his varied business interests. Mr. Pardee was a former president of the Lehigh Coal & Navigation Co., a director of the Lehigh Valley Railroad Co., the North Penn Railroad Co., the Tennessee & West North Carolina Railway Co., and of the Cranberry Iron, Coal & Furnace Co., of Tennessee.

John J. Brown, 71 years old, president of the Pittston Coal Co., for the last fifteen years, died March 20 at his home in Scranton, Pa. He was ill of complication for one month. Born in Carbondale on June 24, 1852, Mr. Brown lived in that city until he was twenty-three years old, working in a blacksmith shop. He later moved to Scranton, where he entered the employ of the Adams Express Company. He eventually became connected with the Garney & Short Cigar Company as a salesman, finally being made a member of the firm. For the last fifteen years he was head of the Pittston Coal Co. His wife, three sisters and a brother survive him.

Coming Meetings

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey. The registration fee of $15 will include all meals except breakfast, transportation to and from the mines which will be visited, and the banquets. The only other expenses to be incurred will be hotel room and transportation to and from Scranton. Executive secretary, J. E. O'Toole, Philadelphia, Pa.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The Virginia Coal Operators' Association will hold its annual meeting on April 21 at Norton, Va. Secretary, G. D. Kilgore, Norton, Va.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24. Secretary-treasurer, J. G. Crawford, Chicago, Ill.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Indiana Retail Coal Merchants' Association will hold its annual meeting April 25 and 26 at the Severin Hotel, Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Set Them Up Again

GENERAL GOETHALS last week closed his desk with a bang, grabbed his hat and left the office of Fuel Administrator for New York State in a huff. Like other famous men he found the coal problem not a stone wall against which he could butt his head with super engineering skill but a simple elemental test in economics where bluster and fame came to crestfallen defeat. According to the New York *Globe*, the General declared his office was a joke and that in view of the way the coal situation was handled from Washington he would like a chance at once to vote in opposition to the Harding administration.

Of course what peeved the General is that his mighty person was not sufficient to obtain for New York State, his protégé, more than was coming to it. He flays the Pennsylvania Fair-Price Commission for allowing certain independents a fair price for their coal, he admits he would have let Canada freeze and recommends a program of nationalization that would out-Brophy Blankenhorn.

He may cool off some day when his offended dignity is once more enthroned and acknowledge that Woodin had the thing well in hand when he took hold.

The coal industry may be a fine place for a dictator, as he suggests, but we doubt if his candidacy would now be seriously considered.

What Is the Price of Coal?

IT IS more generally true than not that what the consumer is willing to pay sets the price of bituminous coal. This, of course, is true of any commodity in which there is no corner or monopoly. The consumer's interest may be largely influenced by purely psychological factors, either for or against high prices, as when a buying panic boosts prices or a buyers' strike depresses them. But the simple fact remains that with a commodity so freely competitive as soft coal the indifference or anxiety of the buyer is the chief factor in setting the price. This is particularly and more noticeably true with respect to the open-market or "spot" prices.

Several of our readers, representing smaller operations in the field, have recently called our attention to the fact that the spot prices at the mines quoted weekly in *Coal Age* often are higher by as much as 50c. than they can obtain for their product on corresponding dates. The answer is that the two figures are not necessarily comparable. The current quotations published by *Coal Age*, and presumably this is true of those published by our contemporaries, are prices to consumers —that is to say, the "market" on coal in those centers where trading is done.

It is a repetition of well-known facts to recite that coal is sold through three well-established channels of trade: Directly by the sales departments of producers, directly by sales agents acting for and in behalf of producers on contract arrangement with fixed compensation, and by independent wholesalers or jobbers. If on a given day in a given city, as for instance Philadelphia, where buying and selling of coal centers, buyers are disposed to place orders for current delivery of a given coal, say Fairmont medium sulphur steam run-of-mine, at prices ranging from, say, $2.50 to $3.25 per net ton at the mines, this fact will be evidenced by conversations between buyer and seller.

If the seller is the sales representative of a producer, either directly or through a sales agency, he can and does act on his own initiative, accepting orders at the price he can induce the buyer to accept. Against that price are the charges for selling before the mine is credited. In the case of the selling department of a producer this usually is cost, and for a sales agency a fixed percentage of sale price f.o.b. mines.

A variable but considerable tonnage is handled through independent wholesalers or jobbers. Smaller operators have middlemen to whom they are accustomed to turn when they have coal to sell, and each jobber has a list of producers to whom he may turn for coal when he has a buyer in prospect. Except during times of great urgency for supplies, when prices are high and panic conditions prevail, the producer and independent middleman on whom he depends for distributing his product have a rather loose but tangible connection. In many such instances there is a common understanding that the coal will be sold to best advantage and that settlement will follow at stated intervals.

In other instances, and this is more typical of the market today, the middleman makes the producer a flat offer on specified tonnage to match the firm offers of consumers. Or this middleman picks up coal "on wheels" at favorable prices, as the shipper on consignment feels the pinch of carrying the coal, and offers this "bargain" to the buying trade. In any event, to go back to our illustration of a market on Fairmont steam coal in Philadelphia, assumed to be on a certain day $2.50@$3.25, we find that the middleman, knowing that this top figure is his maximum and the lower figure the more likely for a quick turn, canvasses the field either through his local agent or by long-distance telephone, and offers $2 to the producer who either has mined the coal but has not sold it or who wants orders that he may run the next day. The producer who accepts business at $2, seeing a published quotation on coal from his field 25c. to 75c. above what he can get is disposed to say the published quotation is grievously in error.

It is difficult enough to round up data sufficient to report the market on soft coal within narrow limits as to grades and quality on the markets where buying and selling are most active, without attempting to cover the multitude of prices that obtain in the field among the smaller shippers, whose product has a wide range from

best to worst and whose values in the market have a correspondingly wide range.

What the producer gets for his coal is not by any means always the market, for to the best salesman go the best prices and a shipper without his own sales force must take what he can get. The price of coal is what the consumer pays.

These Three

THE three qualifications for a mine manager are character, intelligence and education. The first two are almost entirely innate. Education does little to give a man power of leadership, strength of will, quickness of judgment, patience, freedom from excessive sensitiveness, ability to express himself well, power of reserve—all the qualities that mark a man of the world. Education may even weaken character by making a man defer to the judgment of others and by inducing a man to lay more stress on the manner than on the matter of expression. It may make a man of narrow vision more meticulous than ever.

Intelligence also is largely innate. It is the ability to apply and reason about facts. It has little to do with the acquisition of a knowledge of them. Education probably develops intelligence but little. The reasoning faculty, what is called the intelligence quota—the I. Q. of the psychologists—soon reaches in life a given level after which it quite generally fails to increase. Many of the problems presented by life are answered rightly or wrongly partly from experience, education or group consciousness and not by reasoning at all. We appear to be more intelligent but are really only better educated.

If character and intelligence are really, or even only in the main, innate, then indeed it should occasion no surprise if education fail to make a man. The "educated fool" should not be any more a real matter of surprise and regarded as phenomenal than the short-sighted long-distance runner. We know that the powers of sight are distinct from the powers of locomotion. We do not assume that they are connoted, much less correlated. Why then expect education, intelligence and character always to be found in one man?

An educator was asked recently how he could expect to get results out of the untested material furnished him. He replied that it *was* tested—in examinations. That is to say, he tried to find if facts had stuck as a test as to whether other facts might be expected to stick. A splendid test if he was trying to find out whether he could educate his man, but useless if his purpose was to find out if the man was qualified to be a good business man with the three qualifications—character, intelligence and education. That educator was trying to tell the public that his graduates would have all three qualifications yet he could not give them the first two and could only add to the third.

Let the colleges end their clatter about how much they do for the character and intelligence of their students. They do about as much, and can do about as much, for these qualities as they do for the stature of their *protégés*. We presume that if the demand for tall men and fat men were vocal the schools would promise to make their graduates both tall and fat. Almost all that the colleges do is to inform. It is about all that they can be expected to do, and what a noble task it is!

Set an intelligent savage of character to figure out the operation of a motor—how far would his intelligence and his character take him? Could he learn the relative availability of a delta and a star connection? Could he lower a power factor? This is no reflection on intelligence or character except that it argues that they are not enough in themselves. We must have education. There is place in the world for men, even though they be low in both intelligence and character, as long as they are well educated. There is a reward for such men and a big reward for those who are well endowed with two of these and a bigger reward yet for those who have all three. Education does not accomplish everything but what it does is mighty well worth the doing.

"From the Pan Into the Fire"

ONE reads with a puzzled brow the "arguments" for nationalization of the coal industry, for the arguments are not arguments but protests. In the current issue of the *Outlook* C. J. Golden restates his view of nationalization, and John Spargo, "an authority on socialism," takes the contrary side. So far Mr. Golden and the school of thought which he follows have had one stock argument for taking over the coal mines and that is somewhat loosely defined as "fact finding." None of the advocates of taking over the mines offers argument or reason for such action. They agree in saying that they are not satisfied with present conditions; they want things changed and nationalization is the thing proposed. We believe they want the government to take over the mines because they consider this the simplest way to get everything they want—higher wages, less work, more power—everything everybody with human instinct and active appetite wants. For instance, Golden says "the first year [of nationalization] the miners' wages might be reduced, seeing the kind of representatives you've got here now in the government. But not the second year. The workers would soon learn not to vote for men who reduced them. When the representatives' political fates depended on it, we'd get fair conditions from them."

It is rather difficult to answer arguments as nebulous as those of Golden et al., but John Spargo summarizes the results of nationalization of industry as variously practiced and attempted and concludes that the plan "offers no present relief from the evils of the existing methods of producing and distributing coal, bad as they are. It simply invites us to jump from the pan into the fire."

The plea for nationalization as set forth by the miners is not likely in the last analysis to be seriously opposed by those who own coal properties and would sell them to the government. If the United Mine Workers want to buy the coal mines, they are for sale today and if they can get the taxpayers' money with which to make payments, well and good. Before that happens some who are not to be charged as speaking for the operators will challenge the proposal as opposed to public interest, for, as Spargo says, "it opens the way for an appalling amount of wastefulness and extravagance." Concluding, he says: "For the present at least I am free to say that I can see no hope of anything good or useful to be attained by any such extension of the power of the government and its preponderance over the economic life of the nation as has been suggested. On the contrary, the sooner we can lessen those powers, reduce the size of our governmental machine and its interference with the economic life of the nation, the better will it be for all of us."

Nanticoke Coal Is Thickest Though Deepest of All Measures in Northern Anthracite Field

Becomes 39 Per Cent Thinner and 271 Ft. Deeper in 50 Years—Inefficiency Cuts Mines' Output 24.3 Per Cent Since 1902—Four Plants Prove Value of Up-to-Dateness

By Dever C. Ashmead*
Kingston, Pa.

FIFTY years of hard-coal mining in the Nanticoke district of Pennsylvania's northern anthracite field—a district covering the western end of the field below Wilkes-Barre—has developed the widest variations in thickness and depth of coal measures to be found anywhere in the field. In spite of this and the presence of some troublesome displacements, the problems and general tendencies of the Nanticoke district parallel those of the Wilkes-Barre and Lackawanna districts, treated in preceding articles of this series. The average thickness has diminished from 11.5 ft. in 1872 to 6.83 ft. now—but it still is 1.95 ft. thicker than Lackawanna and 1.74 ft. thicker than Wilkes-Barre coal. This advantage is partly counterbalanced by the depth of the field—an average of 567 ft. compared with 399 ft. for Wilkes-Barre coal and only 268 ft. for Lackawanna. Of course pumping and haulage distance are increasing and are multiplying power costs.

Four big new collieries, producing in 1921 about 32 per cent of the district's output, have had a deep influence on Nanticoke statistics. They indisputably prove the value of modern methods and equipment. While the average output per day per man in the whole district in 1921 was 2.02 tons, it would have been only 1.86 tons if the data on the four had been omitted. The output per outside man would have been 8.20 tons instead of 9.43 tons. A decrease in the average Nanticoke miner's production from 5.34 tons in 1902 to 4.04 tons in 1921 can be explained only by charging the miners with inefficiency.

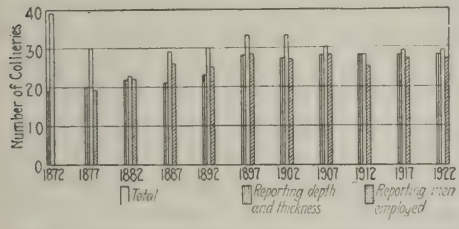


FIG. 25—NUMBER OF COLLIERIES CONSIDERED IN THE NANTICOKE DISTRICT

This shows in the first column of each period the number of collieries which reported on thickness and depth. The second column gives the number of collieries reported by the State Department of Mines and the third column gives the number used in the tonnage calculations.

Practically all of the Nanticoke district collieries furnished complete information for the years from 1882 to 1922 (Fig. 25 and Table XXI). Even for 1877 reports are available from about 50 per cent of the collieries. So the curves plotted on this data give a good picture of what has happened in this district. This series of studies has been confined as nearly as possible to fresh-mined coal. Washery tonnage has been omitted, except washed coal that could not be separated from the breaker output. Strippings did not have to be considered in this district, as there are none of any importance.

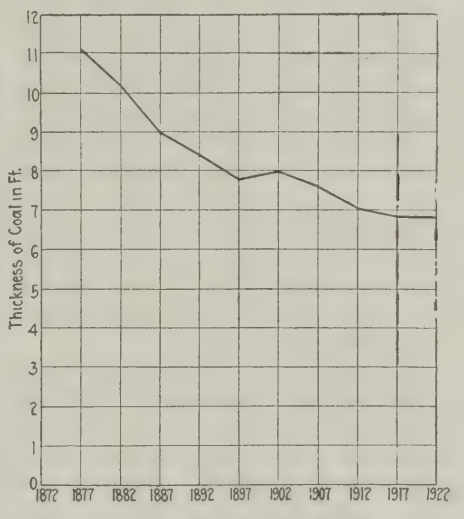


FIG. 27—AVERAGE THICKNESS OF NANTICOKE COAL BEDS BY FIVE-YEAR PERIODS FROM 1872 TO 1922

In the first section of this article under Fig. 3 (*Coal Age*, Vol. 23, p. 324) there was a complete description of the method used in the calculation of this curve. The main feature to be noted in this curve is the general decrease in the average thickness of the beds.

The geological conditions in the Nanticoke district are distinctive. Mines vary from shallow workings to some of the deepest in the northern anthracite region. One of the shafts sinks 1,800 ft. The majority tap deep-lying beds. About four miles west of Wilkes-Barre the coal is deepest. From that point west the measures rise and on the top of the mountain back of Shickshinny the beds spoon out. On both sides of the basin but especially on the south side steep pitches are encountered. Fig. 26 is an actual section of this district. It will be noted that there are a few heavy faults

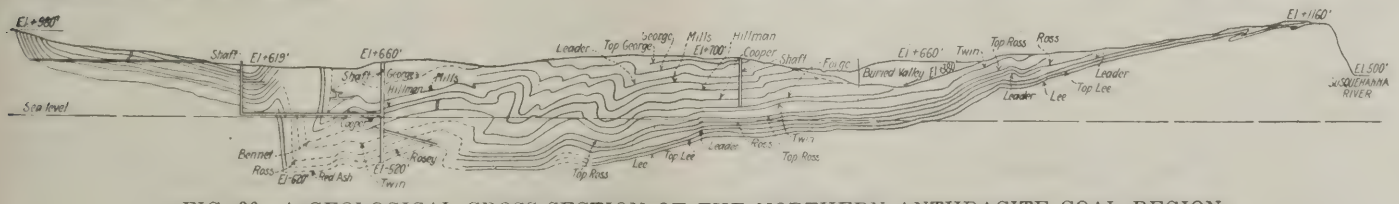


FIG. 26—A GEOLOGICAL CROSS-SECTION OF THE NORTHERN ANTHRACITE COAL REGION IN THE VICINITY OF NANTICOKE

Complete cross-section of the field made near the City of Nanticoke. Working beds are in the heavy black lines. Dotted lines represent beds located by estimate. The faults shown cause considerable displacement and steep pitches in the vicinity of the faulted area. As the beds approach the outcrop on the southern side of the field they become steeply pitching. The "buried valley" is indicated by the heavy wash shown in the center of the cross-section.

FOOTNOTE—This is the third of a series of articles by Mr. Ashmead describing mining conditions in seven sections of the anthracite region. The first and second articles appeared in *Coal Age*, on Feb. 22, 1923, and March 22, 1923. The fourth will appear in an early issue.

*Assistant editor of *Coal Age*.

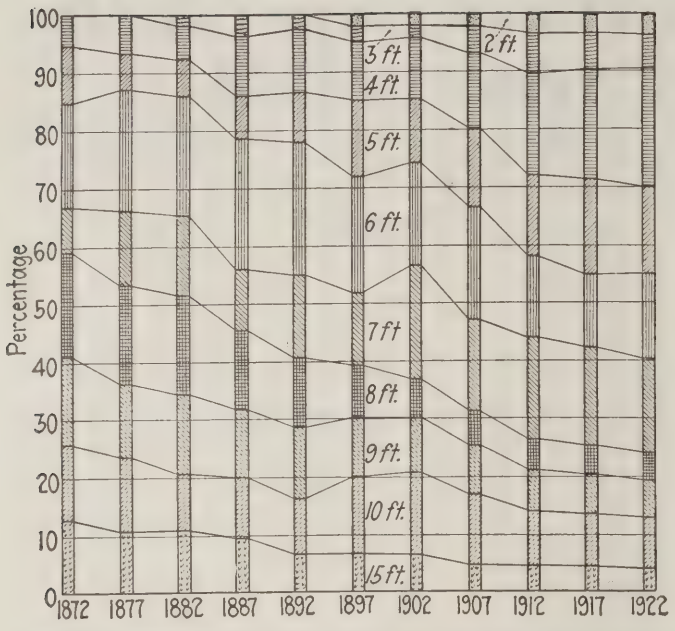


FIG. 28—PERCENTAGE OF EACH THICKNESS TO TOTAL NUMBER OF NANTICOKE BEDS

The variation in the thickness of the beds by 5-year periods from 1872 to 1922 is shown by this curve. The method of arriving at these percentages has been described in the first part of this article under Fig. 4 (*Coal Age*, Vol. 23, p. 324).

that cross the beds, causing considerable displacement and some steep pitches.

The "buried valley"—a continuation of the one mentioned in the description of the Wilkes-Barre district (*Coal Age*, Vol. 23, p. 475)—extends through this district also, from Pittston to a point west of Nanticoke. The cross-section shows that the bottom of the "buried valley" near Nanticoke is about 200 ft. below the surface. Here also some of the beds of coal outcrop in this valley, making the workings near the valley dangerous.

In this district probably more coal is being recovered from first mining in proportion to the total output than in either the Wilkes-Barre or the Lackawanna district.

A list of the beds from the surface downward as they occur in the Nanticoke district follows: Top George, George, Orchard, Mills, Hillman, Cooper, Bennett or Forge, Twin, Top Ross, Ross, Rossy, Top Lee and Lee (Red Ash).

In this district are found the thickest beds in the northern anthracite region, averaging 6.83 ft. In 1877 they showed a weighted average thickness of 11.19 ft.

TABLE XXI—NUMBER OF NANTICOKE DISTRICT COLLIERIES IN THIS STUDY

	Reported by Inspectors	Having Depth Data	Having Thickness Data	Having Tonnage Data
1872	39	19	19	0
1877	30	15	15	14
1882	23	22	22	22
1887	29	21	21	26
1892	30	23	23	25
1897	33	28	28	28
1902	33	22	22	22
1907	30	28	28	28
1912	28	28	28	25
1917	29	28	28	27
1922	29	28	28	27

TABLE XXII—WEIGHTED AVERAGES OF NANTICOKE BEDS

Years	Thickness of Beds	Depth of Workings	Years	Thickness of Beds	Depth of Workings
1877	11.19	296	1902	8.02	524
1882	10.24	335	1907	7.67	540
1887	9.02	346	1912	7.09	526
1892	8.43	414	1917	6.86	567
1897	7.81	484	1922	6.83	567

TABLE XXIII—PRODUCTION PER BOILER-HORSEPOWER AND PER ENGINE HORSEPOWER

Year	Boiler H.P. Installed	Engine H.P. Installed	Tons of Coal Produced Per Boiler H.P.	Tons of Coal Produced Per Engine H.P.
1877	8,370	.....	1.75	...
1882	14,400	20,425	1.22	.86
1887	21,000	.....	1.16	...
1892	25,220	.....	1.18	...
1897	35,780	.....	1.08	...
1902	52,449	70,272	.81	.61
1907	59,599	81,398	.84	.61
1912	64,398	83,962	.79	.60
1917	60,819	83,161	.72	.53
1921	60,391	.....	.77	...

Most of the coal then mined in the district was in the Cooper, Bennett and the Red Ash beds. These are the thick beds of the district. Judging by figures available for 1872, the weighted average thickness in that year was about 11.5 ft. But as 1872 production figures are not available for individual collieries the average thickness can only be estimated and therefore is not shown in the curve. Fig. 27 and Table XXII show the steady decline to 6.83 ft. in 1922. In the first 20 years of the period the decrease was 3.38 ft. while in the last 25 years it was but 0.94 ft.

TABLE XXIV—MULE AND LOCOMOTIVE HAULAGE IN NANTICOKE DISTRICT

	Tons of Coal Hauled Per Mule Per Day	Number of Underground Locomotives Per 100,000 Tons of Coal Produced Per Year		Tons of Coal Hauled Per Mule Per Day	Number of Underground Locomotives Per 100,000 Tons of Coal Produced Per Year
1877	19.54	....	1902	18.85	.10
1882	16.27	....	1907	19.58	.50
1887	15.81	....	1912	23.35	1.00
1892	15.92	....	1917	28.65	1.60
1897	21.35	....	1921	28.70	2.36

Fig. 28 shows that there were fewer thin beds being mined in this district than in either the Lackawanna or the Wilkes-Barre districts, for in 1922 the beds under 3 ft. in thickness were only about 3.5 per cent of the total and those under 4 ft. only 9.25 per cent. Mining in beds less than 4 ft. thick did not start until 1882 and no 3-ft. beds were opened until 1897. The whole diagram, however, shows that thick-vein operation is steadily decreasing and thin-vein work is increasing.

In coal measures so deep as these it is not surprising that the weighted average depth of workings is greater than in either of the two districts previously described. The rate of increase in depth also is greater. Fig. 29 and Table XXII show that 296 ft. was the weighted depth of workings in 1877 — the first year in which complete data were available. In 1872 the unweighted aver-

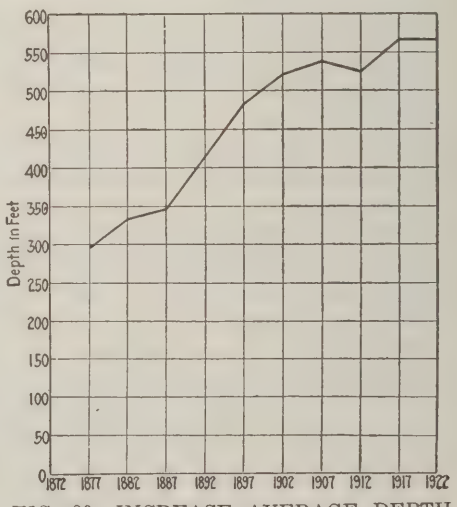


FIG. 29—INCREASE AVERAGE DEPTH OF NANTICOKE WORKINGS

Weighted average by 5-year periods is shown by this curve. The method of calculation is similar to that used in calculating the average depth under Figs. 3 and 5 in the first part of this article (*Coal Age*, Vol. 23, pp. 324-325).

TABLE XXV—NUMBER OF MULES AND LOCOMOTIVES IN NANTICOKE DISTRICT

	Number of Mules	Number of Underground Locomotives		Number of Mules	Number of Underground Locomotives
1877	750	....	1902	2,257	13
1882	1,078	....	1907	2,550	75
1887	1,544	....	1912	2,168	151
1892	1,861	....	1917	1,530	211
1897	1,960	....	1921	1,630	330

age depth of workings was 230 ft. This figure was not used in plotting the curve.

The increase in depth during the period 1877 to 1887 was only 50 ft., or at the rate of 5 ft. per year, but from 1887 to 1907 the increase in depth was 194 ft., or 9.7 ft. per year. From 1907 to 1922 the curve levels out, showing a difference of only 27 ft. in 15 years, or 1.8 ft. per year. The total difference between 1877 and 1922 was 271 ft., or an increase in average depth of 92.2 per cent. If the unweighted average of 1872 is used, then this difference in depth would increase to 337 ft., or to 146.5 per cent.

Fig. 30 illustrates very clearly how the depth of workings increased, especially from 1887 to 1902. In 1872 no beds were mined deeper than 500 ft. and 45 per cent of them lay between the 200- and 300-ft. intervals. In the following 5-year period the maximum depth increased to 600 ft. and then almost every period showed an increased maximum depth until 1902, when the maximum remained stationary at between 1,300 and 1,400 ft. Since then there has been no increase in depth except in 1912, when for a short period beds of coal were mined in the 1,600-1,700-ft. interval.

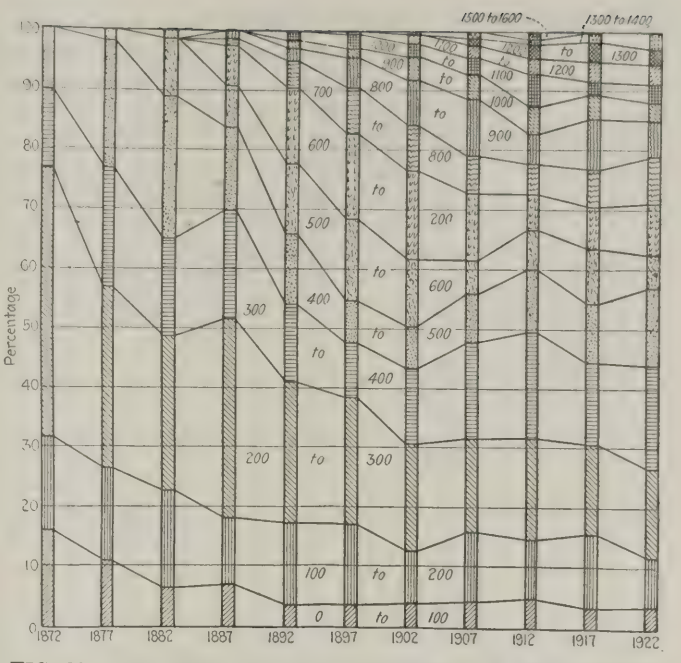


FIG. 30—PER CENT OF TOTAL NUMBER OF BEDS BEING WORKED IN EACH 100-FT. INTERVAL

A full description of the method used in calculating these percentages for the Nanticoke district, beginning with 1872 and by 5-year periods, will be found in the first installment of this article under Fig. 6 (*Coal Age*, Vol. 23, p. 325). The noteworthy feature is the almost steady increase in the depth of workings.

TABLE XXVI—TONS PRODUCED AND WEIGHTED AVERAGE DAYS WORKED IN NANTICOKE DISTRICT

	Tons of Coal Produced	Weighted Average Number of Days Worked		Tons of Coal Produced	Weighted Average Number of Days Worked
1877	2,042,630	150	1902	4,448,708	114
1882	3,702,621	234	1907	9,624,149	225
1887	6,181,958	240	1912	9,963,868	220
1892	5,502,946	203	1917	11,750,030	285
1897	5,665,252	147	1921	13,017,992	279

The curves in Fig. 31 tell the same story—as the depth increases the thickness decreases. Practically every interval shows that the average thickness of the beds has decreased and that the increase in depth has been steady until the most recent periods.

Nanticoke district development is steadily progressing—the depth of workings has almost doubled and thickness of beds has dropped more than one-third in the past 45 years. Power requirements naturally are greater, as is shown in Fig. 32 and Table XXIII. In 1877 for every boiler horsepower installed there was produced 1.75 tons of coal. In 1921 there was only 0.77 ton produced. Thus the decrease was 56 per cent. Expressing it inversely, in 1877 0.57 boiler horsepower was required for each ton of coal produced per day, compared with 1.30 boiler horsepower in 1921.

This increase in power required has not been due entirely to the thinning out of coal beds. Greater depth, increased volume of water to be pumped and longer haulage have made power demands even greater than have the preparation plants which clean this thin coal.

Production increases naturally have had their reflection on power consumed. Table XXVI shows how great has been the increase in the production since 1872.

TABLE XXVII—TONS OF COAL PRODUCED PER DAY IN NANTICOKE DISTRICT

	Total Men Employed			Inside Men Employed			Outside Men Employed		
	Actual	Corrected for Sizes	Corrected for Time	Actual	Corrected for Sizes	Corrected for Time	Actual	Corrected for Sizes	Corrected for Time
1877	2.03	2.98	2.56	3.15	4.62	4.20	5.71	8.37	6.59
1882	1.66	2.36	2.07	2.52	3.58	3.31	4.91	6.97	5.57
1887	1.73	2.21	1.86	2.57	3.29	3.05	5.26	6.72	5.38
1892	1.79	2.29	1.89	2.67	3.22	2.95	5.62	6.91	5.52
1897	2.12	2.48	2.19	3.05	3.57	3.30	6.96	8.24	6.59
1902	2.17	2.32	2.07	3.08	3.30	3.06	7.45	7.99	6.61
1907	2.08	2.21	2.07	2.79	2.96	2.83	8.20	8.71	7.75
1912	2.05	2.13	2.01	2.65	2.75	2.64	9.15	9.50	8.46
1917	2.01	2.01	2.01	2.63	2.63	2.63	8.46	8.46	8.46
1921	2.02	2.02	2.02	2.58	2.58	2.58	9.43	9.43	9.43

TABLE XXVIII—AVERAGE DAILY PRODUCTION OF INSIDE MEN

	Miners and Miners' Laborers		Inside Company Men		
	Actual	Corrected for Small Sizes	Actual	Corrected for Small Sizes	Corrected for Time
1877	6.02	8.83	6.63	9.73	7.77
1882	3.73	5.28	7.72	10.95	8.76
1887	3.73	4.76	8.30	10.60	8.48
1892	4.17	5.13	7.14	8.77	7.02
1897	4.50	5.26	9.52	11.12	8.89
1902	4.99	5.34	8.07	8.64	7.15
1907	4.39	4.66	7.66	8.14	7.25
1912	3.96	4.11	7.98	8.28	7.39
1917	4.26	4.26	6.90	6.90	6.90
1921	4.04	4.04	7.12	7.12	7.12

In that year 2,042,630 tons of coal was mined in the Nanticoke district. In 1921 13,017,992 tons was produced. Of course all of this increase did not come from the deepest workings but depth in many mines registered on the power curve of many mines.

The length of haul has increased notably. This increase will continue with development work in many of the largest collieries for an extended period. Fig. 33 and Table XXIV show the haulage curve for the Nanticoke district. In 1877 the average haul was short and the output per mule per day high. As the haul lengthened the output per mule decreased and by 1892 it had dropped to 15.92 tons per mule per day. Then the curve mounted as the use of underground locomotives increased. This increase is shown by the number of locomotives per 100,000 tons per year.

It is reasonable to suppose that if the underground

locomotive had not been introduced there would have continued to be a slight decrease in the amount of coal hauled per mule per day. If this is true then the curve indicated that the amount of coal hauled per mule in 1897 might have been 15.6 tons; in 1902, 15.5 tons; in 1907, 15.4 tons; in 1912, 15.3 tons; in 1917, 15.2 tons, and in 1921, 15.1 tons. Assuming this reasoning to be correct it is possible to calculate the amount of coal hauled per underground locomotive in the years 1902 to 1921 thus: 581 tons per day in 1902, 142.3 tons in 1907, 115.3 tons in 1912, 96.6 tons in 1917 and 67.2 tons in 1921. This shows that the output per locomotive is decreasing, and if it is decreasing then the power required to haul the coal is increasing.

This decrease in the production per locomotive is to be expected because when they were first introduced they were exclusively used on main-line haulage. Mules did the gathering. Now the construction of the locomotive has been so improved that with its cable-and-reel or with storage-battery power it can actually take the place of the mule and be used to gather coal. This reduced the number of tons per locomotive, however.

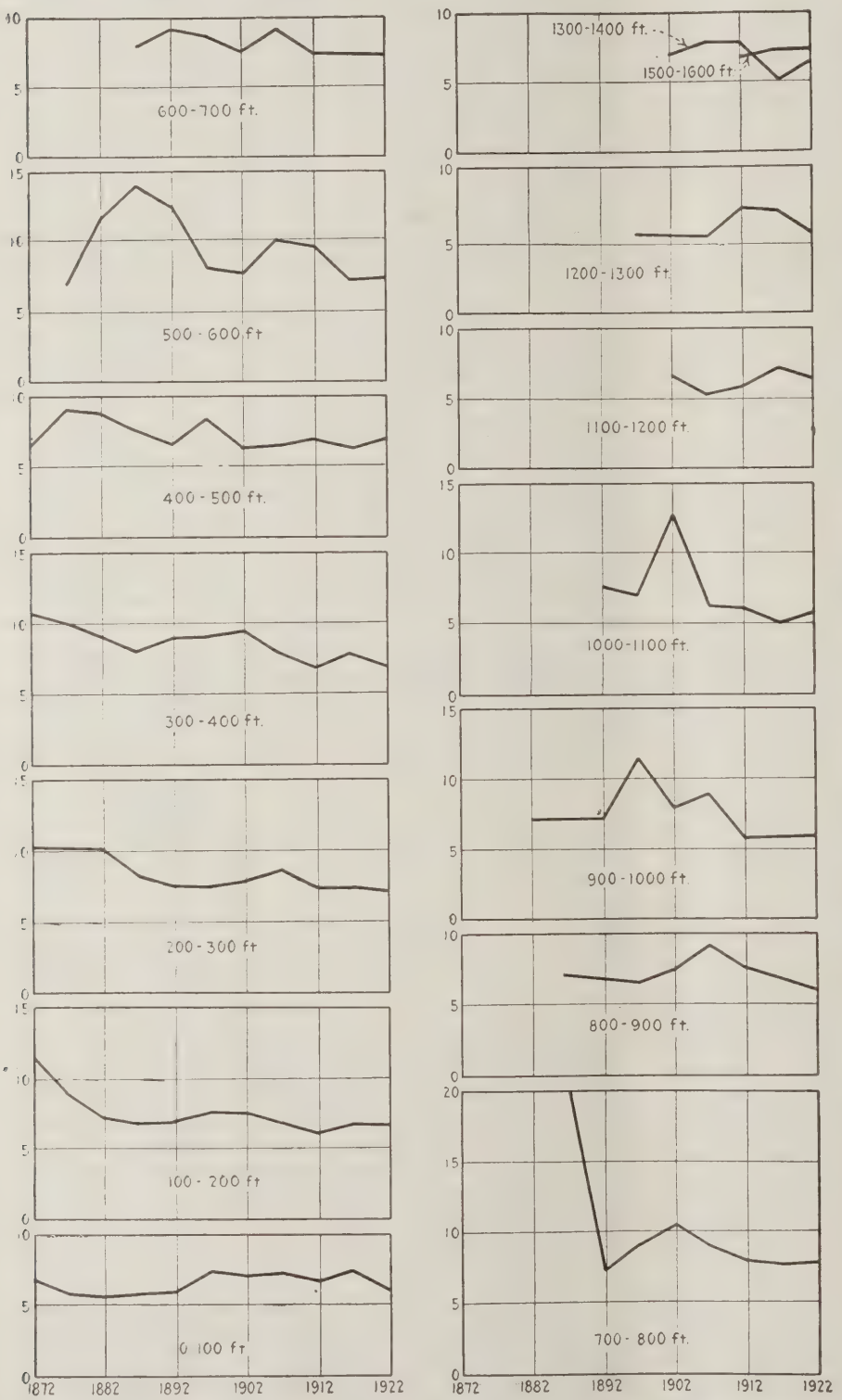


FIG. 31—SIMPLE AVERAGE THICKNESS OF BEDS AT EACH 100-FT. INTERVAL

In the footnote under Fig. 7 in Part I of this series of articles (*Coal Age*, Vol. 23, p. 326) will be found a full description of the method of calculating these curves and the points that these curves bring out will be found in this text.

No underground locomotives were reported in use in 1897, but by 1921 they had increased in this district to 330 and the number per 100,000 tons output increased from nothing in 1897 to 2.36. In spite of the absence of inspectors' reports on them in 1897 it is quite likely that a few were in use, as the locomotive was introduced into the anthracite region in 1887.

In this district are the two largest anthracite operations in the world. These two collieries had a total output of 3,123,353 tons in 1921, or 21.1 per cent of the outupt of the district. There are four collieries in this district which had a total output of 4,207,908 tons in 1921, or about 32.3 per cent of the whole output. These collieries might well be classed as new operations and ones at which there is a great deal of development work being done. These four new operations naturally have a deep effect on the district statistics.

The lowest set of curves in Fig. 34 and the data from which they were plotted in Table XXVII—the first three columns—show the production of coal per day per employee. The curve plotted from the actual figures obtained from the mine inspectors' reports is the solid line. This curve, generally speaking, shows a decrease in the earliest period and then a rising production per man until 1902, when the line is level or tends slightly downward. If these figures are corrected for the small sizes of coal which were not shipped in the earliest years, then the dash line, which represents this correction, shows a decrease in the total output per man per day, but when corrected for the time factor, as is shown in the dot-and-dash line, then there is a downward swing to the curve for the first ten years and upward for the next 10 years, and from this point it becomes practically a straight line for the last 24 years.

On this curve in particular the influence of the four big collieries is shown. Being new operations and having modern equipment they are able to produce their coal with more

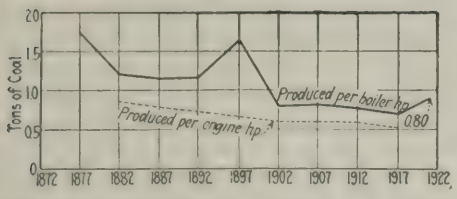


FIG. 32—NUMBER OF TONS OF COAL PRODUCED PER DAY PER BOILER HORSEPOWER

The calculation of the points on this curve and the sources from which the data were obtained will be found under Fig. 8 in the first of this series of articles (*Coal Age*, Vol. 23, p. 326).

efficiency than the older operations. If these collieries had been left out in calculating the curves, then in 1921 the output per man per day would have been 1.86 tons instead of 2.02 tons, as is shown by the curve. This indicates that great savings can be obtained at thoroughly modern equipped collieries. At another colliery in this district, old in years but new in the light of modern practice, the output per man per day is 2.22 tons, or considerably above the average for the district. This will be brought out more clearly in the detail curves that will be taken up later, and the reasons for this increased efficiency will be discussed.

The middle set of curves in Fig. 34 and the middle three columns in Table XXVII show the output per day per inside employee. The solid line shows the actual figures obtained from the mine inspectors' reports. Here again there is a decreasing output in the first period, a steady increase until 1902 and then a decrease until 1921. But when this set of curves is corrected for the per cent in sizes of coal which were not shipped in the early periods, the dash line results and the curve slants downward. The same condition results when the dash line is corrected for the time factor. The dot-and-dash line is produced showing the final corrected figure of output per inside man per day.

TABLE XXIX—MEN EMPLOYED IN NANTICOKE DISTRICT

	Total No. of Employees	No. of Inside Employees	No. of Outside Employees	No. of Miners and Miners' Laborers	No. of Inside Company Men
1877	6,707	4,324	2,383	2,346	1,978
1882	9,504	6,286	3,218	4,237	2,049
1887	14,909	10,013	4,896	6,911	3,102
1892	15,125	10,303	4,822	6,497	3,806
1897	18,108	12,583	5,525	8,547	4,036
1902	17,898	12,657	5,241	7,817	4,840
1907	20,572	15,350	5,222	9,759	5,591
1912	22,072	17,120	4,952	11,437	5,693
1917	20,492	15,627	4,865	9,658	5,969
1921	23,075	18,124	4,951	11,560	6,564

Let us see what would have happened to the curve if the before mentioned collieries were not considered in its calculations. In 1921 the curve shows an output of 2.58 tons per inside man, whereas if they had not been considered the output would have fallen to 2.40 tons per day. The old colliery with modern equipment shows an output of 2.81 tons per inside man per day, which is a considerable increase over the output of the district. At this operation there is some stripping, which increases the output of the inside men per day, and, as will be shown later, decreases the output per inside company man per day.

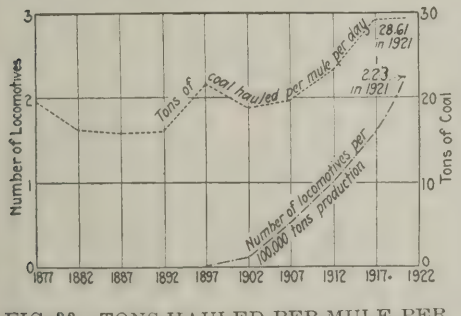


FIG. 33—TONS HAULED PER MULE PER DAY AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS

Table XXIV gives the points from which these curves for the Nanticoke district from 1877 were plotted and Table XXV shows the number of mules and locomotives in the district. The method used in making the calculations is described under Fig. 9 in the first part of this series (*Coal Age*, Vol. 23, p. 327).

The upper set of curves in Fig. 34 shows the number of tons of coal produced per day per outside employee. The figures from which this curve was plotted will be found in the last three columns of Table XXVII. Here, as usual, the whole tendency of the curve is upwards, with the exception of two periods, one in 1877 to 1882 and the other in 1917. The correction for the output of small sizes in the earlier years shows the same thing though less markedly. But the final corrections, which allow for both size and time, change the curve considerably. With the exception of the first two periods the curve is steadily upward.

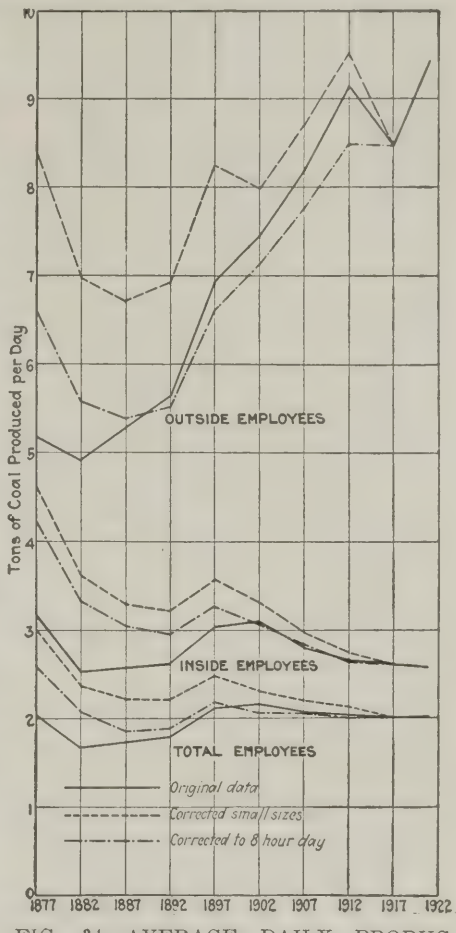


FIG. 34—AVERAGE DAILY PRODUCTION PER EMPLOYEE IN THE NANTICOKE DISTRICT, 1877 TO 1921

These figures were obtained from the mine inspectors' reports. The amounts represented by the solid line were corrected for the small sizes of coal not shipped in the earlier years and the dash line resulted. The dash line was corrected for the introduction of the 9-hour and 8-hour day for all employees except miners, resulting in the dot and dash line. The details as to the methods used and the amount of the corrections will be found under Fig. 10 in the first of this series of articles (*Coal Age*, Vol. 23, p. 327). The middle curves for inside men and upper curves for outside men are determined in the same way. Actual figures are in Table XXVII.

In 1887 the output per outside man dropped to 5.38 tons per day, the lowest in history. In 1921 it attained 9.43 tons. This was an increase of 75 per cent. The explanation of this lies mainly in the performance of the same "big four" collieries. These collieries are modern in every respect. They have labor-saving devices and new and modern breakers which greatly reduce the man power required and correspondingly increase the output per man employed.

If the four collieries had been omitted from the calculations in 1921, then the output would have been 8.20 tons per outside man per day instead of the 9.43 tons shown by the curve for 1921. The fifth colliery shows an output per outside man of 10.73 tons. The increased output per man in this case is due to the consolidation of the surface plants and the preparation of the coal from what were five old collieries in one modern breaker.

In the lower set of curves in Fig. 35 will be seen the result of the work of the anthracite miner in the Nan-

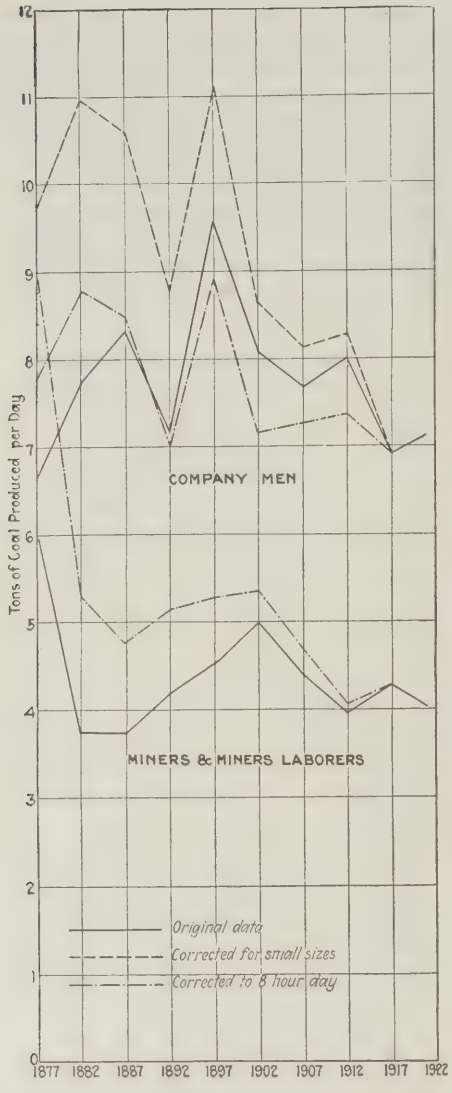


FIG. 35—DAILY PRODUCTION FOR INSIDE EMPLOYEES IN NANTICOKE DISTRICT, 1877 TO 1921

These curves are based on mine inspectors' reports and show corrections for the estimated amount of small sizes of coal that went into the culm banks in the earlier years and also for the introduction of the 9- and 8-hour day affecting inside company men. The method of making these calculations is explained under Fig. 11 in Part I of this series (*Coal Age*, Vol. 23, p. 328).

ticoke district in the past 44 years. The solid black line shows the actual figures as calculated from data published in the mine inspectors' reports, and the dot - and - dash line shows these actual figures corrected for the small sizes of coal not shipped in the earlier years. Here it was unnecessary to correct for the time element, as has been previously explained in the first of this series of articles. The first two periods show a sharp decline in the output per miner and miners' laborer. But from 1887 to 1902 the output per man rises.

Between this period and the one following, two of the four new and modern mines became large producers, in 1912 another one joined that class and in 1917 the last of the four reached its full output. With about one-third of the production coming from four up-to-date mines the production per miner and miners' laborer fell from 5.34 tons of coal per man employed in 1902 to 4.04 tons in 1921, or about 24.3 per cent!

This is difficult to explain. The bed thinned down only 14.8 per cent from 8.02 ft. to 6.83 ft. and a thinning bed is about the only physical factor that greatly effects daily output per miner. Since output increased 1.1 per cent from 1882 to 1902 while the average thickness of bed decreased from 10.24 ft. to 8.02 ft., or 21.5 per cent, and that in a period when little "modern" machinery was being introduced, it can only be concluded that miners then were more efficient than they are at the present time.

Even in the case of miners and miners' laborers had it not been for the four big collieries the output per man would have been as low as 3.80 tons in 1921, again demonstrating the fact that modern equipment and methods are bound to raise per-man output. Probably the haulage increases the output of men in the modern collieries, for the fifth colliery of the outstanding group —one that had been modernized—shows an output of 4.28 tons per man, or 0.24 tons more than the district average. A better haulage system permits the miners to receive a better turn and therefore permits them to load more coal per day up to a certain point. This point of limitation of output will be explained in a later article.

The upper set of curves in Fig. 35 and the figures in the last three columns in Table XXVIII show the change in the output of inside company employees per day, the heavy line being the actual figures as calculated from the mine inspectors' reports. This line was then first corrected for small sizes and the dash line resulted, then this line was corrected for the time factor, and the dot-and-dash line gives the final correction for the Nanticoke district.

If the doubtful 1897 figures are rejected as being in error and the average of 1892 and 1902 is taken in its place and then a curve is drawn for the average output per man per day, the curve will show a decided drop

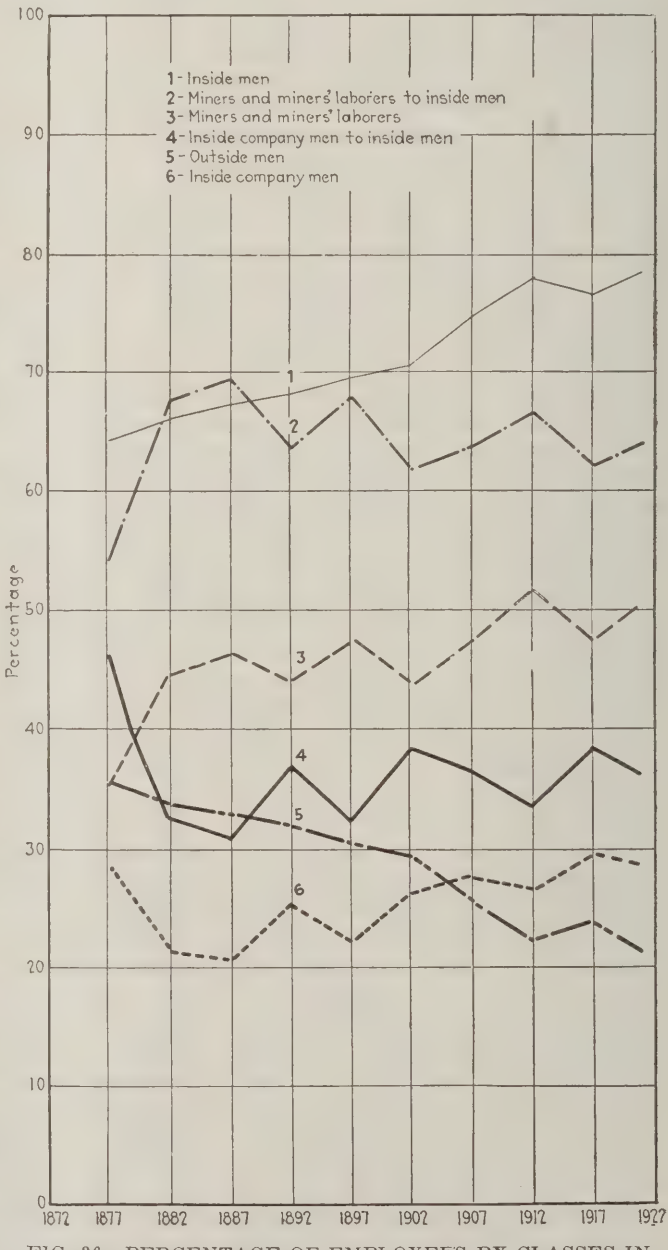


FIG. 36—PERCENTAGE OF EMPLOYEES BY CLASSES IN NANTICOKE DISTRICT

With the exceptions noted, the percentages shown are of each class to total men employed.

in the first three periods, but from then on it becomes practically level and there is no change in the output from 1892 to 1921. This is readily explained by the influence of the four modern collieries on the number of men employed. The equipment at these mines reduced the number and therefore increased the output of inside company employees. This was sufficient to counterbalance the loss in production per inside company employee at the older collieries, thereby keeping the curve level.

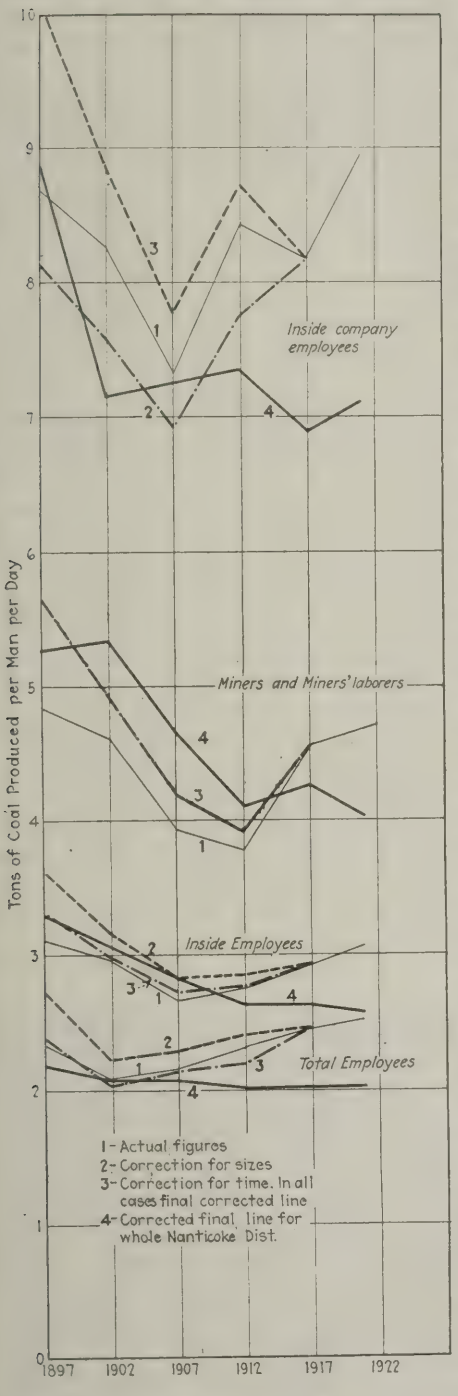


FIG. 37 — COMPARISON OF LABOR STATISTICS AT FOUR MODERN COLLIERIES WITH THE DISTRICT AVERAGES

The light solid lines are actual figures for the collieries, the dash line the correction for sizes and the dot and dash line the correction for time. In the case of the miners and miners' laborers it shows the correction for sizes only. In every case the dot and dash line is the final corrected line and the comparisons drawn in the text are between this line and the heavy black line, which is the final corrected line for all of the collieries in the district. This diagram covers all except the outside employees, for which see Fig. 38.

The average daily output per inside company employee for the four companies mentioned is 9.62, 7.96, 11.21 and 7.56 for the year 1921, which is very much above the 7.12 average for the district. When these figures are weighted to obtain a true average they affect the totals even more. If they were omitted from the calculations in 1921, then the weighted average for the remaining collieries would be 6.49 tons per man per day, which is 0.63 ton per man less than the average for the district. Even the fifth colliery, which has been continually mentioned in this discussion, shows an output per man of 6.58 tons, which is less than the average for the district but is greater than the average would have been without the "big four" collieries.

Fig. 36 shows the relationship between the different classes of employees and, as in the preceding diagrams of similar type in this article, the per cent of the inside men to the total men employed increases while the outside force decreases, which shows that the savings in men employed is in the outside force.

It is interesting to compare the new collieries in the Nanticoke district with old ones that have been modernized. Previous to 1897 these modern operations did not exist. Two were started then with comparatively small tonnages. It was not until 1907 that they became large producers. The third colliery became a large producer in 1912 and the fourth in 1917.

The curves in Fig. 37, on the production of coal per day per total men employed, show that the output per day has steadily increased from 1912 to 1921, while for the district there has been a steady decrease. True the decrease was small, but if these four collieries had not been included it would have been much greater. The increase in production at the modern collieries was 0.45 ton per man, or 21.5 per cent.

The curves for inside employees show that in the earlier years the average for the district was greater than for the new collieries. This is to be expected and is readily explained by the fact that large numbers of men were used for development work

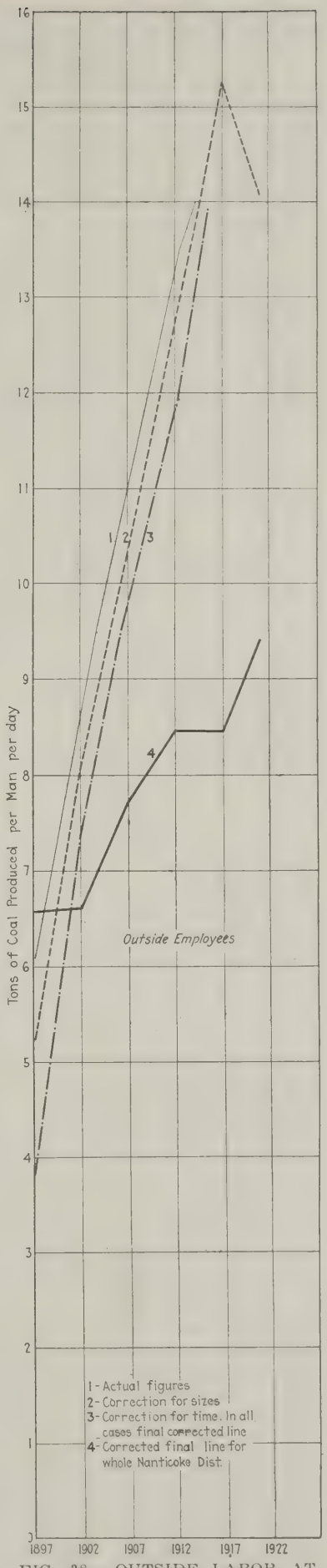


FIG. 38 — OUTSIDE LABOR AT "BIG FOUR" COMPARED WITH DISTRICT AVERAGE

Continuation of Fig. 37

TABLE XXX—PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

	Inside Men	Outside Men	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers (a)	Inside Company Men (a)
1877	64.3	35.7	35.5	28.8	54.4	45.6
1882	66.1	33.9	44.6	21.5	67.5	32.5
1887	67.2	32.8	46.4	20.8	69.1	30.9
1892	68.0	32.0	43.0	25.0	63.1	36.9
1897	69.5	30.5	47.5	22.0	67.9	32.1
1902	70.8	29.2	43.7	26.1	61.7	38.3
1907	74.7	25.2	47.5	27.2	63.6	36.4
1912	77.8	22.2	51.8	26.0	66.8	33.2
1917	76.3	23.7	47.1	29.2	61.8	38.2
1921	78.6	21.2	50.1	28.5	63.8	36.2

(a) Percentage to inside employees.

inside. But when production began to mount the two curves crossed each other in 1912, and from then on the production from the modern collieries increased from 2.74 tons per inside employee in 1912 to 3.05 tons in 1921, or 13.8 per cent in 9 years, while the average for the district decreased from 2.74 to 2.58, or 5.8 per cent. In other words the production of the modern collieries is 18.2 per cent greater per inside man than the average of the district. The miners' and miners' laborers' curve in Fig. 37 shows practically the same thing and the same explanation applies to it.

During development numerous extra men are required on construction and other work about a colliery. This is brought out in the ascent in the curves for the production per day for inside company employees, which is the top set of curves in Fig. 37. Here while development was at its height there was a decrease in production per man, and then when conditions became normal the production increased. In this case it increased from 6.95 tons in 1907 to 8.96 tons in 1921, or 28.8 per cent.

SAFETY OF THE EXCELLIGHT—Writing to *Coal Age* George Stern takes exception to certain remarks which appeared in the issue of Jan. 4 as to the foolproofness of the Excellight, which lamp, he says, has been tested by the Board of Fire Underwriters, the report of which he quotes as follows: "This appliance is so designed and constructed that its ordinary use will not cause ignition of explosive mixtures of gases or vapors with air which may be present in the atmosphere surrounding the device. A study of the design and a consideration of the results of the dropping tests show that the bulb is well protected against accidental breakage. The explosion test showed that the operation of the switch or the removal of the top with the switch in the 'on' position will not cause a spark of sufficient intensity to ignite an explosive mixture of gasoline vapor and air."

He adds: "Although tests have never been conducted on the Excellight to determine how it would stand up in mixtures of explosives or vapor, when the bulb is shattered, we do not think it necessary to make a statement that it is not a foolproof lantern, and for these reasons: First, because the bulb is protected by a heavy wire-reinforced glass door ¼ in. thick; second, because tests have been conducted by dropping the Excellight from great heights on a concrete floor, with the result that the bulbs were never in the least damaged."

THOSE WHO THINK AMERICA can prevent massacres in Turkey forget that we can't even prevent massacres in Illinois.—*Norfolk Virginian-Pilot.*

LONDON DOCTOR SAYS BOLSHEVISM is due to bad teeth. We knew there was something loose in their heads.—*Portland News.*

Sliding Coal Down a Hillside in a Tube

BY JOSIAH KEELY*
Kayford, W. Va.

FOR passing coal down steep sidehills the Cabin Creek Consolidated Coal Co. is using steel tubes at four operations and contemplates using several more whenever its older plants are remodeled. Some small mining companies are successfully using terra-cotta pipe in connection with a crusher for lowering coal down the mountain side, but in most cases it would be difficult to make a grade so uniform that the pipe could be placed on the ground. With terra-cotta pipe, trestles therefore would be necessary because the joints of the pipe are so short that they must have continuous support. Unfortunately, trestles are expensive and unsatisfactory. In any tube which is allowed to fill and stand for several days the coal tends to "set," and then it will not start without being jarred.

When a steel tube is used a few smart blows on its side will start the coal moving, whereas a terra-cotta tube probably would break under such a blow, and it would have to be a heavy jarring blow, for the material is such that it does not readily vibrate. In continuous operation a steel tube filled from bottom to top feeds nicely on a 33-deg. slope, but if it is left standing full for several days the coal in it has to be started. In cold weather the tube must not be left full.

The Cabin Creek company is using four steel tubes from 30 to 36 in. in diameter and from 100 to 220 ft. long, and they are placed on 33-, 36-, 37- and 40-deg. slopes respectively. A 33-deg. slope is just a little scant. An inclination of 35 or 36 deg. is about ideal where the run is as irregular as it is in the coal business.

I can see little difference in the way gas and splint coal run through a steel tube. The first installation at the Cabin Creek mines was on a 36-deg. slope, and it carried gas coal. Believing the splint coal would run more freely, we tried 33 deg. on a 220-ft. tube. The coal feeds perfectly after it has started, but, as before mentioned, it will not start from rest without assistance after lying in the tube a few days.

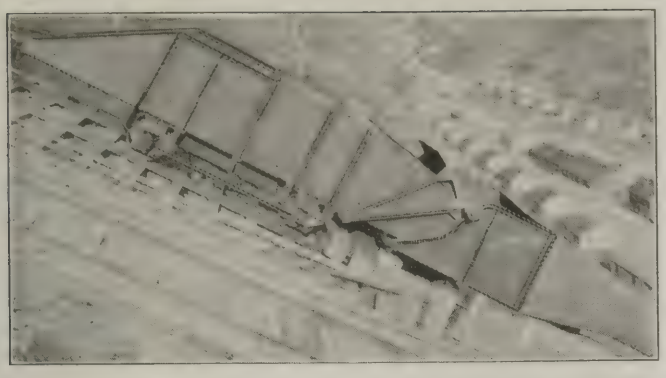
Even where minimum breakage is desired, I can see



LOADING TUBE FOR MONITOR ON INCLINE

Unfortunately this hill was for the most part on a grade of only 25 deg., which was too easy for the use of a tube. The top and bottom were steeper and so it was possible to provide a loading and a receiving tube, the former being 104 ft. long.

*General manager, Cabin Creek Consolidated Coal & Coke Co.



RECEIVING TUBE AT FOOT OF INCLINE

This tube is 220 ft. long and lies at the bottom of the incline illustrated above. The device of the full tube, altogether apart from the monitor, is gaining favor wherever it can be used, as it causes little breakage of the coal, certainly less than with an open chute. Furthermore the upkeep is light and a degree of storage is provided to balance operation. No coal is spilled as it is where cars are lowered down an incline; there are no wrecked cars and, of course, if the tube is continuous so that monitors are not needed, no wrecked monitors either. The only trouble is in the morning during the winter when the tube must be filled. This filling breaks the coal badly.

no reason why coal could not be handled 500 ft. through a tube laid on the proper grade, but that grade would have to be sufficient and absolutely uniform. If the incline has an average slope sufficient for the carriage of the coal it is easy to provide for laying the tubing on a uniform grade, for it is of ¼-in. steel and in sections about 20 ft. long put together with flanges. It consequently is easily rolled into position, and when bolted together will span an opening of 40 ft., though it is better practice to support it every 20 ft.

As compared with grading an incline, the expense, of course, is moderate, and in order to keep the tube on the ground one can afford to excavate much material. This grading is so much narrower than for the usual double-track incline that the yardage need not be one-third as great. The tube will cost about $11 per foot on board cars at the mine. It is desirable to install the man hoist beside the line of the tube. Where this is done sections of tube can be pulled up on wheels and rolled right into place. If concrete piers are placed every 20 ft., the flanges can be set against and above the piers, thus preventing any tendency to slip. These piers need not be more than a foot thick at the top and 2 ft. wide.

If a tube is used for the lower end of the plane, with a monitor dumping into it, it is desirable to make a telescopic joint of the first section, so that the thrust from a runaway monitor will not be communicated to the whole tube. If the tube is of considerable length it is important to have the lower end so arranged as to meet the shock of coal which is first dumped. Later dumpings, of course, cushion on the coal in the tube. There are several successful feeds for taking the coal away, but perhaps the most satisfactory is a reciprocal feed in which the hopper is never allowed to run empty, thus forming a protective cushion of coal at all times.

Of course, the steel tube eventually will wear out, but any sections showing wear in the bottom may be unbolted and given a quarter turn, thus presenting a new wearing surface. The practice of buying expensive machinery for lowering coal down short, steep grades seems theoretically unsound when gravity is there to do the work, but a common mistake is to assume that bituminous coal will act like anthracite when being fed down a slope. The problem should be carefully studied before attempting to install a gravity tube for the lowering of bituminous coal, but there is no reason why, under the right conditions, the tube should not be the simplest means of achieving that object.

One other advantage of the tube is the storage it provides, especially if it is a steam coal and breakage is no item. Almost every hillside bin designed for receiving coal from monitors will receive in practice only one-half its rated capacity, whereas with a tube and a receiving plate slightly elevated, coal may be shot up to the roof of the bin, and, without such a device the coal will pile up higher than from a monitor.

The accompanying illustrations show an operation capable of handling 6,000 tons a day, the monitor shuttling back and forth between two tubes and receiving and discharging its load automatically. In this operation both top and bottom of the hill are steep enough for tubes, but the space between is on a grade of only about 25 deg. The human element has to be taken into consideration, for if the men either at the top or at the bottom allow the tubes to get empty the breakage is excessive.

It is a splint-coal operation, however, and with little care the coal slides in a mass from the car into the upper tubes, from the tube into the monitor and from the monitor into the lower tube, entailing scarcely any breakage. When the lower tube is full, the monitor simply does not empty until the feeder draws out some of the coal; thus the tipple boss can control the situation by stopping the feed if he suspects that the men at the top are allowing the upper tube to become empty.

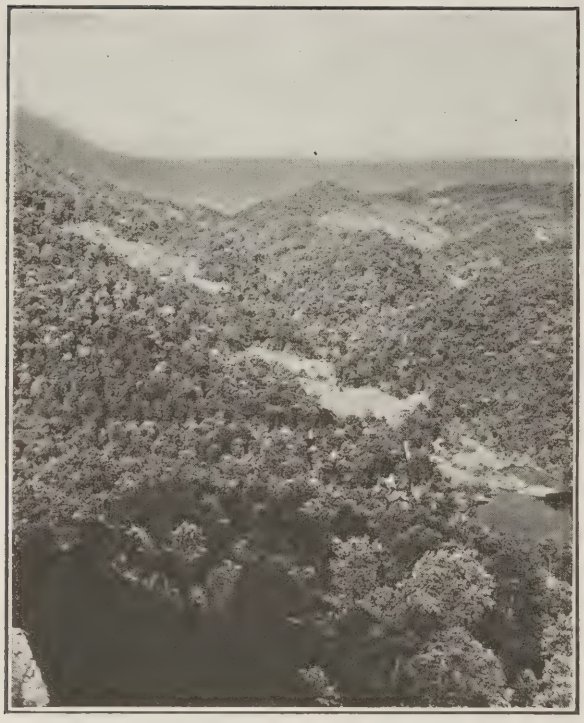
Of course, in a gas-coal operation the only consideration would be the wear and tear on the equipment, which would be much less if the tubes were kept full until the end of the run.

P. & R. Develops and Protects Forests

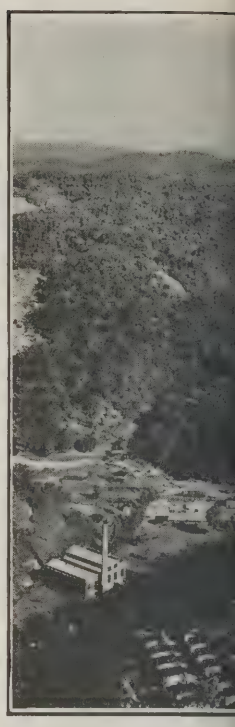
The forestry bureau of the Philadelphia & Reading Coal & Iron Co. further extended its road and trail forest protection system during 1922, so that at the end of the year it contained 130 miles of lanes or strips specially prepared to stop forest fires when the need arises. While 130 miles of such avenues of resistance to the onsweep of burning forests is insufficient to control fires in this region, each year additions will be made until eventually every 250 to 500 acres of forest land owned will be blocked off or broken up by a protective strip represented by a road, trail or fire lane. In order effectively to protect the forests, the land area has been divided into fifteen divisions or ranges and a man placed in charge of each, with responsibility for the thorough protection of the forests placed in his care. To assure results consistent with the effort made, forest owners must have the co-operation and interest of every citizen.

In furtherance of the full use of land that can be safely protected from fire the company during the year planted 70,000 Scotch pine, 5,000 Norway spruce, 14,000 Japanese larch, 1,000 hard maple, 10,000 white ash, and 10,000 white pine. Arrangements have been made to reforest 140 acres with 166,000 trees of the following kinds during 1923: Japanese red pine, European larch, red oak, white ash, Japanese larch, Norway spruce, Oriental sycamore, pitch pine, rock oak, Austrian pine and Western yellow pine. While many of these trees are not native to the anthracite region, they have been tried out in Pennsylvania, and are expected to thrive with care and public interest in their protection.

In order that trees best adapted to this region may be grown to restock protected areas, a small forest tree nursery has been developed. This year more than 90,000 seedlings will be ready for transplanting, and in a year or two sufficient for the entire needs of the company will be available.







Building a Town for a
A Glimpse of Jenkins

Largest Operation in Elkhorn Field Before Coming of the Railroads—Ground—Park and Lake Features of

By Alphonse F. Brosky*
Pittsburgh, Pa.

THE operation controlled by the Elkhorn division of the Consolidation Coal Co. consists of fourteen mines centered around Jenkins, Ky., and is larger than any similar institution in the eastern part of that state. The towns of Jenkins, McRoberts, Burdine and Dunham and the adjacent mines lie in Letcher County, which is in the southern part of the state not far from the border of Virginia.

Jenkins, the largest town, lies at the foot of Pine Mountain on the Sandy & Elkhorn Branch of the Baltimore & Ohio R.R., and on either end are the towns of Dunham and Burdine. About four miles northwest and across a mountain is the town of McRoberts, which is located on the Lexington & Eastern extension of the Louisville & Nashville R.R., the junction point being Jackson. Its importance in that section is only second to that of Jenkins.

Elkhorn District Only Recently Opened

These two railroads, which were extended into the Elkhorn district only a few years ago, opened up a vast coal-producing territory within the limits of which lies the Hazard field. Between Hazard and McRoberts many mines have been opened up recently on the branches leading from the Louisville & Nashville R.R.

Prior to 1911 what few operations had been opened in the Elkhorn district had been confined to a few mines along the Big Sandy Division and the Marrowbone Branch of the Chesapeake & Ohio R.R. The mines on the latter branch, which produce a coking coal, are in a territory adjoining the Elkhorn district, lying at the headwaters of Elkhorn Creek (a tributary of the Big Sandy River) and the headwaters of the North Fork of the Kentucky River.

The history of Kentucky as a coal-mining state, however, commences with the western field of the state and dates back to Civil War days. But so rapidly have the districts of eastern Kentucky been developed in the last ten years that in that time they have progressed further than has the western field in its half century of history. Production figures of the State of Kentucky



FIG. 1—PUBLIC PARK AT JUNCTION OF ELKHORN AND LITTLE ELKHORN CREEKS

The roadway in the foreground, which is the main street of Jenkins, is paved with concrete and has concrete sidewalks and curbs. Grass is laid out between curb and sidewalk as in the better residential portions of our larger towns and cities. The building in the rear is the company's main power station.

*Assistant editor, *Coal Age*.

Note—Headpiece shows village of Jenkins, Ky., seen from Raven Rock looking northwest in the direction of McRoberts. Elkhorn Lake, lying to the east, is an artificial lake which condenses the exhaust steam from the central power station, the energy generated in which operates the mines of the Elkhorn and Millers Creek divisions and a few mines adjoining these near McRoberts. It will be noted that the valley of Elkhorn Creek to the north of the lake curves around like a hook. Burdine lies in this hook and Dunham is located several miles to the east.



Mountain Community; and Nearby Villages

—Towns and Plants Were Erected Lumber and Brick Prepared on the Jenkins — Dwellings Painted White

for the year 1921 shows that approximately 75 per cent of the total tonnage came from the seven districts in the eastern end of that state.

Before railroads had penetrated into Letcher County the Consolidation Coal Co. procured approximately 100,000 acres of coal land in that region. In April, 1921, the Elkhorn district was opened up, its development being followed later by that of other districts. Jenkins and the other towns adjacent to it sprang up in a wilderness, yet at that time they were eighteen miles from the nearest railroad and situated in a dense forest broken only by a few clearings each with its solitary log cabin.



FIG. 2—LETCHER COUNTY, KENTUCKY AND ADJACENT COUNTRY IN THAT STATE AND VIRGINIA

McRoberts and Jenkins, the two important centers of the Elkhorn Field are separated by a mountain—that shown in the panorama above. Consequently they are approached by two entirely different railroad systems, one reaching the Ohio at Cincinnati and the other at Catlettsburg, Ky.

The Consolidation Coal Co. was the pioneer of the district. Though the lack of railroad facilities was a severe handicap, it was regarded as only one of the obstacles to be encountered in developing a mining region and, accordingly, all work went ahead on a large scale. The early history of the development of the Elkhorn holdings of this company are scarcely less instructive and perhaps more interesting than the details of the property as it is today, so engrossing are the reminiscences of the oldtimers who are still on the job.

At first all materials, supplies and machinery were hauled from Hellier, the nearest point on the Chesapeake & Ohio R.R. Many delays due to bad roads made imperative other transportation arrangements. As a result, connections were completed from Norton, Va., on the Norfolk & Western R.R., by extending a narrow-gage log tram between Glamorgan and Pound to a point half way up Pine Mountain on the Virginia side.

Here a freight terminal was established and the wagon haul shortened to four miles. To see twenty teams of oxen harnessed to a large boiler or other heavy equipment was no uncommon sight in those days. Over this route were hauled most of the materials used at the mine—food, machinery and supplies of all kinds—in fact everything from the pins and needles sold at the store to the heavy 100-hp. boilers required for the temporary power houses at the mines then being opened.

One of the first acts in construction was the erection of sawmills and later of planing mills. Practically all the lumber used in construction was cut and prepared on the property. The manufactured lumber was placed in drying kilns and made up into material for the houses which were started shortly afterward. Brick of an excellent quality was manufactured on the ground in two plants constructed for the purpose.

Just as soon as information and data were obtained by the engineering staff, drifts were opened and entries



FIG. 3—MAIN STREET, JENKINS, KY., LOOKING EAST
The ground in the right foreground is the public park. Behind it is the office building, and further beyond the recreation hall. Across the street from the latter is the general store. The greensward between curb and sidewalk adds color and beauty to the village.

driven by pick mining. At the same time work commenced on the construction of tipples, so that by due diligence in July and August, 1912, practically all the mines on the tributaries of the Baltimore & Ohio R.R. were ready to ship coal. That obtained from early development was stored on the surface until the railroads were completed. Mines on the McRoberts side were advanced to this stage about a year later, as the Louisville & Nashville R.R. was completed about at this time.

Among the problems that confront a company in the construction of an isolated mining operation are those of holding disease in check and maintaining the law. At that time "shooting scrapes" were by no means rare about Jenkins, for there were a few "bad men" to perpetrate trouble. Hazard in its day and Lynch later were faced with this difficulty.

Jenkins as it stands today is a town of real beauty, especially when viewed from Raven Rock, a bare sandstone formation to the west of the town. The villages nestled in a deep valley where the monotony of green is broken by white houses, mine buildings, roads and a condensing lake of fair size on the bank of which stands a large power house.

More Like a Suburb than a Mining Town

The main street of the town is concreted and separated from the sidewalks by plots of grass almost as wide as the street itself. These park plots are broken up at intervals by narrow walks from the sidewalks to the street, and the people of the town are prohibited from tramping down this grass, which is conditioned and kept mowed by the company.

This main street, which begins at the public park, has no residences on it. The office building (the headquarters for the Elkhorn division), the recreation hall and the department store, all of which are of brick, stand on three corners in the center of the town. To the side of the office building is a public park inclosed by a box hedge and brightened by flower beds and trees. In one corner of the park is a rustic shelter house; on the side farthest from the street stands the central station of the company and behind that lies a large artificial lake.

A large school building of brick, to which a big wing now is being added, fronts the main street. In this structure are housed a grade school and a high school, affording an elementary education as thorough as that obtainable in any large city, for the course of study includes manual training for the boys and domestic science for the girls. Night classes are conducted in mining, mechanical drawing and other subjects.

In the recreation hall is a library fully furnished and superintended by a librarian, in which are kept current magazines and a circulating library. Four denominational churches care for the spiritual needs of the people. McRoberts, Burdine and Dunham are equally well provided in these ways, though necessarily on a smaller scale.

Swinging from the main street past the power house and the park is the Lake Shore, which skirts Elkhorn Lake and leads to the residences of the company officials. A few of the homes and a large clubhouse are built overlooking the road and lake; other homes are located on a parallel street behind the road.

All the houses along the lake side are of the bungalow type and have an individuality of plan possible only where the lumber is prepared and sized on the ground. The homes of the officials have all modern conveniences, and the miners' dwellings have as many improvements as have been found practicable. These latter dwellings are of many types of construction and built for one or two families. The company favors the single-dwelling type, but limited building space compelled it to erect double houses also. The apartments of the double houses contain either four or five rooms each, while the single dwellings are provided with three or five rooms.

Big Lake Provides Ample Condensing Water

At the junction of Little Elkhorn and Elkhorn creeks, where the power plant is situated, a concrete dam 45 ft. high was erected across a narrow valley forming Elkhorn Lake, which covers an area of 18 acres with a storage capacity of 80,000,000 gallons of water. It is used primarily for the condensing of the exhaust from the power station, but has been well stocked with fish for the benefit of local rodsmen. Bathing and boating are permitted, an unusual feature in a mining town. Without a large artificial basin for the storage of water a central station cannot be operated in this mountainous country where the streams are small and swift with a tendency to dry up in the summer months.

There are 1,600 houses in Jenkins alone. These are constructed of oak, chestnut and poplar, these trees covering the mountains when the town was erected. Most of the houses are plastered, though a few are lined with beaver board. Fifty per cent of the houses are provided with sinks. The company will furnish any house with a sink if the tenant so desires.



FIG. 4—CLUB HOUSE AT JENKINS ON THE LAKE SHORE
This is fitted for the reception of about forty persons. The company laid its plans well in advance, as is shown by the fact that the grounds of this club were not disfigured by the ill-considered zeal of the lumbermen.

With the main body of the houses painted white, the color scheme of the trimmings is varied by interchanging four dark colors. Every four or five years the houses are repainted. In few places can houses profitably be painted white, for it can be done with any hope of continuance only where the air is clear of smoke and injurious gases. White paint should be used only in places far removed from the industries which produce much smoke.

Most of the lots in which houses are built are fenced in, for it has been found that the occupant feels a sense of responsibility only when his property is thus defined and protected. At many mining towns phases of community betterment are short-lived. This is not the case in isolated villages such as Jenkins, where vegetable and flower gardens have been planted each year with no apparent waning of interest. Prizes are offered for the best vegetable gardens, the prettiest flower gardens and the most attractive places.

A certificate of award accompanies the bestowal of each prize. The official photographer of the company photographs the prize-taking subject, and these are included in the official albums of the company. The company plows all lots and furnishes manure; it also supplies trees, vines and shrubbery to those who ask for them, at a cost just great enough to check wanton requests for this favor.



FIG. 5—MINERS' DWELLINGS AT NO. 202 MINE, DUNHAM

Far from the smoke of industrial furnaces and making little smoke itself, the Consolidation Coal Co. has been able to paint its houses and fences white, thus giving its villages an air of cleanliness and light.

The greater part of the water supply at Jenkins is obtained from a spring in a limestone formation on the west side of Pine Mountain. The water, which, of course, is of temporary hardness, is stored in a concrete reservoir of 1,000,000 gallons capacity. It is conducted in a 6-in. main to houses and hydrants at intervals for protection against fire. The main supply is augmented by water from deep wells, which contains much iron, making it unpleasant for household use. To remove the temporary hardness from the spring water and the iron from well water, milk of lime is used, which makes the water clear and of excellent quality. Coming from springs and wells it always is cool and potable. All towns in the division are furnished with filtered water which either is piped to the house or to hydrants conveniently located.

Due to its excellent water supply and its attention to details of sanitation, the division has never had an epidemic; occasionally several cases of disease may make their appearance, but they always prove to have been brought in from the outside. Jenkins proper is equipped with a complete sewerage system which empties into Elkhorn Creek below the town and is flushed at regular intervals by means of an automatic flushing apparatus. Garbage and rubbish are collected weekly, hauled to an isolated hollow and burned. The management does not depend upon its people to provide containers for garbage; each house is furnished with a garbage can, and each town has its garbage wagon.



FIG. 6—SCHOOL HOUSE AT McROBERTS, KY.

Elementary and high schools are both provided even in the smaller mining villages of the Consolidation Coal Co.

St. Bernard Mining Co. Has Tipple Making Thirteen Sizes and Size Groupings

By R. G. Lawry
Chicago, Ill.

MOST recent among the operations of the St. Bernard Mining Co. is that known as the North Diamond Mine. This plant opens up a new coal territory and is the first complete mining installation made by this company for several years.

Extensive drilling and an unusually careful study of the general mining problem preceded the location of the shaft and the development of the new property. The size of the shaft was made to conform to the size of the mine car which the St. Bernard Mining Co. is adopting for all its mines, the expectation being that when finally the old cars in use at the nine mines of the company go to the scrap heap, they will all be replaced by cars of the new standard.

In deciding the design of the screens and the tipple, the sales department of the company made a careful study as to the sizes of coal the market would be likely to demand, and after considering the experience of the past and anticipating the needs of the future drew up a schedule of the sizes for the approval of the higher officials of the coal company. Only when this had been done were the engineers allowed to proceed with the design of the tipple.

This building at the North Diamond Mine has a steel frame covered with galvanized corrugated iron. The tower of the tipple is of the end-pull type, but is turned about 74 deg. from the usual position occupied by this kind of tower, the screening machinery being placed to one side. Although this design is unusual, it is a convenient arrangement for the style of equipment used.

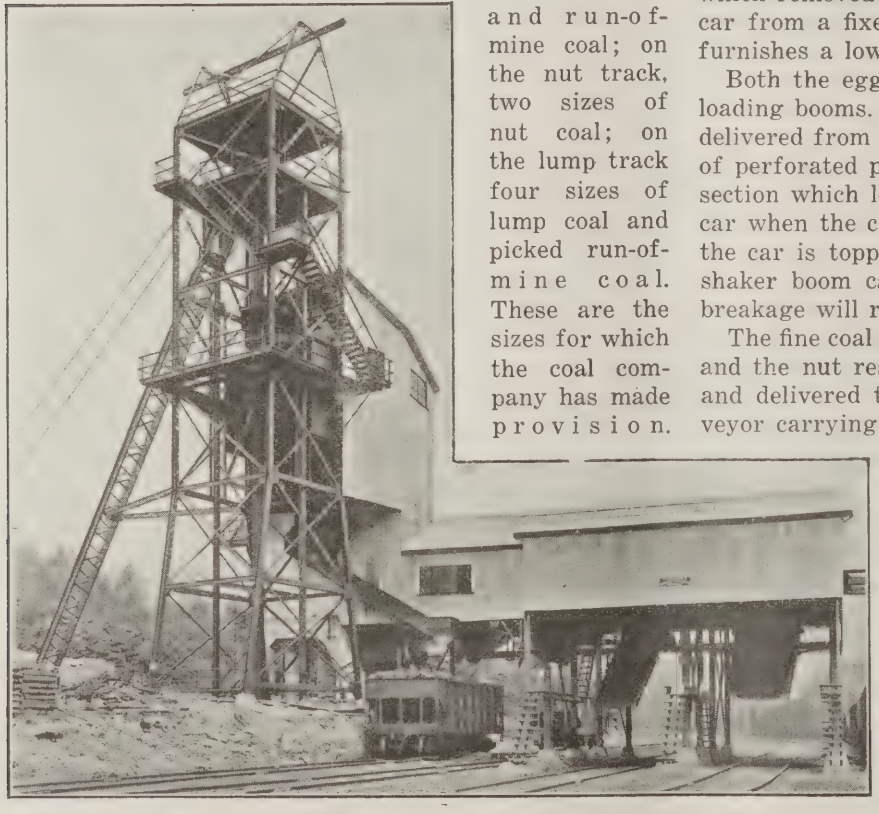
The cars are hoisted in Olson cages and dumped at the top into a weigh hopper which serves both cageways. This weigh hopper has a double-bottom dump with gravity doors and is hung on 15-ton suspension scales with a quick weighing dial. The weigh hopper

dumps into the feeder hopper in such a way that the forward dump serves the feeder hopper of one screen and the backward dump serves the feeder hopper of the other screen. It is only necessary for the weighman to alternate the dumps. This is no trouble, for should he, by mistake, dump too often to one side, no harm would be done. By opening the door in the inside part of the feeder hopper the backward dump of the weigh hopper delivers unpicked run-of-mine to a chute which carries it along to the screenings track without the operation of any machinery.

Each feeder hopper is equipped with a reciprocating feeder driven by two ball-faced, babbitted eccentrics which have an adjustable stroke by means of which the feed to each screen can be regulated. Each feeder is driven by means of a belt from a line shaft and can be thrown in or out of gear by means of a friction clutch. The screens also, which are of Marcus type, are driven each by the line shaft of its own feeder, this line shaft in each case being actuated by a 30-hp. slip-ring motor. The drive of the screen is controlled by a friction clutch.

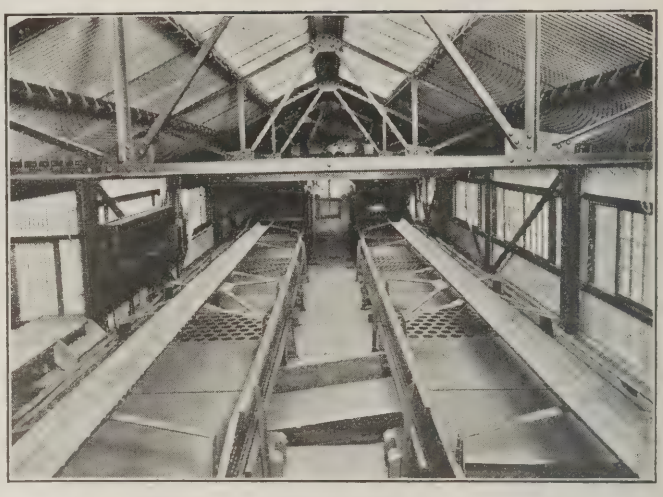
Each of the two screens is 5 ft. wide and designed to handle run-of-mine coal at the rate of 200 tons per hour. Over each screen is a trough on which pickers place the refuse. This trough extends over the run-around track at the end of the tipple and delivers the refuse to a wood bin from which it is loaded into wagons and used for filling around the property.

Each screen has circular perforations of four sizes, the diameters of which are 1⅛ in., 2 in., 3 in. and 5 in. Thus five sizes are made when lump coal is considered. Provision having been made for the mixing of various combinations of the different sizes, thirteen distinct size combinations and sizes of coal can be delivered. For instance, on the screening track can be loaded two sizes of screenings and run-of-mine coal; on the nut track, two sizes of nut coal; on the lump track four sizes of lump coal and picked run-of-mine coal. These are the sizes for which the coal company has made provision. However, other sizes can be made without changing the size of the screen plates. By changing the sizes of the perforations, of course, any size or combination of screened coal can be made.



SIDE ELEVATION NORTH DIAMOND MINE, ST. BERNARD MINING CO.

The unpicked run-of-mine chute passes to the outside of the building and can be seen on the left. The hoist house instead of being alongside the railroad track is up the hill a trifle and thus removed about 74 deg. from the usual position. The sized coal is loaded by shaker loading booms which have rescreens through which the fine coal passes. This is collected in a screw conveyor and delivered to the screenings track.



SCREEN ROOM OF NORTH DIAMOND TIPPLE

Each screen and its feeder is operated by a 30-hp. slip-ring motor. The coal in passing from the rear ground to the foreground passes over perforations of 1⅛-in., 2-in., 3-in. and 5-in. diameter, leaving the smaller sizes at each screen. The refuse is picked off and placed in the trough and travels toward the foreground like the coal.

The screenings are delivered to the car by means of a hopper which collects the coal from both screens and delivers it at one point. At the bottom of this hopper is a swinging undercut gate which will stop the flow of coal while a loaded car is run out and an empty placed in position for loading.

The nut coal is collected from two gates on each screen and delivered to a shaking chute. All this nut coal then passes over a rescreen section in the chute which removed the fine coal. It is then loaded into the car from a fixed chute with a hinged extension which furnishes a lower loading point for small cars.

Both the egg and lump coals are loaded over shaker loading booms. These booms collect the coal after it is delivered from the screen and rescreen it over a section of perforated plate. The shaker booms have a pivoted section which lowers to a point near the bottom of the car when the car is empty and gradually runs up until the car is topped out. If the operative uses care, the shaker boom can be kept close to the load so that no breakage will result from the dropping of the coal.

The fine coal rescreened from the lump and egg booms, and the nut rescreen are collected in a screw conveyor and delivered to the screening chute. The screw conveyor carrying the degradation is driven by a separate direct-connected motor. Each loading boom and the nut shaker chute has its own motor. All light and power wires are carried in iron conduit, adherence being given throughout to the requirements of the National Underwriters Code. The controls for all the motors in the tipple are placed on the side of the screen house at a point about over the nut track. This is a central point convenient to the pickers and also is handy for anyone coming up from the track by a stairway located on the side of the boom house. This tipple installation was designed and built complete by the Roberts & Schaefer Co., of Chicago.



Mine Laws Lax on Handling and Storing of Explosives

MUCH interest has been centered this winter around the explosions in coal mines, some of which occurred at collieries where what are regarded as the best methods of assuring safety were stringently followed. Owing to these explosions new legislation is to be expected. All the dangers are not below ground nor are all of them due to the faults of individual employees. In some cases the management itself is largely, if not wholly, to blame, and perhaps in no particular is this more evident than in the handling of explosives, accidents from which, fortunately, have been fewer than could have been expected in view of the many risks run.

Unless the mining laws of the states are made to specify what may and what may not be done in the handling of explosives we shall awaken one day to find a disaster on our hands. Then there will be a scurrying in the right direction. Ought we not to correct the evil now rather than wait till the lesson is taught us by the grim example of the loss of many lives?

To the operator in the Pittsburgh district a significant lesson was taught only recently, fortunately without any lives being lost to drive that lesson home. It will be well indeed if the bloodless but expensive accident by which the lesson was given will be successful in rooting out the many bad practices that prevail.

On the night of March 26 at the Superior mine of the Superior Fuel Co., near Pittsburgh, a magazine exploded containing about 225 lb. of permissible powder. Though the damage was slight, the thought of what might have been and the facts in the case are indeed alarming. With the demolition of the magazine, evidence of the cause was destroyed. Because the explosive was stored on a rack directly above a steam pipe carrying exhaust steam it is thought by some that local overheating of the dynamite may have been the agent by which the disastrous powder explosion was caused.

Others have suggested that the paraffin in the cartridge may have melted and dripped on the steam pipe, carrying with it small quantities of the highly inflammable ingredients of the explosive. These, it is suggested, burst into flame, then lighted an accumulation of similar material on the floor.

The force of the blast was severe enough to rock the countryside within a radius of three-quarters of a mile of the plant. Windows were shattered, and the populace of the town adjoining the mine was exposed to the danger of flying missiles.

Investigation has disclosed that the location and the general practices in the maintenance of the magazine were both needlessly hazardous. The magazine site lay not more than 50 ft. from the air-and-material shaft, where a fan electrically operated and a steam-driven standby unit were housed. This last unit, which lay the nearer of the two to the magazine, was wrecked; the auxiliary hoist room was demolished and the walls of the boiler room were partly ripped out on the sides nearest the magazine.

If this explosion had taken place about 7 a.m., when the miners were gathered around this shaft waiting to descend, few would have escaped death. If a few additional pounds of explosive had been stored here and the blast had occurred while the men were underground, both fans would have been destroyed, cutting off air to the workings. Then, also the power plant nearby might have been incapacitated, in which case the main hoisting equipment would have been crippled for want of power, and the miners would have been trapped.

Summarizing the facts in this case we learn that: (1) The magazine was located too near to the airshaft in particular and the mine plant in general; (2) the

NOTE—Headpiece shows the mine of the Superior Fuel Co. after the powder-house explosion which wrecked the fan and other surface equipment at that mine.

construction of the magazine was not according to specifications recommended by the U. S. Bureau of Mines or the makers of explosives; (3) care was said not to have been exercised to keep the interior of the magazine clean. It also is said that ingredients spilling from the explosive were allowed to accumulate on the floor over a period of years. Such material is highly inflammable, especially at the temperature which is believed to have existed. (4) Detonators were stored in the same compartment as the dynamite.

Where mining laws do not regulate certain features in operation the state mine departments are empowered to order that any dangerous condition be remedied. Any one of these listed will make storage of explosives unsafe, and one or more of these is known to prevail at many mines. Even in the states where there are no blanket regulations in regard to explosives why have the state mine departments allowed such practices? It is time that all states enacted specific and detailed laws covering the location, construction and maintenance of magazines, as also the distribution and use of the explosives they contain.

The industry should go on record as recommending that these laws specify: (1) That explosive magazines be located in agreement with the American Table of Distances; (2) that the construction of magazines as regards design, material, heating, ventilation and barricading be in accord with recognized safe practice; (3) that the storage of detonators and dynamite in the same compartment be considered a penal offense; (4) that the attendant in the magazine perform his duties in accordance with rules prepared for his instruction; (5) that the distribution and uses of explosives be better regulated.

Made Over 2,100 Hoists in Eight Hours

By Charles F. Sherman*
Peoria, Ill.

MANAGEMENT in hoisting is best shown not by the number of tons hoisted but by the number of hoists. In consequence the record made on Feb. 28 of this year at the Groveland Coal Mining Co.'s No. 2 mine, Peoria, Tazewell County, Ill., of 2,115 hoists in eight hours, or 264⅜ hoists per hour, is worthy of more than usual note even though the cars were of only 1½ tons capacity. The hoists were as follows:

	Hoists		Hoists
First hour	263	Carried forward	1,071
Second hour	263	Fifth hour	271
Third hour	243	Sixth hour	260
Fourth hour	302	Seventh hour	254
		Eighth hour	259
Total	1,071	Grand total	2,115

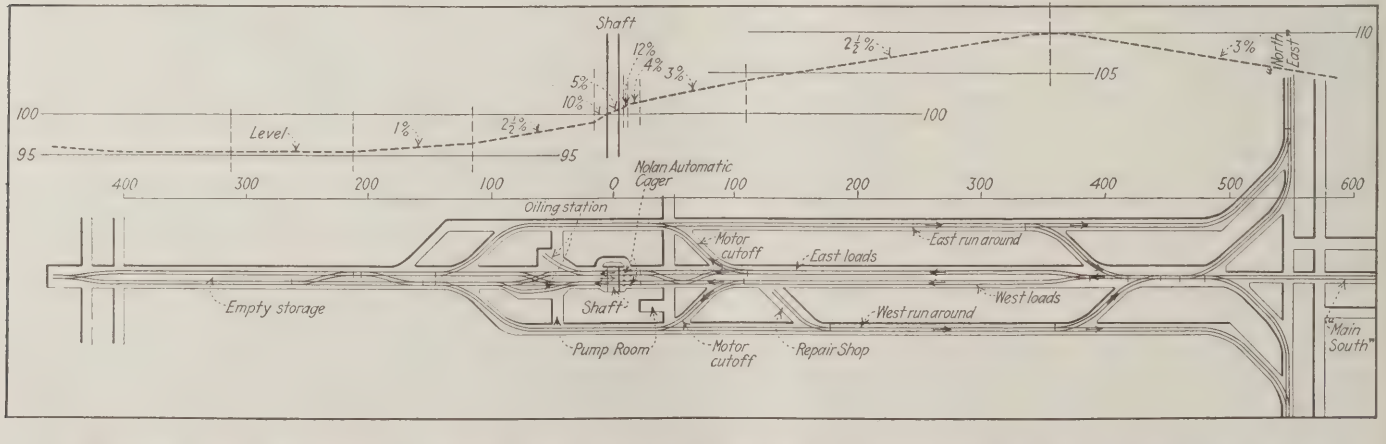
So far as I have been able to ascertain, this record exceeds all others hitherto made. The record, I believe, formerly was held by the Vermilion mine of the United States Fuel Co., near Danville, Ill., with 2,026 hoists.† The average hoisting period at the Groveland mine was 13.617 seconds, and at the Vermilion mine 14.215 seconds. It will be noted that during the fourth hour 302 hoists were made, or a fraction over five hoists per minute. This rate continued for 65 minutes. Every move on that day was timed with a stop watch and it was noted that in that 65-minute period 325 cars were hoisted. When it is known that the total hoist is 202 ft., that the cages weigh 3 tons, the cars 1 ton, and the coal approximately 1½ tons it will be realized that this is a remarkable record.

The Groveland mine is located at Peoria, Ill. Don Wills is mine manager and George Long and Grover Hooten are the hoisting engineers who made the record, alternating at the throttle every 30 min. during the eight hours. The mine is in No. 5 seam, which at this plant is 4 ft. 2 in. thick. It is operated on the advancing room-and-pillar system. The panel entries are driven 1,800 ft. apart, East and West Room Entries being driven north and south respectively. These room entries are driven at such a distance apart that a 420-ft. block of coal is left between them. The rooms are driven 200 ft. long, leaving a 20-ft. pillar at their ends. On each side of all main and panel entries a 75-ft. barrier pillar has been provided. The rooms are driven on 30-ft. centers, 24 ft. wide, leaving 6-ft. pillars.

The seam at this point is underlaid by about 12 in. to 18 in. of fireclay, and below this is 18 in. to 24 in. of iron band. Over the coal is an irregular black slate ranging in thickness from 24 in. to nothing. Above the slate is an unstratified clod which runs from nothing to 15 ft. thick. Above this clod is a sandrock 12 to 15 ft. thick and running in enormous rolls, sometimes lifting its lower surface 15 or 20 ft. above the coal and then immediately thereafter dropping to the very top of the seam.

This sandrock is completely saturated with water,

*General superintendent, Groveland Coal Mining Co., Peoria, Ill.
†4,858 tons.



GROVELAND COAL MINING CO.'S CAGING AND DECAGING GRADES BY WHICH RECORD DAY'S HOIST WAS MADE

The grade on the cage is shown as 5 per cent. This, however, is reduced to 2½ per cent, as the text shows. Note the 12 per cent for 30 in. on the caging side and 10 per cent for a longer distance on the empty side. These grades were made as the result of experiment on the spot and were not merely good guesses of the engineering department. They are made to fit the caging conditions and the cars to be caged. Are your grades the best that can be devised for speedy caging?

causing the mine to be very wet. Water drips constantly from the roof, and twelve pumps have to be operated 24 hours per day.

The cars are gathered from the face by 50-in. mules and Welsh ponies which haul to inside gathering partings, from which they are transferred to the shaft bottom by electric haulage locomotives. The cars are caged with the aid of Nolan automatic cagers, and the cages are hoisted by a pair of direct-connected Crawford-McCrimmon 20 x 36-in. engines with a 6-ft. straight cylindrical drum. A Litchfield throttle is used to control the admission of steam to the cylinders. The engines are also provided with a Welch automatic overwind and overspeed device. The cages are equipped with automatically operating stop horns and rebound blocks of Mining Safety Device Co. type.

The actual caging time is exactly 2 seconds, the other 10 seconds being occupied by the movement of the cage. This extremely rapid caging time is made possible by a unique arrangement of grades on the track at the shaft bottom. These different grades were worked out and adopted only after many weeks of careful investigation made by changing the grades night after night and watching the performance of cars on them through the daytime, before the automatic cagers were installed.

Then the automatic cagers were ordered made to specifications as to grades which we found would cage our cars in the shortest time possible. We first changed the grade on our cages from horizontal to 2½ per cent in favor of the loads. Then we adopted 42 in. of 5 per cent grade immediately approaching the cages. Behind this is 30 in. of 12 per cent grade on which the loaded car stands. Back of this is a 4 per cent grade past the crossover switches, and a 2½ per cent grade back of this. The empties drop off the cage onto a 10-per cent gradient, and then run away on a grade of 2½ per cent. As the hoisting tonnage depends entirely upon the rapidity with which the cars are caged and hoisted, months of thought and study were devoted to this question alone, and the record mentioned in this article is the result.

Mechanical Loader Excavates a Side Track

AT MINE No. 206 of the Consolidation Coal Co., Jenkins, Ky., a side track for empties had to be excavated in a bed of solid clay, the depth of the cut averaging 6 ft. Accordingly a crew of eleven men with picks and shovels were set to work to dig, load, tram and dump the material, but it was discovered that the picks made little impression on the clay and that dynamite was needed to dislodge it effectually. Even then, using fifty-four sticks of dynamite in a day of eight hours the eleven men could do no better than load out twenty-two 2-ton mine cars. Yet these men had no other duties than that of loading, tramming and dumping the spoil.

An old-type Halby shovel happened to be available and this was brought to the excavation. With its aid a crew of five men, comprising two men on the locomotive, which was kept in constant attendance, two tracklayers and one machine runner, could load forty mine cars of the clay in eight hours at a great saving in cost. With this shovel it was not necessary to use dynamite or powder to loosen up the clay.

This unusual application of the loading machine is significant, for it suggests that the coal loader has other useful applications than the loading of coal or rock at the working face. In the laying of outside track at a drift mine, in the construction of railroad tracks, in the preparation of sites for buildings, in the digging of new stream channels, in the making of village roads more or less grading has to be done which, in the past, for want of a better method has been accomplished by pick and shovel. The saving that may be effected by using a mechanical loader may go a long way during the construction period to defray the first cost of the machine itself.



EXCAVATING CLAY WITH LOADING MACHINE

Long before a mine is opened a loading machine has its uses in excavating on the surface. Sometimes, but rarely, a steam shovel is available at a mine to make the deeper cuts, but where it is not, a mechanical loader of the right type will do the work.

New England Anthracite Receipts

(In Net Tons)

1922	Tide	Rail	Total
January	114,000	361,000	475,000
February	206,000	551,000	757,000
March	337,000	757,000	1,094,000
April	201,000	277,000	478,000
May	42,000	135,000	177,000
June	34,000	111,000	145,000
July	48,000	85,000	133,000
August	43,000	51,000	94,000
September	71,000	144,000	215,000
October	304,000	604,000	908,000
November	355,000	658,000	1,013,000
December	305,000	677,000	982,000
Totals 1922	2,060,000	4,411,000	6,471,000
1923			
January	324,000	684,000	1,008,000
February	*286,000	*673,000	*959,000

* Subject to revision

New England Bituminous Coal Receipts

(In Net Tons)

1922	Tide	Rail	Total
January	805,000	532,000	1,337,000
February	1,081,000	753,000	1,834,000
March	1,407,000	879,000	2,286,000
April	936,000	322,000	1,258,000
May	800,000	148,000	948,000
June	812,000	117,000	929,000
July	831,000	112,000	943,000
August	1,079,000	174,000	1,253,000
September	1,611,000	689,000	2,300,000
October	1,420,000	792,000	2,212,000
November	1,107,000	694,000	1,801,000
December	1,107,000	600,000	1,707,000
Totals, 1922	12,996,000	5,812,000	18,808,000
1923			
January	1,248,000	604,000	1,852,000
February	*1,383,000	*664,000	*2,047,000

* Subject to revision



Problems of Operating Men

Edited by James T. Beard



In the Wake of the Explosion at Nanaimo, B. C., Canada

Brief Survey of Conditions — Carelessness, Indifference or Ignorance of Fireboss Cause of Disaster Rather Than Failure of Lamp

IN THE issue of *Coal Age*, Jan. 25, p. 184, there appeared an interesting article written by Mr. W. H. Moore, Manager, Wakesiah Mine, Western Fuel Corp., Nanaimo, B.C., entitled, "The Relative Safety of Safety Lamps under varying conditions." Mr. Moore gives some details of an explosion in the Wakesiah mine, which caused the loss of two lives, a fireboss and a fellow workman, and states what he believes was the probable cause of the explosion.

According to Mr. Moore's account, the fireboss went into a working place that was idle owing to the presence of a highly explosive mixture. For the purpose of removing the gas, he used a compressed-air jet, under a pressure of 90 lb. per sq.in., which gave the air an estimated velocity at the nozzle, say between 2,000 and 3,500 ft. per min. Mr. Moore seems to think that the cause of the explosion, was this highly explosive mixture coming in contact with the fireboss's safety lamp, which was the standard Wolf type, approved for use in gaseous mines.

Lamp Found in Perfect Condition and Later Withstood Four Severe Tests

This lamp was found, after the explosion to be in perfect condition and properly assembled. The gauzes and glass were undamaged. Later, in the lamproom, the same lamp withstood a severe test, being exposed to an explosive mixture four times in succession without failing. Close examination of the inner gauze, showed signs of intense heat, which was not apparent on the outer gauze.

Thirteen men, including the fireboss, were in the mine at the time of the explosion. Eleven of these men were on the intake side of the air-current, or outby from the point where the explosion occurred, while one was on the return side from that place. The fireboss, who was found in the place, where the explosion occurred and the workman on the return side were both killed; but the other eleven men, working on the intake side, escaped without injury.

Carelessness or Lack of Knowledge Charged

From the description given by Mr. Moore, it is evident that while coal dust may have contributed to the explosion it did not, in my opinion, contribute to the propagation of the explosion, which seems to have traveled with the ventilating current. Assuming that this "highly explosive mixture" was ignited at the Wolf lamp carried by the fireboss, there would seem to have been a certain amount of carelessness, indifference or lack of knowledge on his part.

The practice of blowing out explosive mixtures with compressed air is not to be commended, any more than that of brushing out an accumulation of gas with a piece of brattice cloth or a coat. The fireboss's lamp was found a distance away from where he lay; and I would infer that he must have placed the lamp on the floor where it was exposed to the explosive mixture driven out by the air blast. That the lamp became heated is not at all surprising.

Tests Have Shown Under What Conditions All Types of Lamps Will Pass Flame

The fact that a safety lamp will pass flame when heated is nothing new. Numerous tests made with every type of safety lamp have proved that under certain conditions of velocity, temperature, position of lamp, and with certain percentages of methane and dust, the flame of burning gas within the lamp will pass through the protecting gauze to the outside atmosphere.

If as Mr. Moore states this Wolf lamp gave signs of having been heated to such a point as to pass flame, it must be that the average temperature of the mine was very high, or there was a high percentage of methane traveling in the air-current. An ordinary Davy lamp, that withstood a current velocity of 307 ft. per min., with 4.5 per cent of methane, failed in the same current when a very small amount of coal dust was added.

Not only did the lamp pass flame, in that instance, but it did so without the gauze becoming as hot as would be required were no dust present. Again, a Clanny lamp, found comparatively safe when held in a vertical position, failed easily when tilted sideways, even with a small flame.

Small Lamp Flames Claimed to Be Particularly Dangerous in Gas

In his pamphlet on safety lamps, No. 3, Marsaut states, "It is especially with small flames that the lamps failed." Every mining book we read emphasizes the importance of exercising care in the use of the safety lamp, protecting it against sudden rush of air, high velocities and keeping it in an upright position.

One point seems quite evident; namely, there was no great velocity of air traveling at the working face, or it would have been unnecessary to have used the compressed air to blow out the gas. The fact that this was done while a man was working in the return current from the place, is certainly bad mining practice, and should be prohibited by the rules of the Wakesiah mine as it is by the rules at other mines in British Columbia.

Referring to the four successful tests, made in the lamproom after the lamp was recovered from the mine, Mr. Moore does not state the kind of gaseous mixture used in those tests, or whether the tests were made in a chamber, where the velocity was equal to that to

which the lamp was exposed in the mine. Nor does he say whether coal dust was present in the testing chamber, such as would very likely result in a working place when an air pressure of 90 lb. per sq. in. was turned on, giving a velocity of from 2,000 to 3,500 ft. per min.

Wolf Lamp Held in High Esteem

The Wolf lamp is used extensively both for lighting and testing purposes. It is generally regarded as a most excellent lamp. The lamp has been tested in air currents measuring 3,600 ft. per min. and containing 9 per cent of methane and found safe when properly handled. The lamp may develop weakness when not held in a vertical position, and, in this case, being on the floor, it may have been tilted a considerable angle. It appears to me that, under the conditions described, the lamp does not seem to have failed, as much as the fireboss to whom it was entrusted.

Regarding Mr. Moore's plea for some other and safer means of testing for gas, allow me to point him to the Burrell gas detector, which has given good satisfaction wherever used. In the mines of the Crow's Nest Pass, the Burrell detector is in general use, though it cannot be said to have superseded the Wolf safety lamp for making a rapid determination of the condition of the mine atmosphere. Admittedly, it takes more time to determine the percentage of gas, in the mine atmosphere, with the Burrell device, than with the Wolf safety lamp, but the results in the use of the former, are more accurate and more satisfactory than with the latter.

Improvement in Methods of Testing for Gas Will Insure Increased Safety

Mr. Moore's idea of having the fireboss use a twin-bulb electric head lamp, with switch to extinguish the light while making a test for methane with a Wolf safety lamp having its flame set low to prevent the overheating of the lamp, may not prove as satisfactory as expected, in view of the statement previously quoted from the pamphlet of Mr. Marsaut, claiming a lesser degree of safety in small flames in the lamp.

In common with Mr. Moore, I trust the time is not far distant when we can improve on the present means of detecting methane, and developing methods that will insure a plentiful supply of pure air sufficient to dilute and render harmless inflammable and noxious gases in our mines. In the meantime, we can all find some assistance by following the rules laid down in the Mines Act, which require an adequate amount of pure air that shall be made to sweep the face of every working place.

If this is done it will not be necessary to use compressed air to dislodge explosive mistures, and will at the same time, lessen the dangers surrounding the use of the safety lamp. I would, also, emphasize the idea of more education and less legislation. If this fireboss had received proper instruction in regard to how he must handle his safety lamp, and had followed those instructions, this accident could have been avoided. In our own narrow mining sphere, we have safety blocks that are left open, which makes them a source of danger, instead of being a means of safety. Some time ago we had a "Safety explosive" that turned out to be safe only when used under certain conditions. We have had safety lamps now for many years; but these have only been safe in the hands of capable men who have handled them properly.

Glen Calder.

Fernie, B.C.

Circulation in Safety Lamps

Observation in testing often deceptive—Gas-charged air may appear to enter at top of lamp—Study of conditions shows this is not natural.

REFERRING to the inquiry of Francis Devlin, *Coal Age*, Feb. 8, p. 260, in regard to the question of where air and gas enters the lamp, in making a test for gas in the mine, let me give a little of my own experience with safety lamps, covering a period of 46 years.

During that time I have handled all kinds of safety lamps, both in England and in this country, having worked mostly in mines where lamps were required. For a while I was under the same impression as my friend correspondent in *Coal Age*. Like him, my observations led me to think that the gas-charged air entered the top of the lamp whenever the test was made of a thin layer of gas at the roof.

Experience Often Teaches the Fallacy of Our Wrong Conclusions

For some time this was my full belief, but later experience showed me that such conclusion was wrong. Even assuming that the Wolf or the Koehler is the type of lamp used, as stated by the correspondent, I have no hesitation, now, in saying that the gas and air enter the lamp through the lower portion of the gauze or at the ports of entry below the flame.

To assume that the air and gas enter the top of the lamp and flow downward toward the flame is contrary to a clear understanding of the laws regarding the circulation of air. For that reason, I consider such a proposition as an impossible one, in the ordinary use of a safety lamp in mining practice.

With the editor who has replied briefly to this inquiry, my experience has taught me that the best results are obtained, in testing for gas with a safety lamp, when the circulation within the lamp is wholly ascensional, the air and gas mainly entering the ports of entry below the glass and passing upward and out through the top of the gauze chimney.

If Ports of Entry Are Obstructed Below Some Air May Enter Above the Glass

There are, of course, many conditions and I do not deny that a small portion of the gas or air may enter the lamp through the lower part of the gauze just above the glass, particularly if the lower ports of entry are at all obstructed, a condition that frequently happens in the use of the lamp in the mine.

By way of explanation let me state that in raising a safety lamp to the roof, under a thin layer of gas, it always happens that the gas is more or less disturbed by the movement of the lamp or the person. This causes the gas to mix with the air below and it is fed into the lamp through the regular ports of entry. The action is also assisted by the flow of burnt air outward from the top of the lamp.

In my experience it matters not how slowly you may raise your lamp toward the roof, the thin layer of gas there will be disturbed by the movement of the lamp and the rush of heated air from the top of the chimney. I recall that, on one occasion when testing for small quantities of gas in a certain place I knew was generating gas, my first test was made at the highest point in the place but gave no cap on the lamp. This seemed strange to me, as I had gotten a cap in that place earlier in the day.

After a moment's thought, I blew a gentle whiff against the roof, with the result that a cap at once showed on the lamp. I notice this method of getting a cap from a thin layer of gas at the roof is mentioned by the editor in his reply. He has also explained to my satisfaction the result of the test made by this correspondent, as being due to the rapid diffusion of the gas into the air so diluting the mixture that no gas cap was formed. W. DICKINSON.

Bay City, Mich.

ANOTHER LETTER

NO DOUBT the question asked by Francis Devlin, *Coal Age*, Feb. 8, p. 260, regarding the way gas enters a safety lamp when making a test in the mine, has been asked by more than one fireboss. To tell the truth, it is a matter that set me to thinking many times during the twenty years that I was firebossing in the mines.

It often happened that I had the same experience as that described by Mr. Devlin, when I would find gas in a small cavity in the roof. At such times the test seemed to show that the gas must enter at the top of the lamp. At least, that was my conclusion for a long time.

After thinking the matter over, however, and making a careful study of the laws of gases and air, I have come to the conclusion that my first thought was wrong and the air that reached the flame of the lamp must enter further down where it would not be opposed by the upward rush of the heated air escaping from the top of the chimney.

PRINCIPLE ON WHICH SAFETY LAMPS ARE DESIGNED DEPENDS ON ASCENSIONAL CIRCULATION

One thing in particular that led me to this conclusion was the thought that if the gas did enter the top of the lamp in any quantity, it would become mixed with the products of combustion and change the composition of the mixture so that no cap would be obtained. I have used many kinds of lamps and will say that it makes little difference whether the test is made with a Wolf, Koehler, Mueseler, Marsaut, or the common Davy lamp.

The principle on which all of these lamps are constructed is to provide for a free ascensional circulation within the lamp, in order to secure the most advantageous results, both in the way of illumination and in the observance of the gas cap. Considering the tendency of heated air to rise, there appears to be no reason to think that any amount of air or gas would enter the upper portion of the lamp where it would have to contend against the upward draft caused by the heat of the flame. GEORGE BOWKER.

West Frankfort, Ill.

Inquiries Of General Interest

Dimensions of Mine Ventilation Fan

Estimate Based on Required Volume and Water Gage—Diameter of Fan, Function of Gage and Speed—Width Determined by Air Volume

PLEASE give me the dimensions of a mine fan capable of producing 30,000 cu.ft. of air per minute and show at what speed this fan should be run and the horsepower required to operate the same. What water gage will the fan produce at this speed? What I am anxious to ascertain is the diameter and width of the fan to meet the conditions named.

Hawk Run, Pa. WILLIAM KILPATRICK.

When estimating the dimensions of a mine ventilating fan it is absolutely necessary to know, not only the volume of air required to be delivered, but the water gage or unit pressure (lb. per sq.ft.) against which the fan must operate, as determined by the mine potential or the resisting power of the mine. At the same constant speed, a fan will deliver more or less air, according as the water gage is lessened or increased.

It is important to remember that the unit pressure or water gage, producing circulation in a mine is determined by the resisting power of the mine, which is better expressed as the "mine potential." It is determined by the ratio of the sectional area of the air passage through the mine, to the cube root of the rubbing surface. Or, the cube of the potential is equal to the ratio of the square of the quantity of air in circulation to the unit of ventilating pressure.

The value of this mine potential remains constant for all speeds of the fan. Knowing the mine potential, the unit of ventilating pressure is found by dividing the square of the quantity of air required in circulation by the cube of the potential.

For example, a 6x10-ft. airway, 3,000 ft. long, has a potential of about 483. Then, dividing the square of the circulation by the cube of this potential and that quotient by 5.2, gives for the water gage required to produce 30,000 cu.ft. of air per minute in this airway—

$$w.g. = \frac{30{,}000^2}{5.2 \times 483^3} = 1.53, \text{ say } 1\tfrac{1}{2} \text{ in.}$$

In designing a fan for this circulation, the first step is to determine the peripheral speed, u (ft. per sec.) by means of the formula—

$$u = 47.26\sqrt{w.g.} = 47.26\sqrt{1.5} = 57.88 \text{ ft. per sec.}$$

Or $57.88 \times 60 =$ say 3,473 ft. per min., which is the required peripheral speed to produce a circulation of 30,000 cu.ft. per min., against the given mine potential.

Now, it is possible to choose a fan of lesser diameter running at a higher speed; or to select a fan of greater diameter and run it at a lower speed. Some prefer a high-speed fan, which can be installed at a lower first cost, than a larger fan running at a more moderate speed. The latter, however, allows of a greater margin and permits of a greater increase of speed should the necessity arise for a large increase in air volume owing to any sudden emergency.

In the present case, it is possible to use a 10-ft. fan running at a speed of about 110.5 r.p.m.; or to employ a 6-ft. fan operated at a speed of 184 r.p.m. Either of these fans will yield the required volume of air, under a water gage of 1.5 in.

It is important to observe that as the mine develops, the water gage required to maintain the same circulation will increase in proportion to the increase in

rubbing surface, and the power must be increased in the same proportion. If the power remains constant, however, the increased water gage, due to the development of the mine will be accompanied with a corresponding decrease in the volume of air circulated.

Good mine practice requires maintaining a more or less constant mine potential, by splitting the air so as to increase the area of passage throughout the mine in proportion to the cube root of the increase in rubbing surface. This condition will maintain a practically uniform efficiency in the ventilation of the mine, the power, speed of fan, and volume of air circulated remaining practically constant. In a large development there is, of course, a limit to this condition, as the required air volume will naturally increase with the employment of more men and a larger coal production.

Examination Questions Answered

Examinations Under the Mine Act, Alberta, June, 1922

(Selected Questions)

QUESTION—*A sample of dust from an underground road gives the following analysis: Moisture, 7.87 per cent; volatile matter, 20.30 per cent; fixed carbon, 35.93 per cent; ash, 35.90 per cent; 96 per cent of the dust passing through a 200 mesh. Give your opinion on the relative importance of the constituents and state your conclusions.*

ANSWER—This sample of road dust was probably taken from a road in a bituminous mine. The high percentage of ash shows the admixture of fine shale or stone dust. The comparatively high percentage of moisture shows the effects of dampening the dust to prevent its suspension in the air current. The fine dust of the coal accumulated on the road has lost some of its volatile matter, while the percentage of fixed carbon has been decreased by the admixture of the incombustible shale or stone dust. The fact that 96 per cent of the dust passes through a 200-mesh sieve shows the need of taking extra precaution to prevent a dust explosion.

QUESTION—*Explain fully the first, second and third laws relating to friction of air in mines and give an example by calculation illustrating each law.*

ANSWER—In giving three laws relating to friction of airways, we will first assume a constant size and length of the airway. In that case, the unit pressure or water gage varies as the square of the velocity of the air current. For example, if a pressure of 5.2 lb. per sq.ft., or a 1-in. water gage will produce a velocity of 500 ft. per min., in a given airway, to double this velocity in the same airway will require $2^2 = 4$ times the pressure or water gage.

Again, for the same size or cross-section of an airway, the unit pressure or water gage varies as the length or rubbing surface of the airway. For example, if a given pressure or water gage will produce a certain velocity in a 6x10-ft. airway, 1,000 ft. long, twice that unit pressure or double the water gage will be required to produce the same velocity when the length of the airway has been doubled.

Again, assuming a constant size of airway or a constant cross-section and a constant unit pressure or water gage, the velocity of the air current will vary inversely as the square root of the length or rubbing surface of the airway. For example, if a given pressure will produce a velocity of, say, 300 ft. per min., in an airway of a given cross-section and four miles in length, the same pressure will produce a velocity of $\sqrt{4}$x300, or 600 ft. per min., in an airway of the same cross-section but one mile in length. In that case, the first airway being four times the length of the second airway, the velocity in the second will be $\sqrt{4} = 2$ times that in the first airway, for the same pressure.

QUESTION—*Find the diameter of an upcast shaft necessary to circulate 200,000 cu.ft. of air per minute, with a velocity of 10 ft. per sec.*

ANSWER—A velocity of 10 ft. per sec., is $10 \times 60 =$ 600 ft. per min. The required sectional area of the shaft is, therefore, $200{,}000 \div 600 = 333\frac{1}{3}$ sq.ft. The diameter of this shaft is, therefore, $\sqrt{333\frac{1}{3}} \div 0.7854 = 20.8$ ft.

QUESTION—*If a ventilating fan is running at 100 r.p.m., with 3.75 in. of water gage and its speed is altered so that the gage reads 1.82 in., what will be the speed of the fan?*

ANSWER—It is commonly assumed that the volume of air circulated by a fan varies with its speed, other conditions remaining unchanged. Then, since the unit pressure or water gage varies with the square of the quantity, the gage reading would vary as the square of the speed; or the speed will vary as the square root of the water gage. On this basis, calling the required speed of the fan x, we have—

$$x = 100\sqrt{\frac{1.82}{3.75}} = 69.66, \text{ say } 70 \text{ } r.p.m.$$

In practice, however, this result is not attained; but the fourth power of the speed is found to vary more nearly as the fifth power of the quantity of air in circulation, which makes the speed vary as the eighth root of the fifth power of the water gage; or, in this case,

$$x = 100\sqrt[8]{0.4853^5} = 63.64, \text{ say } 64 \text{ } r.p.m.$$

QUESTION—*If a mine has two openings, one 60 ft. higher in elevation than the other, with the temperature outside at 85 deg., and the temperature inside the mine at 50 deg., will a current of air be produced and, if so, in what direction will it move?*

ANSWER—If it could be assumed that the average temperature of the two shafts differed but slightly from the given temperature of the mine, the solution of the problem would be definite and comparatively simple. We can, however, ignore the two shaft columns below the elevation of the lower opening, and consider an outside air column 60 ft. high and having a temperature of 85 deg., as being in balance with the air column in the upper portion of the deeper shaft, which we will say has a temperature of 50 deg., and is the heavier of these two columns, making that shaft the downcast for the mine, under the assumed conditions. Now, assuming a barometric pressure of 30 in., the weight of the mine air in the shaft column, for a depth of 60 ft., is $60(1.3273 \times 30) \div (460 + 50) = 4.6848$ lb. Likewise, the weight of a 60-ft. outside air column, at a temperature of 85 deg., is $60(1.3273 \times 30) \div (460 + 85) = 4.3836$. The difference in the weights of these two columns represents the unit of ventilating pressure, which is $4.6848 - 4.3836 = 0.3012$ lb. per sq.ft., to a water gage of $0.3012 \div 5.2 =$ say 0.06 in.

Leaders to Study Industrial Co-operation

Leaders in the mining industry will discuss industrial co-operation in various phases at an informal conference April 27 at the Bankers Club in New York City under the auspices of the American Mining Congress, which at its last convention created a special division to develop this subject.

Invitations have been sent to 150 men prominent in mining affairs and acceptances are arriving in sufficient volume to assure success for the conference. In addition, members of the committees on industrial co-operation established by the congress in twenty states will be present. Speakers will include not only mining men but industrial leaders of other lines who have had experience with various plans of co-operation between employers and employees.

Sidney J. Jennings, president of the American Mining Congress, will preside at the conference, which will begin at 12:30 with a luncheon, the discussions continuing throughout the afternoon. W. A. Grieves, national chairman of the Division of Industrial Co-operation of the Mining Congress, will present the objects of the movement and the foundation which has been laid by the division for its work.

John D. Rockefeller, Jr., has been invited to attend and to speak of the co-operative work of the Colorado Fuel & Iron Co., particularly in the results of employees' representation. Among acceptances received are those of S. D. Warriner, C. H. Jenkins, C. F. Richardson, Otis Mouser, A. M. Meguire, J. G. Bradley, Lee Long, Frank Rash, W. H. Cunningham, George Van Dyke, G. D. Kilgore, D. B. Wentz, Albert Nason, Hugh Shirkie and Carl Scholz, representing coal-mining interests.

Governor Cox Attacks Anthracite Tax

Governor Channing H. Cox, of Massachusetts, has written Governor Pinchot, of Pennsylvania, a letter of protest against the Pennsylvania anthracite tax. "In my judgment the policy of your state to use its natural resources to build up Pennsylvania at the expense of less fortunate states is most dangerous," said the Massachusetts executive. "As the nation's non-replaceable natural resources become more completely discovered and developed, such a policy of discrimination would result in economic disaster."

Major Accidents Force Up Fatality Rate In Coal Mines During February

Accidents at coal mines in the United States in February, 1923, according to reports from state mine inspectors to the U. S. Bureau of Mines, resulted in 292 deaths, as compared with 237 in February, 1922. The fatality rate was 5.85 per million tons, based on a production of 49,933,000 tons during the month, as against a rate of 4.96 per million tons during February, 1922, based on an output of 47,742,000 tons. In January, 1923, the fatality rate was 3.23 per million tons produced.

During the first two months of 1923 the number of fatal accidents at coal mines was 487, representing a rate of 4.48 deaths per million tons, based on a production of 108,824,000 tons. In January and February, 1922, fatal accidents numbered 397, indicating a fatality rate of 4.33 per million tons, based on a production of 91,604,000 tons of coal. The figures for 1923 include the loss of 125 lives in two mine explosions; those for 1922 include the loss of 49 lives in four explosions. One of the explosions in 1923 occurred on Feb. 8 at Dawson, N. M., and resulted in the death of 120 men; the other explosion was in Schuylkill County, Pa., on Feb. 21, and killed 5 men.

Comparing the combined record for January and February, 1923, with that for the first two months last year, lower fatality rates per million tons are noted for falls of roof and coal, haulage, explosives, and electricity. An increased rate is noted for gas and dust explosions. The fatality rates per million tons during the first two months of 1922 and 1923, by main causes, were:

	1922	1923
Falls of roof and coal	1.976	1.774
Haulage	.830	.625
Gas and dust explosions	.677	1.305
Explosives	.207	.110
Electricity	.120	.110

COAL-MINE FATALITIES DURING FEBRUARY, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	3							1					4											1	1	5	15
Alaska																										0	0
Arkansas				1									1													1	0
Colorado	2	2											4													4	5
Illinois	12		4			1				1			18													18	22
Indiana	3		1					1					5													5	5
Iowa	1												1													1	1
Kansas									1				1											1	1	2	1
Kentucky	3		3					1					7													7	22
Maryland																										0	0
Michigan																										0	0
Missouri	1												1													1	2
Montana	1							1					2													2	0
New Mexico			1		120								121													121	0
North Dakota																										0	1
Ohio	7							1					8													8	11
Oklahoma	1											1	2													2	3
Pennsylvania (bituminous)	17	7	10									2	36													36	55
South Dakota																										0	0
Tennessee							1						1													1	7
Texas																										0	0
Utah																										0	2
Virginia	1		3										4													4	3
Washington	1			3									4													4	1
West Virginia	9		8										17										1	3	4	21	35
Wyoming	1								1				2													2	0
Total (bituminous)	63	9	30	4	120	1	1	5	2	1		3	239										1	5	6	245	191
Pennsylvania (anthracite)	13	4	6	5		1				1		3	33			2		2	4		4		1	3	12	47	46
Total, February, 1923	76	13	36	9	120	2	1	5	2	2		6	272			2		2	4		4		2	8	18	292	
Total, February, 1922	88	12	46	12	34	11	1	7	1	2		8	222	2	2	1		5	4		3		1	2	10		237

5,000 West Kentucky Miners Strike; Would Renew Pact For One Year; Operators Ask Two-Year Renewal

Chicago, April 2.—Approximately five thousand miners struck Saturday night in Christian, Webster and Hopkins counties of western Kentucky. The owners of forty mines there, comprising the Operators' Association—an organization distinct from the West Kentucky Operators' Association—refused to sign with the United Mine Workers of America for a one-year continuance of the present union scale. They held out for a two-year contract and Lonnie Jackson, president of the union district, called out his men. Practically every union mine in the three counties is shut down except those of the St. Bernard Mining Co., which signed on a one-year basis on the 27th at Louisville, when the West Kentucky Operators' Association continued the present contract with the union. A few non-union strip mines in the three counties are unaffected.

On Monday, which was Mitchell day for the United Mine Workers, of course there were no union operations working anywhere, so the evidences of strike in the three counties were few. It was prophesied by both operators and union leaders, however, that the strike would be a peaceful one, at least at the beginning. There is no crying demand for the coal that might be mined in the shut-down properties and no effort is to be made now to run them. The operators say they are well fixed for an enforced idleness.

"We do not want to go open shop," says a statement from Virgil Y. Moore, attorney for the Operators' Association, "but this fight has been forced upon us by union leaders, and if we find it necessary to go open shop in order to have a steady run of our mines, we will do so."

The conference in Madisonville the 27th followed the Louisville meeting at which operators of the West Kentucky Operators' Association, including about two-thirds of the field, had signed up for a one-year continuance of the agreement. The temper of the two meetings was markedly different. At Louisville sweet peace had prevailed and Lonnie Jackson, union district president, had issued a statement saying that probably never again would there be a district strike of miners in western Kentucky.

But at Madisonville the Operators' Association, covering Webster, Hopkins and Christian counties and employing about 5,000 men, refused to sign as the bigger association had done. It declared for a two-year agreement. The union would accept nothing but a contract like that signed with the rest of the field, to run one year. Negotiations soon halted. Both sides left and gave evidences of preparing for a strike.

President Jackson in his union statement said the union was ready to sign for the same period as the rest of the unionized bituminous fields of the country—for the one year recommended by the United States Coal Commission. He said the operators' only reason for insisting upon two years was that a two-year plan would overlap the rest of the country next April 1 and would guarantee that their mines could run after that date no matter what happened elsewhere. He said that if the Operators' Association mine owners did not sign by midnight of March 31, a strike would be called and the mines would shut down in the three counties.

The Operators' Association statement said:

A system has been established in Hopkins and Webster counties during the past four years under the contracts between the operators and the union whereby there could be no controversy between the companies and their employees over any question of wages. Wages were adopted automatically to meet those paid by union operators, our competitors. All grievances were settled by friendly arbitration. No strikes were or could be called on account of controversies in Illinois or other states. Our contracts, being for two years, overlapped all other contracts in other districts. Thus we were able to operate and give our local people work during national strikes. . . . This condition could be continued to our profit and that of our men and communities by the making of a two-year contract, to expire April 1, 1925.

The union, however, refuses to make a two-year contract, insisting on a one-year contract, so that when the usual national strike is called April 1, 1924, our men, though having no grievance or controversy with us, will be arbitrarily called out then.

Rather than have this menace hang over us for a year, we prefer to close down our mines now and let them stay closed until our men can induce their union to restore conditions as they have been for the last four years. . . .

The break lies squarely at the union officials' door; they have refused to make the same contract with us that has for so long worked well to the benefit of all concerned. We shall not attempt to reopen negotiations, as the union district president has assured us that it would be idle to do so. We still are willing to renew the present contract for two years. Economic conditions make it impossible for us to make any other contract. We have no desire to go open shop or non-union unless forced to do so by the union officials.

The area in the affected zone has a yearly output of 4,500,000 tons of coal. About forty plants are included in the Operators' Association, an organization separate and distinct from the West Kentucky Coal Operators Association. Included in the list is the Kentucky Block Coal Corporation, two plants; Hart Coal Corporation, three plants; Reinecke Coal Co., one plant, all near Madisonville; Providence Mining Co., two plants; Diamond Coal Co., two plants; Buckman Coal Co., three plants, all near Providence, Webster County. The remainder are small operations scattered through the three counties.

Twenty-six Companies in Kanawha District Sign New Wage Scale

When it came time, on March 29, to sign a scale covering the year beginning April 1, 1923, for that section of the Kanawha district of West Virginia where mines are operated on a union basis only seventeen producers representing eighteen operations in the entire field signed the new agreement with the United Mine Workers. Companies becoming a party to the scale agreement for the new coal year were: Ivy Branch Coal Co., Spruce River Coal Co., Gilbro Coal Co., Halcon Coal Co., Standard Eagle Coal Co., West Virginia Eagle Coal Co., New Export Coal Co., American Rolling Mills Co., for the Martin mine; Kanawha & Hocking Coal & Coke Co., Blue Creek Coal & Land Co., Fayette-Kanawha Coal Co., Cannelton Coal & Coke Co., Plymouth Coal & Mining Co., Lewis Coal & Coke Co., Crown Hill Coal Co., Coalburg Kanawha Mining Co. and Edwin Marmet Coal Co., for the Monarch and Hernshaw mines.

Although several companies heretofore operating their mines in agreement with the union had not signed any agreement for the new year pending a final decision from the Circuit Court of Appeals on the question of whether they had a right or not to pay over the proceeds of the check-off, 26 companies in the Kanawha field had appended their signatures to a contract with the union on March 31, when the old agreement expired. Companies in addition to those already signed who entered into contract with the union were: Kelley's Creek Colliery Co., Simms Branch Coal Co., Southwestern Splint Fuel Co., Hackett Coal Co., Eureka Coal Co., Big Bottom Coal Co., and the Indian Run Colliery Co. Eighteen companies who had an agreement with the union had not at the expiration of the old agreement signed any new contract with the union.

Although some of the operators not signing have refrained from doing so pending a decision of the court, yet it is understood that others among the 18 will not under any condition again enter into agreement with the union. Some of those not signing have closed down their mines and others are operating now on a non-union basis. As a result of the failure of some companies to sign, radicals have become active on Cabin Creek in the Kanawha field and there have been reports of minor disorders there, though none could be confirmed.

Union mines were closed down on April 2 in observance of Mitchell day.

Since the organization of the field the union has not been given to making concessions to Kanawha operators. In negotiating a wage scale this year, however, the union yielded upon several points, possibly because of the fact that so small a remnant of the operators in the Kanawha field are now operating in agreement with the union. Many

of the amendments to the old agreement, suggested by the operators were adopted.

Included in the list of amendments were a clause eliminating bonuses and premiums formerly paid union miners, except in cases where the sums are paid because of local conditions, a clause providing for tracklaying by the miners and the adoption of a uniform slate scale, superseding local slate-scale agreements.

It is provided in the new agreement that if during the life of such agreement the question of rates for the arc-wall or track-cutting machine arises, the matter will be adjudicated as provided for in Section 25-A of the agreement.

The general rates of pay in the new agreement are the same as those in the old agreement which expired on April 1. Nearly all the mines in the Kanawha field are now operated on a non-union basis.

Full Bench Hears Union Appeal from Judge McClintic's Injunction

Argument of the appeal of the International organization, United Mine Workers of America, from the temporary injunction issued by Federal Judge McClintic at Charleston, W. Va., March 20, forbidding the use of money collected through the check-off for the purpose of unionizing non-union mines, was heard by the full bench of the U. S. Circuit Court of Appeals at Richmond, Va., March 31. William A. Glasgow, Jr., of Philadelphia, represented the union, and S. B. Avis, of Charleston, W. Va.; E. L. Greever, of Tazewell, Va., and A. M. Belcher, of Charleston, appeared for the operators. A decision is expected soon.

Judge Edmund Waddell, Jr., of the appellate court, temporarily suspended Judge McClintic's injunction March 24 and representatives of the miners' union said they would be governed by Judge Waddell's decision pending a final decision by the full court. Meanwhile failure to reach a settlement has been an obstacle to an agreement between operators of union mines and the union for the year beginning April 1.

Slight Gain in German Coal Output in 1922

Complete statistics of German coal production, as well as exports and imports in 1922, now available, are shown in the following tables, accompanied by the figures for 1921 and 1913 for comparison. They comprise the output within Germany's present frontiers, including, however, the alienated parts of Upper Silesia. In the figures of 1922 the latter is omitted starting with June, 1922, when the partition came into force.

OUTPUT OF COAL BY GERMAN MINES
(In Metric Tons)

	1922	1921	1913
Bituminous coal	129,964,597	136,227,231	173,096,426
Brown coal	137,207,125	123,010,036	87,233,084
Coke	29,664,291	27,913,436	32,652,933
Patent fuel — Bituminous coal	5,562,841	5,686,176	6,811,097
Patent fuel — Brown coal	29,466,149	28,243,162	21,976,744

IMPORTS OF COAL BY GERMANY
(In metric tons)

	1922	1913
Bituminous coal	12,598,397	10,540,069
Brown coal	2,015,651	6,987,065
Coke	288,765	594,501
Patent fuel — Bituminous coal	39,241	27,273
Patent fuel — Brown coal	30,557	120,965

The chief countries of origin were Great Britain, Polish Upper Silesia, the Sarre district and, in the case of brown coal, Czechoslovakia. The share of these countries in the total may be seen in the following, in metric tons:

	Bituminous Coal	Brown Coal	Coke	— Patent Fuel — Bituminous Coal	— Patent Fuel — Brown Coal
Great Britain	7,793,888	.....	166,784	20,323	.....
Polish Upper Silesia	2,966,476	.....	88,087	11,760	.....
Sarre District	1,147,000	.....	13,590	2,471	.....
Czechoslovakia	106,286	2,014,351	.....	.....	30,526
Total	12,598,297	2,015,651	288,765	39,241	30,557

Imports of brown coal in 1922 registered a further decline in accordance with the development of German brown-coal mining. Present imports are based upon the higher quality of Czechoslovakian brown coal and upon expediency of transport, which especially applies to Bavaria, which is nearer to the Bohemian fields than to German sources of supply.

GERMAN COAL EXPORTS, EXCLUDING REPARATION COAL:
(In Metric Tons)

	1922	1913
Bituminous coal	5,062,021	34,598,408
Brown coal	14,223	60,345
Coke	908,177	6,432,986
Patent fuel — Bituminous coal	39,474	2,302,602
Patent fuel — Brown coal	418,491	861,135

A large part of these exports was contributed by Upper Silesia, but since the partition of the province these no longer figure as German exports. The remainder consists only of the supply to Holland, which was 1,064,843 tons; to the Sarre district and Switzerland, which amounted to 800,000 tons in the aggregate.

Shipment of reparation coal in 1922 consisted of the following: Bituminous coal, 8,906,503 metric tons; coke, 6,451,862 metric tons; brown coal, 677,127 metric tons. Computed on the efficiency level of bituminous coal at the usual ratio these quantities equal 19,006,248 metric tons. The quantity stipulated for was 21,193,866 tons. The shortage in the deliveries was therefore 2,187,618 tons or 10 per cent.

The Entente countries shared in the reparation deliveries as follows: France and Luxemburg, 13,201,195 tons; Belgium, 3,021,353 tons; Italy, 2,783,700 tons.

Smokeless Coal Output in 1922 Exceeds That of 1921 by 5,000,000 Tons

Of the 33,768,766 tons of smokeless coal produced in West Virginia in 1922, 21,099,725 tons originated on the line of the Norfolk & Western. Smokeless output was more than 5,000,000 tons in excess of that for 1921, it is shown in a table prepared by the Winding Gulf Operators Association. According to that table smokeless tonnage was handled by the various roads as follows for the years 1922 and 1921:

	1922	1921
Norfolk & Western	21,099,725	17,442,900
Virginian	6,402,056	5,674,545
Chesapeake & Ohio	6,266,985	5,601,610
	33,768,766	28,719,055

TONNAGE MOVED BY RAILROADS

Norfolk & Western

	1922	1921	1920
Pocahontas District	16,675,980	13,352,300	.....
Tug River District	4,423,745	4,090,600	.....
Thacker District	5,923,830	3,868,900	.....
Clinch Valley	2,020,940	1,159,100	.....
Kenova	1,753,780	808,900	.....
Totals	30,798,275	23,444,374	25,314,585

Chesapeake & Ohio

Logan District	12,274,810	10,551,200	.....
New River District	4,527,970	.....	.....
Winding Gulf District	1,739,015	5,601,610	.....
Kanawha District	1,919,400	3,749,250	.....
Coal River District	1,393,930	1,962,300	.....
Kentucky District	3,842,030	1,900,000	.....
Totals	25,697,155	23,764,360	27,187,950

Virginian

Winding Gulf	5,276,600	4,551,639	.....
New River District	1,097,469	1,110,260	.....
High Volatile District	618,148	401,821	.....
Pocahontas District	27,987	12,646	.....
Anthracite District	588	.....	.....
Totals	7,020,792	6,076,366	7,612,309
Grand totals	63,516,222	54,285,100	60,114,844

TONNAGE CONSUMED BY PRODUCERS*

	1922	1921	1920
Pocahontas District:			
U. S. Coal & Coke Co.	3,665,220	2,229,800	3,310,050
Algonquin Steel Co.	431,700	241,100	250,450
By-products Pocahontas Co.	110,650	91,250	42,359
Tug River District:			
Solvay Collieries	449,738	225,900	429,150
Henry Ford	27,885	None	None
New River District:			
Milwaukee Coke & Gas Co.	69,560	78,470	286,160
Winding Gulf District:			
Richmond Railway & Power Co.	129,061	149,282	106,826
Totals	4,883,794	3,015,802	4,424,986

*Compiled by Winding Gulf Operators Association.

Union Leaders Urge Central Pennsylvania Non-Union Miners to Strike; Operators Report Men at Work

Altoona, Pa., April 2.—Taking advantage of Easter Monday, when practically all the mines in Somerset County were idle, officers of the United Mine Workers held meetings on Monday afternoon in practically every mining town in the county in an effort to get the non-union miners out. Of the 10,000 non-union mine workers in the Windber district, 1,200 have been out on strike since April 1, 1922. The appeal to join the union was made to the remaining 8,800. John Brophy, president of District No. 2, spoke at Windber and other leaders at various places.

All operators having cars report men returning to work, as the men have nothing to gain by joining the union, although the effect of the call will not be known for some time. The strike was called primarily to force a recognition of the union and to collect the check-off. There is no question of wages or working conditions involved. Miners in the Windber area get union rates and work on an eight-hour basis. Operations reached by the Baltimore & Ohio and Western Maryland railroads report no difficulty in mining coal to load all available cars. No attempt has been made to call out miners in other sections of central Pennsylvania and all operators having cars are working as usual. John Brophy, district president of the miners' union, and J. C. Brydon, representing the association of operators, have assured Governor Pinchot that they will use their best efforts to avoid violence. The outcome is being watched with considerable interest, as the Somerset district is the only portion of the central Pennsylvania field still working on a non-union basis. So far, reports indicate, but few men have joined the union ranks.

Governor Pinchot today said that he expected no trouble to come from the strike of bituminous miners in Somerset County, brought about through efforts to unionize the mines. "In view of the coal strike announced to begin today in Somerset County," he said, "I have called in John Brophy, president of District No. 2, representing the miners, and J. C. Brydon, representing the association of operators, and have explained to them both that the state takes no part in the controversy but is interested purely in maintaining public order.

Both Sides Promise to Avoid Violence

"Both Mr. Brophy and Mr. Brydon have given me their assurance that every effort will be made on the part of those whom they represent to maintain order and avoid violence and both have been in communication with their friends in Somerset County in the effort to make this assurance good. I am convinced that there is entire good faith on both sides and I hope for the best results from the effort that each side is making."

If necessary, the state police will be called out, although the Governor intimated that he did not believe the occasion would arise as a result of today's conferences. The state police were in the bituminous field prior to and long after the national guard which a year ago was sent into southwestern Pennsylvania.

It is unofficially reported that the state authorities will allow no outdoor meetings of the miners, but will take no action to prevent those held by the union in halls. The state constabulary are mobilized at points outside but adjacent to the disturbed areas.

For the past three months there has been a great deal of speculation as to whether the local union would attempt to call a strike in Somerset County in a second effort to organize that field. A year ago, on April 1, the union demonstrated unexpected strength in this area and for a time had a large portion of the field on strike. Striking miners were told in the summer of 1922 that the union fields would not settle and return to work until the operators were forced to recognize the union in Somerset County. John Brophy led the fight, backed more by radicals outside his organization than by John Lewis, it appears. He announced not so long ago that radicals in New York City had furnished some $40,000 to help finance his Somerset strike. As the summer wore on the operators were able to augment their forces materially, and, except for one company, to get back to somewhere near normal operation by the time the strike was settled in the union fields in August, 1922.

Not so long after settlement of the big strike was effected, John Lewis called off the strike in the non-union Connellsvill field, adjoining Somerset on the west, where similar efforts to organize the non-union workers directly under the international headquarters had been tried, apparently succeeded at first and then signally failed.

Subsequently Brophy asked Lewis to finance strike benefits for the Somerset strike, which he persisted in continuing. Lewis is reported to have asked him how many men he had out and what chance he had of winning. Brophy, it appears, was optimistic, asserting that 3,000 men were out. After going into the situation Lewis refused to prolong the strike with money from the treasury of the International and Brophy has been forced to go it alone. He tried to raise sympathy in New York City and actually got Mayor Hylan to send a committee to investigate conditions on the theory that the strike in Somerset was endangering the coal supply of public utilities in Greater New York. This investigation provided a junket for some of Hylan's friends and gave some printer a chance to turn out an elaborate brochure, but did Brophy no good.

U. S. D. Corporation May Buy Coal Holdings Of Central Coal & Coke Co.

Negotiations are under way for the purchase by the United States Distributing Corporation of the entire coal holdings of the Central Coal & Coke Co. The Central is understood to be planning to expand its lumber activities.

Harry N. Taylor, president of the distributing corporation and until the first of this year vice president of the Central, says an agreement of sale has been reached with the officers of the Central and now awaits confirmation by the company's Board of Directors. The price agreed upon has not been announced, but in financial circles in Kansas City it is rumored to be in the neighborhood of $10,000,000.

When the deal is closed it is understood the distributing corporation will operate its newly acquired holdings under the name of the Central Coal Corporation, with offices in Kansas City and with few changes in the personnel now employed by the Central Coal & Coke Co.

The property comprises acreage, mines and tipples in Arkansas; Cherokee and Crawford counties, Kansas; eastern Oklahoma; Ray and Macon counties, Missouri, and southern Wyoming, with a distributing organization embracing the southwest district. An official of the Central Coal & Coke Co. says the normal production with present equipment is 17,000 to 18,000 tons a day, with a potential capacity of double that amount. At present rate of production he estimates it would require fifty years to work out the Oklahoma acreage, thirty years for Arkansas, thirty to forty for Missouri and Wyoming, and fifteen for Kansas, but adds that other acreage is available to extend the life of all fields indefinitely. The Central is one of the largest operators in all states of the southwest district, but its greatest production is in Kansas and Arkansas.

Alabama Miners Reject Wage Increase

Union coal miners of Alabama declare that they will not accept the increase in wages announced March 16, but will demand the full scale agreed upon at the conference of bituminous coal producers and miners held in New York City in January. On March 27 they arranged to meet April 3 and present the higher scale.

Governor Smith Abolishes Office of New York Fuel Administrator

Governor Smith of New York issued a proclamation Tuesday night, March 27, abolishing the office of State Fuel Administrator on April 1. The Governor said he had been informed by Major General Goethals, the administrator, that "conditions are so far progressed toward their normal status that after April 1 the allotment basis of coal distribution will terminate and the normal flow of that commodity will be resumed." The offices of all local administrators will close on March 31.

The people of the state should be thankful, the Governor said, that industry and commerce have not been interrupted by the coal shortage. The administrator's offices, the Governor said, will remain open for thirty days after April 1, to conclude all unfinished business.

Under the terms of the New York State Fuel Administrator Law, passed at an extraordinary session of the Legislature last autumn, the Governor is given power to dissolve the administration by proclamation, but no right to revive his powers, so that a future emergency would be necessary in order to revive the measure, and that would have to be done by legislative action.

The administration was in existence nearly seven months. Administration officials said the winding up of its affairs would see New York City well supplied with coal.

Wholesalers to Convene in Cincinnati; Wadleigh Names Advisory Committee

The annual convention of the American Wholesale Coal Association is to be held in Cincinnati. The exact date has not been fixed but it probably will be during the second week of June.

Federal Fuel Distributor Wadleigh announces the appointment of the following advisory committee to co-operate with him in his study of marketing, storage and distribution of coal: T. F. Farrell, Pocahontas Fuel Co.; C. E. Tuttle, Tuttle Coal Corporation; S. L. Yerkes, Grider Coal Sales Agency; George W. Reed, Peabody Coal Co.; W. D. Ord, Empire Coal & Coke Co.; C. E. Bockus, Clinchfield Coal Company; S. A. Scott, New River Coal Company; C. F. Richardson, West Kentucky Coal Corporation; E. M. Poston, New York Coal Co.; S. Pemberton Hutchinson, Westmoreland Coal Co., and E. L. Douglas, First Creek Mining Co. A meeting of the committee is to be called in the near future.

Ford Will Not Mine His New Kentucky Land At Once, but Has Extensive Plans

Ford Motor Co. officials have stated to *Coal Age* that there is no intention of immediately opening up the new Ford coal holdings centering in Clay County, Kentucky. The approximate 120,000 acres of land acquired two weeks ago were bought with the double idea of holding both coal and timber in reserve, they declared. It is recognized that no production worthy of the name can be taken out of the property until a railroad has been projected into the area. No definite railroad building program has been laid down. However, the Detroit, Toledo & Ironton R.R., which is the logical line to extend southward into this new property, will be electrified and supplied with power from the new generating plant at Flatrock, Mich., a few miles west of Detroit, and with purchased power down along the line to the Ohio River, where eventually a hydro-electric plant may be built by the Ford interests. It would then be logical for a steam plant to be built somewhere on the newly acquired coal lands in eastern Kentucky.

It is Mr. Ford's intention to coke all or nearly all of the coal his own plants consume and to encourage the coking of the coal he sells to subsidiary and contributory concerns. It is by no means certain, however, that types of byproduct ovens now standard will be used. Koppers ovens are now in operation at the River Rouge plant in Detroit but Ford engineers are watching with interest the development of new types of ovens which may be used eventually.

In Detroit now the Ford company is producing a little more coke than it consumes and sells it to employees at $8 a ton, which is half the market price in that city. The following table shows a calculated return to the company from a ton of coal if it costs $2.42 per ton at the mine—a figure that may vary:

MATERIALS AND VALUES RECOVERED FROM 1 TON OF COAL AS COKED BY THE FORD MOTOR CO.

1 ton of coal costs, at mine	$2.42
Freight to Detroit, per ton	2.58
Total cost	$5.00
7⅝ gals. of tar, @ 7c. per gal.	= $0.55
2⅛ gals. of light oil, @ 35c. gal.	= 0.81
11,100 cu.ft. of gas produced of which 5,800 cu.ft. is not required for coke-oven operation, @ 30c. per 1,000 cu.ft.	= 1.74
¾ ton of coke, @ $8 per ton	= 6.00
25 lb. ammonium sulphate, @ 3c. per lb.	= 0.75
	$9.85

Battle for Northwest Trade Is On

The Northwest and Midwest are just now reading a good deal of propaganda on the question: "Should rail rates be altered to give Lake docks a better chance at the Northwest market?" The dock interests have petitioned the Interstate Commerce Commission for an adjustment of rates upward on coal shipped from Indiana and Illinois. Preparatory to the hearing in Minneapolis, Minn., May 2, the dock operators are pointing to the rate disadvantage under which they now labor, which enables southern Illinois coal, for instance, to be laid down in Minneapolis for approximately 50c. a ton under any price the docks can profitably make. They point to their $25,000,000 investment and say that without a freight equalization the docks will have to go out of business.

Operators' defenders in Indiana and Illinois reply that the drop in dock business over recent years has been only in the same proportion that coal production the country over has dropped. They point out that the docks, owned by Eastern interests whose mines have heretofore been guaranteed good summer running time by reason of the Lake trade, have been granted a distinct preference in emergencies such as the rail and mine strikes of last summer. They wonder why docks should get this preference at the expense of the people of the Northwest if Indiana and Illinois can undersell them in their own territory.

The case for an increase in rail rates from Illinois and Indiana to Minnesota, Iowa, Wisconsin and the Dakotas is covered in five complaints. The effort is not to get a reduction of rail, lake and rail rates from the Appalachian region northwesterly through the docks but an increase in the all-rail rates from the Western competing mining fields. The dock operators believe the Holmes and Hollowell scale, which now applies to shipments off the docks, should be applied also to coal from Midwestern mines. Illinois men say this would advance Illinois rates from 50c. to $1.40 a ton and would set up a Northwest monopoly for the docks.

N. C. A. Takes Larger Quarters

The National Coal Association, forced by its increasing activities to have more office room, has leased space in the Southern Building, at Washington. For several years the association has occupied an entire floor in the Commercial Bank Building. At various times it has been necessary to make temporary use of space on other floors in this building and in a nearby building. So as to avoid the difficulties arising from a separation of activities, it was found necessary to move the offices to the Southern Building.

The Southern Building is at the corner of 15th and H Streets, northwest. It faces the Shoreham Hotel and is in the very heart of the capital's business district.

A portion of the newly acquired space is being occupied by the statistical force. The remainder of the offices will be moved as circumstances permit, during the next month or six weeks.

Fred W. Lukens, of Kansas City, has been made a member of the Bituminous Operators' Special Committee.

Coal Commission Completes Field Work on Wholesale And Retail Distribution; Sanitary Survey Begun

By Paul Wooton
Washington Correspondent of *Coal Age*

Criticism in the press of the action of the Federal Fuel Distributor in urging early purchase of coal led Commissioner George Otis Smith, of the President's Coal Commission, to state at the press conference on March 31 that he stands squarely with Fuel Distributor Wadleigh in the position he has taken. While Dr. Smith did not say so, there is reason to believe that the other members of the commission deem it the wise policy to begin at this time a definite program of coal storage. This applies to bituminous as well as to anthracite and to steam users as well as to domestic users.

Dr. Smith's references were largely to the policy that should govern the domestic user of anthracite. The advantages that come with the early storage of domestic fuel, both to the individual and to the industry, are such, he pointed out, as to offset the possible speculative advantages which might come were reductions in price made later in the season.

No duplication of the work being done by the commission will result from the studies which are being undertaken by the Federal Fuel Distributor and by the Federated American Engineering Societies. This point was emphasized by Commissioner Smith. His reference to the matter was prompted by recent statements that these studies would overlap, with consequent waste of funds and needless meddling. He declared that every precaution is being taken to prevent any duplication of work. The three studies, he said, will be carefully co-ordinated. While some may think that the expenditure of $700,000 in less than a year on surveys of the coal situation cannot be justified, Dr. Smith pointed out that a saving of that amount to the consumers of coal well may result this year, to say nothing of the permanent results that may follow the only thorough and comprehensive analysis of the coal situation ever undertaken in this country.

Dr. Smith Sets Example in Ordering Early

"Dr. Smith mentioned incidentally that he is practicing what he is preaching in that he personally has followed Mr. Wadleigh's advice and has placed his order for his entire requirements of household fuel for next winter."

During the conference with the correspondents Governor Marshall related this experience: When the removal of appendices just was coming into vogue an Indiana doctor operated on a patient but made the necessary incision on the wrong side of the body, a full 8 in. away from the appendix's nearest point. As a result of the malpractice the patient barely escaped death. Governor Marshall, then a young lawyer, was retained to bring legal proceedings against the physician. After a long legal battle he obtained a judgment in favor of his client, but not until after the members of the medical profession in that vicinity, including many physicians of whose great ability there was no doubt, had interposed every possible technicality and even had resorted to violent distortions of truth and common sense.

Governor Marshall drew no moral from his story, but to his hearers the thought occurred that he believes the same situation exists in the ranks of each group within the coal industry. They are ready enough to accuse each other but are loath to admit any shortcoming on the part of their own colleagues.

At the conference Governor Marshall announced the receipt of a letter from Judge Alschuler which indicated definitely that he would not resume his duties with the Coal Commission. Governor Marshall expressed deep regret that the commission is not to have the advantage of Judge Alschuler's assistance. He spoke highly of Judge Alschuler's ability and stated that he is particularly qualified to pass on many of the questions before the commission. Dr. Smith has not given up hope that the commission still will receive some benefit from the study that Judge Alschuler gave to the coal situation, as it is possible that certain problems will be submitted to him for his opinion.

Dr. Smith reported that returns on the cost questionnaires are being received in satisfactory volume and that in many cases companies that had delayed their report had advised the commission that it would be forthcoming at the earliest possible time. In the matter of tabulation the commission's force has been able to keep abreast with the incoming returns. Dr. Smith stated that it had not been necessary to invoke the powers conferred recently by Congress providing for sworn answers to questionnaires.

A published statement to the effect that the commission had sought to induce the Pennsylvania Legislature to defer certain coal legislation was denied by Dr. Smith. He admitted having discussed the matter with Senator Pepper, but, as had been set forth in the commission's letter to J. C. Brydon, of the bituminous operators' special committee, the commission is in no position to memorialize state Legislatures. Dr. Smith reiterated that the commission believes that it would be in the public interest for the Legislatures to withhold legislation until after the commission had completed its study. It obviously would be improper, he said, for the commission to make any such direct representations to a state body.

Personnel Increased 44 in Two Weeks

All field work on wholesale and retail distribution has been completed. As certain phases of the work are concluded the employees engaged in that particular work are dropped from the roll. The augmentation in other branches, however, is requiring additional personnel, with the result that the force grew from 216 to 260 between March 17 and March 31.

Actual work on the sanitary survey, being undertaken at the commission's request by the Public Health Service, is in progress in Belmont County, Ohio, it was stated.

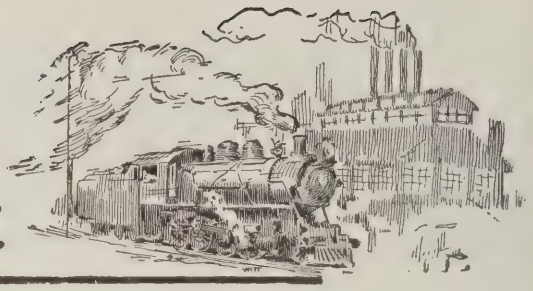
The Coal Commission was very anxious to take advantage of the experience of W. B. Reed in accounting and tax matters, in connection with its study of investments in coal properties. Mr. Reed was forced to decline the tender to direct that study because the Committee on Enrollment and Disbarment of the Treasury Department, to whom the proposition was submitted, ruled that such an appointment in effect would make Mr. Reed a government employee and, therefore, would preclude him from continuing his private practice in matters of taxation before the Commissioner of Internal Revenue.

William Lamont Abbott, chief operating engineer of the Commonwealth Edison Co., Chicago, has been selected to head the special committee of the Federated American Engineering Societies which will make a study of coal storage. Mr. Abbott was born in Whiteside County, Illinois, in 1861. He was graduated from the University of Illinois in 1884. He worked as a machinist and draftsman in Chicago from that date until 1887, when he became president of the National Electric Construction Co. He continued in that position until 1894, when he was made chief engineer of the Chicago Edison Co.'s power house. He served in that capacity until 1899, when he became the chief operating engineer of the company. Mr. Abbott long has been a student of coal storage. He was selected for the chairmanship of the Federated Society's committee on the recommendation of the late Dr. H. H. Stoek, of the University of Illinois.

A digest of the character of state legislation affecting the coal industry proposed and enacted since Jan. 1 is being prepared by the National Coal Association.



Production and the Market



Weekly Review

Prices of soft coal bounced a trifle from the bottom of last week and on Monday upward reactions in three standard grades, eastern Kentucky, Clearfield, and Cambria-Somerset in the East turned the general price average up 6 points in the *Coal Age* Index. On Monday, April 2, the Index stood at 252 as compared with 246 the previous week.

Interest today centers on April prices, as commitments beyond the end of this month are rare, outside of a few pieces of large buyers, largely railroad. Sales for April delivery are at figures around those quoted today, best low-volatiles from central Pennsylvania around $4, from southern West Virginia $3,50@$4, with Illinois screenings holding to $1.90 as a bottom figure.

Except locally no marked changes in the soft-coal market are expected until prices are made for May deliveries.

Despite a widespread change for the better in traffic conditions, production decreased, corrected estimates showing less than 10,500,000 net tons of bituminous coal in the week ended March 24.

Export Demand Easy

Export demand continued to sag. Prices eased somewhat and the indications are that European buyers are holding off pending further developments in the Ruhr and further evidence of urgent needs.

The smokeless agencies also have had on hand at Hampton Roads more coal than orders with accumulation, upward of 200,000 tons, mainly low-volatile. At the end of the week Navy standard grades were an easy purchase at $6@$6.25 per gross ton f.o.b. vessel, and now that rehandling congestion at Boston is practically at an end the various New England factors are marking down their current supplies to figures that are little if any above $8.50@$8.75 per gross ton on cars. Much of this coal now being offered was shipped at higher cost and no drastic reduction is expected for another couple of weeks.

Dumpings at Hampton Roads during the week ended March 29 were 370,823 net tons, as compared with 407,234 net tons the previous week, a decrease of 36,411 net tons, and the week past was marked by more than usual dumpings for export at Baltimore.

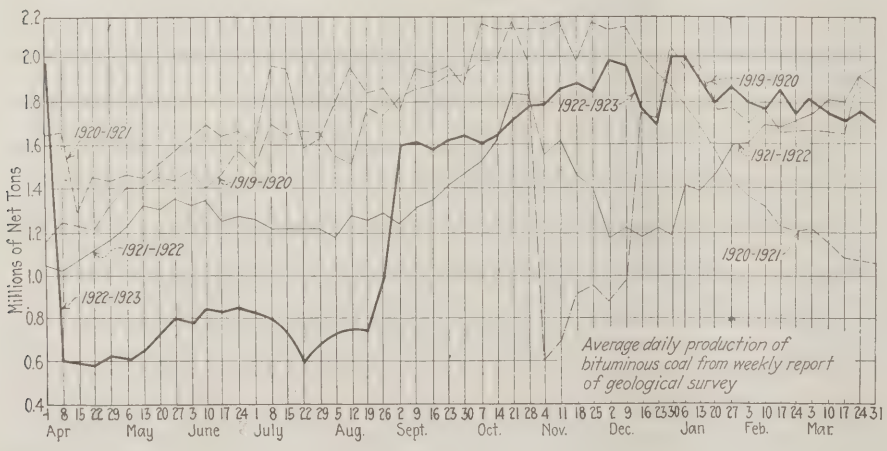
In the Middle West domestic coals were kept moving, due to weather conditions, but the steam sizes dragged considerably. Eastern Ohio had a dull week and expects nothing unusual to develop until the Lakes are in full swing.

Railroads Consider Contracts

The New York Central R.R. has this week been considering contracts for supplying coal for the new coal year and the trade is awaiting announcement of the range of prices at which this large buyer covered its requirements of several million tons. It generally is conceded in advance that prices are lower than last year. Bids will be opened next week by the New Haven for 250,000 net tons of bituminous coal to be delivered at South Boston, Mass.

"Present estimates of soft-coal production for the week ended March 24," says the Geological Survey, "indicate a total output of 10,443,000 net tons, including coal shipped, mine fuel, local sales, and coal coked. There is thus shown a very slight increase over the revised estimate of 10,428,000 tons for the week preceding and a decrease of approximately one million tons as compared with the output of the corresponding week a year ago.

"Preliminary reports of cars loaded in the week March 26-31 show 41,119 cars on Monday, 31,705 on Tuesday, 29,832 on Wednesday, and 28,059 on Thursday, and for those days totaled 1,000 cars more than for the corresponding period of the week before. Loadings on



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Mar. 10 (*b*)	11,102,000	10,628,000
Mar. 17 (*b*)	10,843,000	10,428,000
Mar. 24 (*a*)	11,448,000	10,443,000
Daily average	1,908,000	1,740,000
Coal year to date	424,285,000	409,314,000
Daily average coal year	1,409,000	1,358,000
ANTHRACITE		
Mar. 10	1,982,000	2,049,000
Mar. 17	1,907,000	2,057,000
Mar. 24	2,095,000	2,126,000
Coal year to date	87,411,000	54,478,000
COKE		
Mar. 17 (*b*)	409,000	410,000
Mar. 24 (*a*)	175,000	384,000
Calendar year	1,618,000	4,321,000

(*a*) Subject to revision. (*b*) Revised from last report.

Friday and Saturday, however, will doubtless show much lower production than on the same days of recent weeks and the total output for the week probably will not greatly exceed ten million tons."

As anticipated, the large producers of anthracite made no stir with the opening of the new coal year, reductions of 50c. on buckwheat, rice and barley being the only feature aside from a 15c. cut on pea by two companies. No reductions in the prices of the larger sizes of coal were announced. Reductions in retail prices were announced in Boston, Chicago and Philadelphia. The principal dealers in New York City made no changes in prices.

Retail dealers in hard-coal territory are circularizing their trade urging immediate filing of orders, pointing out that mine prices will show no decline this summer, and suggesting that coal in the cellar prior to Sept. 1, when the wage contract with the hard-coal miners expires, will be good insurance. Independents' prices will slump after the manner of these producers when the edge is off of demand, and thus take from under a portion of the retail trade the argument for an extra dollar or so on householders' prices, but so far there is little evidence of it. Fuel Administrator Wadleigh has issued a proclamation urging early purchase and storage of all kinds of coal that should appeal to the average run of buyer.

Production of beehive coke in the week ended March 24, as estimated by the Geological Survey from reports of cars loaded by the principal coke carriers and in part on reports of producers, was 384,000 net tons as against 410,000 tons in the week preceding. The increase was principally in the output of the Pennsylvania-Ohio region.

Midwest's Burst Is About Over

Cold and more or less raw weather all week throughout the Midwest region kept domestic coals moving out of most fields with no marked drops in price, but steam sizes dragged a good deal and were sold often for whatever they would bring. Nobody is buying heavily, of course. Trading was brisk enough to take up about all the coal hoisted, however, the car supply in most fields was good enough to give oper-

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

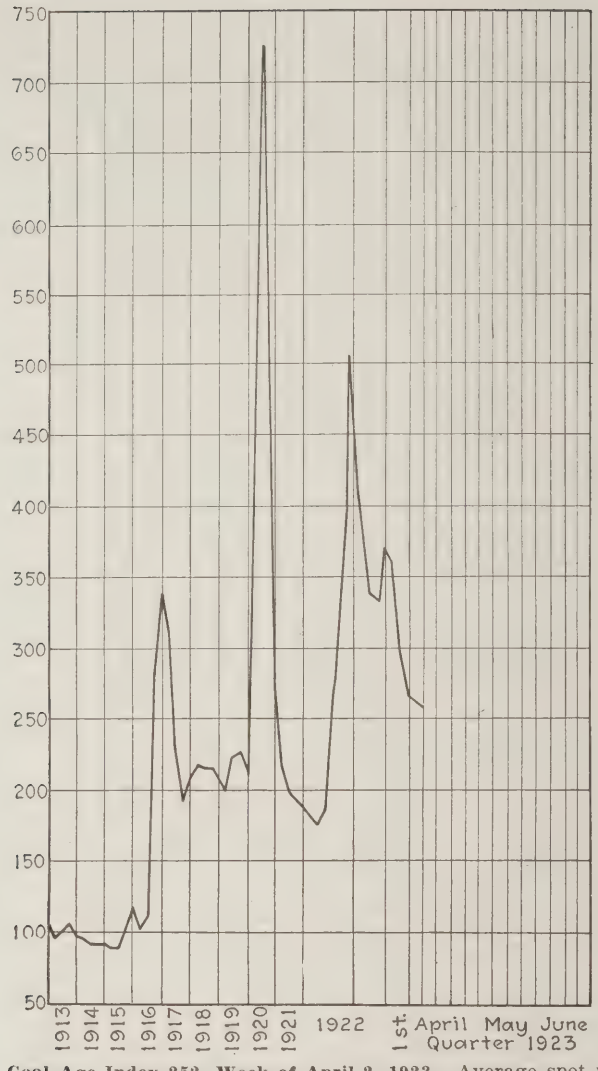
	Market Quoted	Apr. 3 1922	Mar. 19 1923	Mar. 26 1923	Apr. 2† 1923
Low-Volatile, Eastern					
Smokeless lump	Columbus	$2.95	$7.00	$7.00	$6.50@$7.25
Smokeless mine run	Columbus	1.85	4.50	4.50	*4.00@ 4.50*
Smokeless screenings	Columbus	1.15	4.25	4.50	*4.00@ 4.50*
Smokeless lump	Chicago	2.60	6.35	6.35	*6.00@ 6.25*
Smokeless mine run	Chicago	1.35	4.00	4.00	*3.50@ 4.00*
Smokeless lump	Cincinnati	2.90	7.00	6.75	*6.00@ 6.50*
Smokeless mine run	Cincinnati	1.75	4.85	4.60	*3.50@ 4.50*
Smokeless screenings	Cincinnati	1.25	4.75	4.50	*3.50@ 4.25*
*Smokeless mine run	Boston	4.55	7.10	6.50	*6.00@ 6.25*
Clearfield mine run	Boston	1.95	3.05	2.60	**2.40@ 3.75**
Cambria mine run	Boston	2.45	3.85	3.60	**3.50@ 4.25**
Somerset mine run	Boston	1.90	3.35	3.10	**3.25@ 3.75**
Pool 1 (Navy Standard)	New York	2.85	4.35	4.25	*4.00@ 4.25*
Pool 1 (Navy Standard)	Philadelphia	2.80	4.55	4.50	*4.10@ 4.50*
Pool 1 (Navy Standard)	Baltimore	2.70	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.25	3.60	3.50	3.25@ 3.75
Pool 9 (Super. Low Vol.)	Philadelphia	2.15	3.80	3.70	*3.20@ 3.80*
Pool 9 (Super. Low Vol.)	Baltimore	2.30	3.50	.....	3.50
Pool 10 (H.Gr.Low Vol.)	New York	2.00	3.10	3.00	*2.60@ 3.25*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	1.90	3.15	3.20	*2.80@ 3.20*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.20	3.25	.....	3.25
Pool 11 (Low Vol.)	New York	1.80	2.55	2.50	2.25@ 2.75
Pool 11 (Low Vol.)	Philadelphia	1.75	2.55	2.60	*2.30@ 2.75*
Pool 11 (Low Vol.)	Baltimore	2.10	2.35	.....	2.35
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.60	2.35	2.35	**2.10@ 2.75**
Pool 54-64 (Gas and St.)	Philadelphia	1.50	2.25	2.35	**2.20@ 2.45**
Pool 54-64 (Gas and St.)	Baltimore	1.60	2.40	.....	2.40
Pittsburgh sc'd gas	Pittsburgh	2.65	4.05	3.60	*3.00@ 3.75*
Pittsburgh mine run (St.)	Pittsburgh	1.85	2.35	2.35	*2.00*
Pittsburgh slack (Gas)	Pittsburgh	1.55	2.60	2.50	*2.25*
Kanawha lump	Columbus	2.35	4.25	4.50	*4.00@ 4.50*
Kanawha mine run	Columbus	1.45	2.60	2.75	2.50@ 3.00
Kanawha screenings	Columbus	1.35	2.05	2.40	*2.00@ 2.60*
W. Va. lump	Cincinnati	2.15	3.75	3.60	*3.25@ 3.75*
W. Va. Gas mine run	Cincinnati	2.10	3.35	2.75	2.75
W. Va. Steam mine run	Cincinnati	1.45	3.00	2.75	*2.50*
W. Va. screenings	Cincinnati	1.30	2.35	2.35	*2.00@ 2.25*
Hocking lump	Columbus	2.55	3.75	3.75	*3.25@ 3.75*
Hocking mine run	Columbus	1.75	2.35	2.45	*2.25@ 2.50*
Hocking screenings	Columbus	1.55	1.95	2.05	*1.85@ 2.00*
Pitts. No. 8 lump	Cleveland	2.75	3.70	3.10	*2.50@ 3.35*
Pitts. No. 8 mine run	Cleve'and	$1.80	$2.70	$2.35	*2.15@ 2.35*
Pitts. No. 8 screenings	Cleveland	1.65	2.50	2.10	*1.90@ 2.15*
Midwest					
Franklin, Ill. lump	Chicago	$3.35	3.85	3.85	3.85
Franklin, Ill. mine run	Chicago	2.40	3.35	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	2.05	2.35	2.05	1.90@ 2.25
Central, Ill. lump	Chicago	2.60	3.10	3.10	3.00@ 3.25
Central, Ill. mine run	Chicago	2.25	2.60	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.85	1.60	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.15	3.60	3.60	*3.25@ 3.50*
Ind. 4th Vein mine run	Chicago	2.35	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.15	2.10	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	2.60	3.10	3.10	*2.75@ 3.00*
Ind. 5th Vein mine run	Chicago	2.20	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	1.75	1.60	1.60	*1.50@ 1.60*
Standard lump	St. Louis	2.65	3.10	2.60	2.50@ 2.75
Standard mine run	St. Louis	1.80	2.25	2.10	2.00@ 2.25
Standard screenings	St. Louis	1.45	1.25	.95	.90@ 1.00
West Ky. lump	Louisville	2.35	2.80	2.50	2.25@ 2.75
West Ky. mine run	Louisville	1.85	1.85	2.05	*1.75@ 2.00*
West Ky. screenings	Louisville	1.70	1.65	1.70	**1.60@ 1.90**
West Ky. lump	Chicago	.....	2.85	2.85	2.75@ 3.00
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	.....	2.50	2.50
Big Seam mine run	Birmingham	1.70	.....	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	.....	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	4.60	3.75	**3.75@ 4.00**
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.25	5.05	4.00	**4.00@ 4.50**
S. E. Ky. mine run	Louisville	1.55	2.75	2.85	2.50@ 3.25
S. E. Ky. screenings	Louisville	1.40	2.50	2.25	**2.25@ 2.60**
S. E. Ky. lump	Cincinnati	2.10	3.60	3.50	**3.75**
S. E. Ky. mine run	Cincinnati	1.40	2.75	2.50	**2.25@ 3.00**
S. E. Ky. screenings	Cincinnati	1.30	2.35	2.25	*2.00@ 2.25*
Kansas lump	Kansas City	4.50	4.50	4.50	4.50
Kansas mine run	Kansas City	4.00	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	March 26, 1923 Independent	March 26, 1923 Company	April 2, 1923† Independent	April 2, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	**$7.75@$8.35**
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@11.00	8.00@ 8.35	*8.25@10.00*	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@11.00	8.00@ 8.35	*8.25@10.00*	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@11.00	8.00@ 8.35	*8.25@10.00*	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	**8.30**
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 8.50	6.15@ 6.30	6.30@ 8.50	*6.00@ 6.80*
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	3.40@ 4.25	4.00@ 4.10	*3.00@ 4.00*	*3.50@ 4.15*
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	4.00@ 5.00	4.00	4.00@ 5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 2.75	2.75@ 3.00	2.25@ 2.75	*2.50*
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.75	1.50@ 2.00	1.25@ 1.75	*1.50*
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.40@ 2.00	2.00	1.40@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	*1.60*

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 252, Week of April 2, 1923. Average spot price for same period $3.07. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the war Industries Board.

ating mines about half time. It is generally admitted that within a few days, when real spring returns, many shutdowns will occur.

Independents in Williamson County are down to $3 on domestic sizes and a low as $2.75 on mine-run. One operator quoted a price of $3 on a contract for lump and egg, about six or seven cars a day for a year. Duquoin field prices are somewhat in line with that of the independents. Jackson County is slightly higher and conditions are somewhat similar to those in Williamson and Franklin County.

The Mt. Olive condition is bad. Steam sizes fail to move and there is little demand for domestic. Steam coal is down to $1.75 for screenings, $2 for nut and slightly above that for steam egg. During the past week Mt. Olive domestic sizes dropped from $4 to $3.50 and it is expected that soon after April 1 a price of $3 will be made.

Business has been good in the Standard field on domestic sizes. Cold weather has forced domestic buying in small quantities and this fell to the cheaper Standard coal. It is understood that coal from around Pinckneyville has been offered on contract for a year, mine run, at less than $2.

Kentucky Market Firmer

As a result of cold weather Western Kentucky felt more demand from retailers during March than normally is the case. General industrial consumption is forcing a slightly better placement of orders on the part of big consumers, while the railroads with heavy tonnage movements are taking a fair amount of fuel. Many wagon and hillside operations have closed down since prices reached present levels, which is making it easier on the larger operations. A threatened strike in one section of the field may have its effect, but the feeling is that the operators will not make an issue of their demand for a two-year instead of a one-year contract.

Northwest Frozen Again

The cold snap did a good deal for the coal trade in the Northwest by way of moving a volume of domestic coal and put off spring navigation by solidifying harbor and shore ice that once had given signs of breaking up. The main interest of Northwest coal men, however, lies not in immediate trade but in prospective freight-rate changes and the future of the docks. Dock propaganda is going out showing that rail rates distinctly favor Illinois and Indiana and that the docks will go out of business if the rate structure is not leveled up at once. Ammunition is piling up for the May 2 hearing in Minneapolis before the Interstate Commerce Commission.

A March survey of the Head-of-the-Lakes docks showed that much less free coal than had been supposed was on hand—about 452,000 tons of bituminous. No price advances were made, however. The continued slump continued instead.

The dock companies are afraid that what coal is carried over will be handled at a loss after the opening of navigation. From present appearances the prices will open up $1 to $1.50 lower than at present.

Milwaukee continues its rather feverish scramble for anthracite, which arrives in small shipments, and for coke, the supply of which is in a constant state of exhaustion. Anthracite screenings are hard to find because so little coal is being prepared.

West Passes Its Cold Peak

The snappy weather of a week ago, which moved all the "no bills" in the Kansas and Oklahoma field and which kept Colorado and Utah coal moving steadily from mines working about 60 per cent of the time, has passed. Once more domestic sizes are a drug in the Southwest while steam demand remains rather steady.

Ohio Trade Shows More Weakness

More weakness has developed in the Ohio coal trade, as a result of smaller orders on the part of steam-coal users and curtailment of business from retail dealers. Little activity is expected before the opening of the lake season, which is likely to begin earlier than at first expected, because of the clearing out of the ice.

Production is jamming the Cincinnati market and the outlet is clogged in all directions. The market for smokeless coal for April opened with a spread in prices that denotes indecision on the part of those who have this coal for sale. Local retail dealers are urging householders to put in their supplies early.

Operators and jobbers in the Cleveland market say that inquiries are few. Contract consumers are hesitant and spot buyers have no difficulty in getting coal. Shipments to the lower Lake ports are growing heavier and early loading tonnage is in good demand. Due to the scarcity of coal at some of the ports, boats are being shifted to fill out cargoes.

Market Dull, Prices Soft, at Pittsburgh

The Pittsburgh market was dull last week, with prices softer. Consumption by industries is heavy and appears to have increased during the past few weeks. Domestic demand practically disappeared several weeks ago. There has been little demand for gas coal for export and scarcely any for steam coal in the past week or two. Some of the small and high-cost mines are now closing and it is believed there probably would have been some closing of mines early in March had it not been for the export demand.

Car distribution in the central Pennsylvania fields, especially along the Pennsylvania R.R., amounted to little more than 20 per cent during the last week in March. There was no increase in demand.

Demand in the Buffalo market is light. Supply is heavy, due to the improved car supply.

Dealers in the Birmingham (Ala.) district are contracting for stocking coal for the new year and a number of mines have already booked orders for such proportion of expected output as they desire to tie up during that period, while others are sold ahead, three, six and nine months. Production is holding up well, being limited only by car supply. A slight labor shortage exists in some sections.

Outlook Unfavorable in New England

There are no bright spots in the current market in New England. Spot coal is easy in all directions, and the outlook for April is not favorable for much improvement. Recent wage advances in the textile industry have given the trade a hopeful view, but the largest of these plants get power from hydro sources and from fuel oil to such an extent that as a whole they are nothing like the factor they were five or six years ago.

Central Pennsylvania grades all-rail were rather druggy. Quotations were hardly more than nominal, because there is so little buying; there were rumors of extremely low prices, but as a general rule the operators have not yet shown their hand. If some of the non-union operations turn out to be reasonably well supplied with contracts while union mines are idle there will be real cause for trouble.

Contract business in New England appears to be at rather loose ends. At least one or two of the larger operating groups have made new selling arrangements in this territory, and the trade will be interested to see what policies will develop. In practically every instance the contract business that has been closed has been simply a continuation of last year's understanding. In other words, two or three of the Pocahontas and New River agencies have thus far made prices only for April, based on $3.50@$4 per net ton f.o.b. mines, the price depending upon the class of buyer. There is nothing to suggest, however, that there will be any broader market for grades all-rail than was the case last year.

Certain special users of Pennsylvania coals, together with some of the illuminating gas companies, have shown apprehension over transportation difficulties in the way of short car supply and inadequate motive power by continuing to take a proportion of their tonnage via New York and Philadelphia piers. Coastwise rates are reasonably low, especially in railroad-owned transportation, and greater volume is possible under present conditions by rail-and-water as compared with the all-rail route. Congestion is still the rule at certain of the Hudson River gateways, a situation that will take weeks and months to correct.

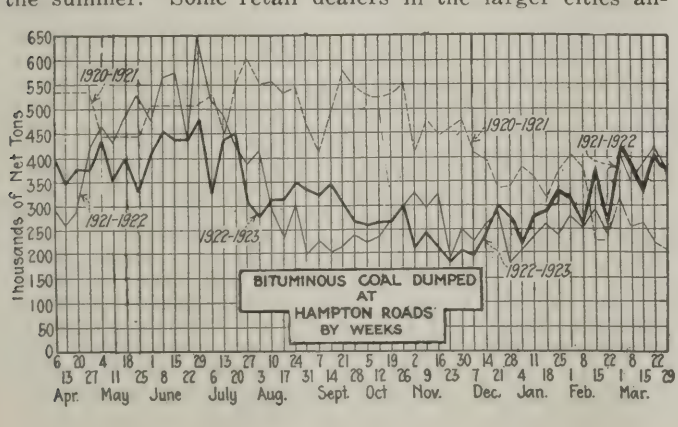
Demand Slow at New York and Philadelphia

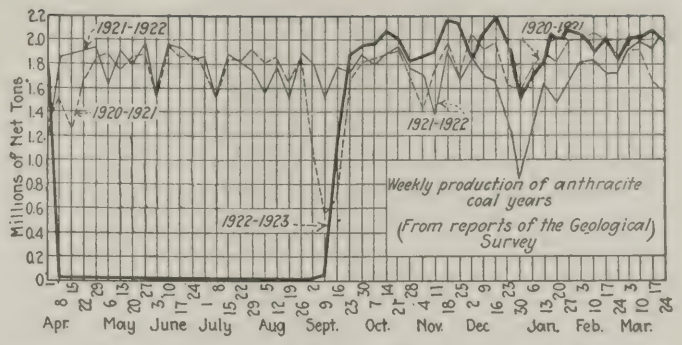
Demand continued slow in both New York and Philadelphia markets, with prices falling slightly. Good coals were scarce for the spot buyer at the New York terminals, it being estimated that from 60 to 75 per cent of the coal at the terminals was on contract.

The Baltimore market was weak. There is small call for coal except in small lots and there is no tendency to stock up. Few contracts are being entered into.

Expect Active Summer Anthracite Demand

Demand for anthracite domestic sizes continued strong throughout March and is expected to be active throughout the summer. Some retail dealers in the larger cities announced a reduction in retail prices while others who had been selling at lower prices for the past several weeks announced no change. Many retail dealers in New York City have sent circular letters to customers advising them to place their orders and are consecutively numbering orders received.





Independent producers have found it necessary to lower their prices slightly but expect that with consumers insisting upon having their coal delivered, demand will increase and that quotations will advance soon.

Dealers in Buffalo are slow to buy independent product, though the quotations have been down to $9. It is not expected that there will be any loading of anthracite at Buffalo for lake shipment until well into April.

"The production of anthracite in the week ended March 24, says the Geological Survey, is estimated, on the basis of 40,648 cars loaded, at 2,126,000 net tons, including mine fuel, local sales, and dredge and washery output. This was an increase of 7 per cent over the preceding week and the record production of the present calendar year.

"Early returns for the first four days of the present week, (March 26-31) show a high rate of production, which, on account of the church holidays, will not be maintained throughout the week and will doubtless fall much below the average for recent weeks."

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Mar. 17, 1923 Inclusive	Week Ended Mar. 17, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	28.0	(a)
Panhandle, W. Va.	51.3	57.3	55.2	54.3
Westmoreland	58.8	65.8	53.6	62.7
Virginia	59.9	55.7	53.5	55.8
Harlan	54.8	22.1	21.6	22.1
Hazard	58.4	16.4	19.4	26.9
Pocahontas	60.0	36.6	37.8	39.3
Tug River	63.7	28.8	34.1	35.3
Logan	61.1	26.2	30.9	30.9
Cumberland-Piedmont	50.6	31.7	45.8	50.9
Winding Gulf	64.3	30.4	33.5	39.6
Kenova-Thacker	54.3	42.4	40.0	47.7
N. E. Kentucky	47.7	28.4	28.2	(a)
New River	37.9	31.6	34.9	41.1
Oklahoma	59.6	59.1	42.3	45.0
Iowa	78.4	75.9	79.9	72.7
Ohio, Eastern	46.6	40.8	34.1	34.6
Missouri	66.8	76.3	76.4	76.7
Illinois	54.5	49.9	49.7	37.2
Kansas	54.9	55.9	48.5	39.0
Indiana	53.8	37.7	53.9	45.0
Pittsburgh†	39.8	41.2	32.3	35.1
Central Pennsylvania	50.2	53.4	44.7	44.8
Fairmont	44.0	35.5	36.2	34.0
Western Kentucky	37.7	32.4	33.4	28.1
Pittsburgh*	31.9	56.1	61.7	65.0
Kanawha	13.0	15.6	22.3	25.1
Ohio, Southern	24.3	38.1	32.9	29.4

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars All Cars	Loaded Coal Cars
Week ended March 17, 1923	904,286	183,530
Previous week	905,219	186,327
Same week in 1922	815,082	190,790

	Surplus Cars All Cars	Coal Cars	Car Shortage	
March 14, 1923	12,461	3,897	74,442	30,405
March 7, 1923	13,229	4,127	79,270	34,642
Same date in 1922	216,661	79,803	.....	.....

Foreign Market And Export News

British Production Reaches Highest for Year; Demand Continues Strong

Production of coal in the British mines hit the highest mark for the year during the week ended March 17 when 5,721,000 tons were produced. The output for the previous week was 5,713,000 tons. The big record for 1922 was recorded during the week of December 16 when 5,742,000 tons were mined.

Pressure on the Welsh market continues heavy, and, though operators have announced that their output till the end of April is sold, they are pressed with urgent demands. The business being received is considerably in excess of available supplies, and this has forced prices to a level which has not been reached since August, 1921, following the resumption of work after the strike of that year. Good business has been done with Germany. France and Italy are much larger buyers of Welsh coal than other countries, and consumers there are unwilling to take American coal as long as Welsh is obtainable. Sellers are not disposed to relax present prices.

Bristol Channel coal exports for the four weeks ended March 9 were 2,316,354 tons.

The demand on the Newcastle market is insistent especially from Germany, in spite of the fact that supplies for early loading are sold out and only occasional loads are available for delivery at any time this side of July. Inquiries extend from April to September delivery, and there is little to sell. These conditions have not been experienced for years.

Export Demand Up at Hampton Roads

Business at Hampton Roads was active last week, and March ended with the heaviest dumping record of the last twelve. Unusually large stocks were on hand, rushed to port by operators on the strength of revived foreign trade, and the result was a weakening of prices which was regarded as wholly temporary.

Export business was on the increase, large cargoes being forwarded to Germany and to Holland, the latter for ultimate consignment to Germany. Coastwise business was somewhat reduced, but bunkers were holding strong. The car situation was reported as from 50 to 60 per cent of normal, whereas hitherto it has been only 30 to 40 per cent of normal.

The outlook was somewhat brighter, due to building up export business, although export inquiries had been reduced. No contracts were in sight as April 1 approached. the tendency of the purchasers being to depend further on spot prices.

Export Clearances, Week Ended March 24, 1923

FROM HAMPTON ROADS

	Tons
For Belgium:	
Braz. SS Pelotas, for Antwerp	7,293
For Canada:	
Nor. SS Thorsdal, for St. Thomas	3,189
For Colombia:	
Amer. Schr. Kenton, for Cartagena	1,201
For Cuba:	
Nor. SS H. C. Flood, for Havana	2,743
Nor. SS Christian Krogh, for Havana	1,763
For Germany:	
Br. SS Tapton, for Emden	5,339
Nor. SS. Kristianiafjord, for Hamburg	6,741
For Holland:	
Nor. SS. Sierstad, for Rotterdam	11,518
Swed. SS. Laponia, for Rotterdam	7,711
For Italy:	
Ital. SS. Bampton, for Porto Ferrajo	6,491
For West Indies:	
Swed. SS. Colombia, for Port au Spain	2,855

FROM PHILADELPHIA

For Belgium:	
Nor. SS. Opland, for Antwerp (coke)	.....
For Chile:	
Dan. SS. Nordfarer, for Antofagasta (coke)	.....
For Cuba:	
Dan. SS. Jan., for Havana (coke)	.....
For France:	
Bel. SS. Carlier, for Dunkirk (coke)	.....
For Germany:	
Dutch SS. Jobshaven, for Bremerhaven (coke)	.....

Export Shipments from Baltimore

With the filing at the Baltimore (Md.) Custom House of manifests of 16 of the 17 steamers carrying export coal cargoes from that port during March, the total amount of dumpings, including bunkers, is shown to be 109,144 tons for the period from January 1 to March 31, 1923. For the three months there was loaded on ships 7,821 tons more than the total amount of cargoes sent from Baltimore on export during the entire year of 1922. While there was but six vessels to leave Baltimore during January and February with cargoes totaling 13,331 tons and three of these vessels taking 1,472 tons of bunkers, making the total dumpings at tide for the two months 14,803 tons, there were 16 vessels to leave from March 1 to 27 inclusive with cargoes amounting to 91,970 tons, and six of these ships took 2,371 tons of bunkers, making the total dumpings for that period of the month 94,341 tons. Thus far in 1923 there have been 22 vessels to leave here with 105,301 tons of cargo coal, 9 of these ships taking 3,841 tons of bunkers.

During 1922 36 vessels left Baltimore with cargoes amounting to 101,325 tons, 14 of these vessels taking bunkers totaling 6,410 tons, making the total dumpings at tide during last year 107,733 tons.

A summary of the export cargoes for the first 27 days of March is as follows: Porto Rico, 2 ships, 1,028 tons; Holland, 1 ship, 9,625; Italy, 6 ships, 42,138 tons; Germany, 3 ships, 19,119 tons; Peru, 1 ship, 3,348 tons; France, 3 ships, 16,712 tons. Of the above named vessels three ships for Italy took a total of 1,379 tons of bunker coal; 1 ship for Germany took 250 tons of bunkers and 2 ships for France took 760 tons of bunkers, making a total of 2,371 tons of fuel taken by vessels engaged in this trade from Baltimore.

The first shipment of coal to France in many years has been consigned at Hampton Roads aboard the steamer Rothley, which is due to arrive early in April, and to be followed by other steamers in the same trade. An estimated shipment of 1,000,000 tons to France will be made, according to shippers.

Hampton Roads Pier Situation

N. & W. piers, Lambert Pt.	Mar. 22	Mar. 29
Cars on hand	1,479	2,060
Tons on hand	93,400	124,951
Tons dumped for week	121,665	112,369
Tonnage waiting	12,000	9,000
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,672	1,614
Tons on hand	92,560	90,880
Tons dumped for week	108,225	134,836
Tonnage waiting	26,402	12,000
C. & O. piers, Newport News		
Cars on hand	1,891	2,220
Tons on hand	102,680	118,465
Tons dumped for week	133,712	83,887
Tonnage waiting	11,320	3,900

Pier and Bunker Prices, Gross Tons

PIERS

	March 24	March 31†
Pool 9, New York	$6.65@$7.00	*$6.50@$7.00*
Pool 10, New York	5.75@ 6.25	*5.60@ 6.15*
Pool 11, New York	4.50@ 5.50	*4.75@ 5.25*
Pool 9, Philadelphia	7.00@ 7.40	*6.70@ 7.00*
Pool 10, Philadelphia	6.15@ 6.50	*5.70@ 6.30*
Pool 11, Philadelphia	5.25@ 5.70	*4.60@ 5.40*
Pool 1, Hamp. Roads	6.75@ 7.00	*6.40@ 6.50*
Pools 5-6-7 Hamp.Rds.	6.00	*5.75*
Pool 2, Hamp. Roads	6.75@ 7.00	*6.40@ 6.50*

BUNKERS

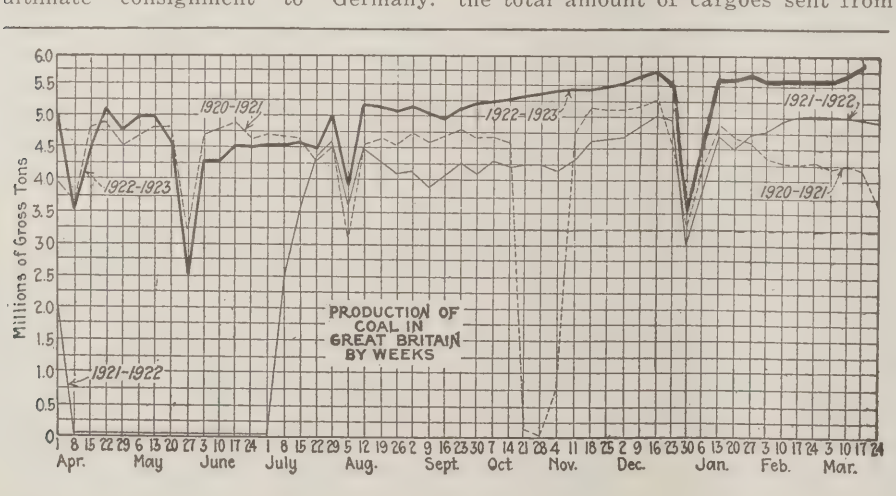
Pool 9, New York	$6.95@ 7.30	*6.80@ 7.30*
Pool 10, New York	6.05@ 6.55	*5.90@ 6.45*
Pool 11, New York	4.80@ 5.80	5.05@ 5.55
Pool 9, Philadelphia	7.20@ 7.50	*6.90@ 7.20*
Pool 10, Philadelphia	6.45@ 6.75	*6.00@ 6.50*
Pool 11, Philadelphia	5.30@ 6.00	*4.90@ 5.75*
Pool 1, Hamp. Roads	7.00	*6.50*
Pool 2, Hamp. Roads	7.00	*6.50*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	March 24	March 31†
Admiralty, large	35s.@37s.6d.	**37s.6d.@40s.**
Steam, smalls	27s.6d.@30s.	**28s.@30s.**
Newcastle:		
Best steams	33s.6d.@35s.	**34s.6d.@35s.**
Best gas	33s.@35s.	**34s.@35s.**
Best bunkers	32s.6d.@35s.	32s.6d.@35s.

† Advances over previous week shown in **heavy** type; declines in *italics*.



News Items From Field and Trade

ALABAMA

Charles F. DeBardeleben, formerly vice-president and general manager of the **Alabama Fuel & Iron Co., was elected to the presidency of the corporation** at a recent meeting of the stockholders, succeeding the late J. M. Overton, who met death in an automobile accident a short while back. Henry Colton, of Nashville, was elected first vice-president to succeed Mr. DeBardeleben. Other executives of the company were re-elected.

ALASKA

Alaska's 1922 coal production totaled 84,403 tons, according to figures made public on March 27. Of that amount 53,658 tons came from the Matanuska field, 26,891 tons from the Nenana field, and the remainder from the Broad Pass, Bering River and Cook Inlet mines. The output in 1922 exceeded that of 1921 by 8,118 tons.

COLORADO

The Midwest Mine., of the Midwest Coal Co., Palisades, located in Mesa County, on the D. & R. G. W. R.R., which closed in June, 1920, was reopened in March, 1922.

Moore No. 2 Mine, of the North Park Coal Co., Ft. Callins, located in Jackson County, on the C. W. & E. R.R., a new mine, was opened in September, 1922.

Rainbow Mine, of the Wyoming & Utah Coal Co., Cheyenne, Wyo., located in Routt County, on the D. & S. L. R.R., which closed in January, 1922, was reopened in August, 1922.

Yampa Mine, of the Yampa Collieries Co., Denver, located in Routt County, on the D. & S. L. R.R., which closed in February, 1922, was reopened in September, 1922.

Postal Mine, of the Postal Coal Mining Co., Denver, located in Routt County, on the D. & S. L. R.R., which closed in February, 1922, was reopened in August, 1922.

The Curtis Mine, of the Colorado Fuel Co., located in Routt County, on the D. & S. L. R.R., which closed in October, 1920, was reopened in August, 1922.

Colorado coal mines produced a total of 1,909,118 tons in January and February, according to a recent report of State Coal Mine Inspector James Dalrymple.

ILLINOIS

The new Henderson mine at Gillespie, Ill., has been connected with the Chicago & Northwestern R.R. by switch track and the **first coal was shipped** to Chicago about March 10.

The Rex Coal Mining Co. has located a vein of coal 4 ft. 8 in. thick on a 600-acre tract of land one-half mile east of Sarner.

The Yankee Branch Coal Co., Georgetown, Vermilion County, has opened a new mine on the C. & E. I. R.R.

The Justice Coal Co., Danville, Vermilion County, has opened a new mine on the Wabash R.R.

The Clover Leaf Coal Co. has reopened its mine at Coffeen, Montgomery County, on the T., S. L. & W. R.R., which was closed in March, 1921.

The Norris Coal Co., Norris, Fulton County, in November, 1922, reopened its mine on the C. B. & Q. R.R., which was closed in the autumn of 1920.

Among the many **Illinois mines that have closed down are these:** Royal mine of the Columbia Colliery Co., at Freeburg; No. 52 mine of the Springfield District Coal Mining Co., near Springfield; the Cantrall mine of the Buckley Coal Mining Co., at Cantrall, and the Empire No. 2 mine of the Illinois Coal Corporation, at Auburn.

On the morning of March 16 a part of the **mine operated by the Security Coal & Mining Co.,** Duquoin, **was flooded** by water following heavy rains. The water did not reach the working faces at any place, and the company is running all its pumps night and day, and expect to be able to operate in about 15 days.

Anton Fanke has resigned as superintendent with the Star Coal Co., Freeburg, and has assumed a similar post with the Little Muddy Coal Co., Tamaroa.

The following **mines in district No. 9 are completely closed down:** Alladin Coal & Mining Co., No. 1, at Cutler; Southern Gem, No. 8, Jamestown; Illinois Sixth Vein Coal Co., Pinckneyville; Kanawha Fuel Co., St. Johns; Willis Coal & Mining Co., No. 1, Willisville; Ft. Dearborn Coal Co., De Soto; Jewell Coal Co., No. 2, Duquoin. The Jewell Coal Co. is planning extensive repairs for its mine.

The Industry Coal Co. organized under the laws of Illinois for the purpose of acquiring approximately 6,200 acres of coal lands in Franklin County, together with two mines, has placed on the market $2,000,000 first mortgage 7 per cent serial gold bonds. John F. Gilchrist, vice-president of the Commonwealth Edison Co., is president of the company. Stuyvesant Peabody, president of the Peabody Coal Co., is vice-president; Edward J. Doyle, vice-president of the Commonwealth Edison Co., secretary, and C. E. Schrage, vice-president of the Peabody Coal Co., treasurer. Directors are Messrs. Gilchrist, Peabody, Doyle, Britton I. Budd, president of the Public Service Co. of Northern Illinois; J. H. Gulick, vice-president of the Commonwealth Edison Co.; C. J. Gray, vice-president of the Peabody Coal Co., and Joseph Solari, secretary of the Peabody Coal Co. Under an operating agreement which extends for the life of the bonds, the Peabody Coal Co., of Chicago, will be in complete charge of the operation of the properties of the new company.

Secretary John Watt, of the Springfield sub-district appealed March 27 to the international executive board of the United Mine Workers **to oust President Frank Farrington,** recently re-elected, and to order a new state-wide election.

The Southern Gem Coal Corporation is sinking a new shaft at its No. 11 mine, near Percy. It will be used for ventilation purposes temporarily after it reaches the coal, but later will be converted into the main hoisting shaft of the mine.

INDIANA

Surveyors have arrived in Petersburg to lay out another seven-mile switch to be built from the Big Four R.R. to the coal fields in Pike County. The new switch will leave the main line at Rogers station just south of the White River crossing and run southeast through the town of Alford, two miles east of Petersburg, and will join the Big Four again at Clark's station, three miles south of Petersburg. The switch will penetrate the 15,000 acres of coal territory recently leased by Pennsylvania coal men, on which testing has been under way for the last two months.

The Globe Coal Co., of Petersburg, **has purchased 22 acres of land south of Rogers** and will move its stripping machines onto the land early this spring. The coal company has donated a new right of way for the Petersburg and Washington highway so that the new bridge over White River can be approached straight and not at right angles.

An explosion in the Wabash mine in Vigo County late in March probably due to ignition of a pocket of gas, resulted in serious injuries to two men, John Armstrong, of West Terre Haute, and Abraham Gallez, of Marion Heights. Both were burned badly about the head and face and upper portions of the body, but it was said the injuries would not prove fatal to either. The mine was not damaged by the explosion and the fire was confined to the immediate vicinity of the blast.

Richard Eddleman and Bert Fredericks, shotfirers, were killed in the mine of the **Carlisle Coal Co.** at Carlisle, by **an explosion in the mine occurring March 19,** and the interior of the mine was badly damaged. Four other men who were on the bottom of the mine at the time of the disaster were brought to the top by the night shift uninjured. The first knowledge of the explosion was obtained when the night shaft reached the bottom and found twisted trackage and trolley wires barring the entries. A mine rescue car was immediately rushed to the scene while the day and night shifts began searching for the entombed men.

The Ogle Coal Co., Indianapolis, has decreased its capital from $150,000 to $100,000.

KENTUCKY

The Payne Pond Creek Coal Co., McAndrews, Pike County, has opened a new mine located on the N. & W. R.R.

The J. E. Polly Coal Co., Millard, Pike County, has opened a new mine at that place on the C. & O. R.R.

The Excelsior Elkhorn Bi-Product Coal Co., Shelbiana, Pike County, has opened a new mine on the C. & O. R.R.

The Looney Justice Coal Co., Regina, Pike County, has opened a new mine, the Looney Justice, on the C. & O. R.R.

The Victor Coal Co., McAndrews, Pike County, has opened a new mine, the Victor, on the N. & W. R.R.

In a preliminary report Lawson Blenkinsopp, Chief Inspector of Mines, states that **in 1922 the total production of Kentucky mines was 41,293,933 tons,** as compared with 30,282,695 tons in 1921, an increase of 11,016,274 tons. The number of mines increased from 641 in 1921 to 719 in 1922. The total number of employees, inside and outside, in 1922 was 57,666, an increase of 7,876 over the previous year, but despite this the fatal accidents were 122, or four less than in the previous year. The average number of days worked was 126, as compared with 109 in 1921. The 418 wagon mines in the state had an output of 414,000 tons. In addition, 64 mines not co-operating with the State Department of Mines had an estimated output of 100,000 tons.

A news item in *Coal Age* March 22 stated that "according to a press statement the State Tax Commission has been busy trying to explain how come that Henry Ford paid $15,000,000 for 30,000 acres of land and improvements in Pike County, when Pike's entire 423,782 acres is assessed at only $19,466,686." Grant Phillips, assistant mine inspector, Eighth district, Pikeville, writes that he thinks this is an error as the stamps on the deed would indicate that only $6,000,000 was paid for the land in Kentucky. Mr. Phillips says he understands that most of the land involved is in West Virginia so that if $15,000,000 was paid $9,000,000 was for property in the latter state. The 1923 assessment for Pike County, Mr. Phillips says, is approximately $27,000,000, the exact figures not being available.

Coal produced in Kentucky in 1922, according to Grant Phillips assistant mine inspector, 8th district, Pikeville, **totaled 41,377,217 tons,** an increase of 11,094,522 tons over 1921. The mines employed 10,712 men outside and 47,607 inside, a total of 58,319. Mines co-operating with the State Department of Mines number 740; there are 98 mines that do not co-operate with the department and 441 wagon mines in the state.

The Elkhorn Coal Co. reports gross earnings for 1922 of $3,443,877 against $2,195,158 in 1921. After payment of all expenses and charges and allowances for taxes, there was a net loss of $99,906 against $380,990 in the previous year. After preferred dividends, there was a deficit of $495,858 and the profit and loss surplus on Dec. 31, 1922, was $495,331 against $909,640 at the end of 1921.

Officials of Perry County have filed a suit in the Franklin County Circuit Court at Frankfort to compel the State Tax Commission to accept assessments of $13,606,753 for 1923 taxation purposes in Perry County. **The commission has ordered an increase of $5,600,000, most of which would be paid by coal interests** in Perry County. The additional assessment is declared unfair and unreasonable.

The Columbus Mining Co., of Chicago, with holdings in eastern Kentucky, has opened a district sales office at 610 Fayette Bank Building, Lexington, John W. Hall, who for the past two and a half years has been associated with the C. L. Ryley Coal Co., has been appointed Southern sales manager.

Congressman **Alben W. Barkley,** of Paducah, who is a **Democratic candidate for nomination for governor, is panning the coal interests** and arguing for a tonnage tax on coal production. He is stirring up much talk concerning coal taxation. In a recent talk he held that the mouth-of-the-mine value of coal production in Kentucky last year was $162,000,000, or more than the present assessed coal-land valuation of the state. "Barkley might as well argue the value of made bricks as against value of clay in a pit," remarked one coal man.

The Louisville coal trade arranged a banquet at the Louisville Old Inn Hotel on April 2 for Morris M. Kling, of the Louisville Coal & Coke Co., who is leaving Louisville in April to make his home at Oakland, Cal.

The Marian Coal Co., Lexington, has recently filed amended articles increasing its capital stock from $200,000 to $400,000.

MARYLAND

The Equitable Fuel Co., of the Maryland Trust Company Building, Baltimore, has increased its capital to $10,000.

The Consolidation Coal Co. had its heaviest production on March 13 for any one day since the miners' strike was declared nearly a year ago. **The day's output was 1,790 tons** from mines Nos. 1, 3, 4, 7, 9, 10, 11 and 13, at Frostburg. It is reported that more than 500 men are now working for the company.

MINNESOTA

A committee from the St. Paul Association has been named to study the use of North Dakota lignite for industrial and other use. The move was made at the instance of representatives of the Association of Commerce, of Minot, N. D., which is seeking to expand the field for lignite.

The Northwestern regional board of the American Railway Association has solemnly passed resolutions urging the coal using public to buy its coal for next season early so that the docks may stock accordingly. It has been remarked in the Twin Cities that this board might as well pass resolutions recommending that spring be inaugurated each year on March 10 or that the ice go out and navigation on the Great Lakes be regularly opened up not later than April 2. The dear public will buy its coal when, as and if it pleases.

E. S. Kendrick, of the Kendrick Coal & Dock Co., Minneapolis, **predicts that the dock coal traffic, once 10,000,000 tons a season, will drop to insignificant amounts** if there is not a speedy revision of the lake and rail rates on coal to equal the favorable rates from the all-rail fields. In reply, a representative of one of the railroads sets up that the rates complained of are generally made by the commission, and could not be changed without resulting in a general change. Yet the all-rail rates were established by carriers of their own volition.

The purchase of coal fields in Kentucky by Henry Ford is expected to forecast the bringing of coal via the Mississippi River to the proposed St. Paul Ford plant.

A good demand for shipments from the docks has resulted at Duluth-Superior harbor through the starting up of some of the mines of the Mesaba iron range. This coal was purchased some time ago.

J. A. Ferguson, manager of the Pittsburgh Coal Co. at Duluth, and **L. D. McNamara**, manager of the Carnegie Coal & Dock Co. at Superior, Wis., **take a pessimistic view of the rate condition to the Northwest.** Both assert that unless a readjustment is accomplished, a minimum amount of coal will be shipped to the docks here this year.

MISSOURI

The Mitchell & Lovell Coal Co. has purchased all of the property of the Hanks Coal Co. from Bevan & Sneed and has obtained a lease from Mrs. Lowry for a considerable acreage of coal land. Immediate arrangements will be made to put this much talked-of coal mine in operation at once. The Mitchell & Lovell company has one mine in operation now.

The Mosby Coal Mining Co. has announced that on April 1 it will begin sinking a new shaft on its property at Mosby and this will result in two mines being put in operation. It has been announced that a large contract from a North Kansas City manufacturing concern will be available as soon as coal is mined. It also is said that if sufficient fuel can be produced a large manufacturing concern will make Mosby its headquarters and will erect a factory here.

The Domestic Fuel Co., of Kansas, has been incorporated with a capital of $500,000 at Mindenmines, to produce and sell coal. Incorporators: G. K. Mackie, J. W. Mackie, A. H. Schlanger, Thomas Mackie, C. M. Sweeney.

NEW YORK

Colonel C. D. R. Stowits, after nine years of close application as **receiver of the bankrupt coal operating firm of Frank Williams & Co., has made a final report**, by which the creditors receive 50c. on the dollar. Judge Hazel highly commended the work on receiving the report. The company owned coal mines, included the Upper Hillville and Oak Ridge, in Clarion County, Pa. Frank Williams, a Buffalo coal shipper of large business capacity, died quite a long time ago. His successors bought the mines, but were unable to operate them profitably.

Timothy Burns, general manager of the Lackawanna plant of the **Bethlehem Steel Co.**, at Buffalo, announces that **two batteries of modern coke ovens** with 60 ovens each and total capacity of 110,000 tons of coke a month, **will be built at once.**

The Anthracite Mining Co. has been incorporated at Albany to open undeveloped coal property in the vicinity of Scranton, Pa. It is affiliated with the Marquette Coal Co. of Albany, and will have headquarters with the Marquette company, which deals in coal at wholesale. The officers of the Anthracite Mining Co. are: President, Arthur T. Palmer; vice-president, Ernest A. Barvoets; vice-president, Lewis F. Harder, Philmont; vice-president and general manager, William B. Vernoy; treasurer, Jacob H. Herzog; secretary, Arthur L. Andrews.

Bids for furnishing 45,000 tons of slack coal to the city waterworks of Buffalo, which is the principal item of that sort in the spring, **were all thrown out** by the City Council on the request of Councilman Kreinheder, who declared that he could buy in the open market lower than the lowest bid (McVicker Coal & Coke Co., Cleveland, $2.25 on a $2.39 freight rate). Shippers say it can be bought for 40c. less, but the high bidding is attributed to the belief that prices will soon advance.

OHIO

Plans are being made by the **Cincinnati Southern to extend that line into the Harlan coal fields,** which will give another outlet to a large tonnage toward the Cincinnati gateway. Word comes from the Louisville and Nashville that it will tunnel through the mountains at Krypton, Ky., to give an outlet to North Fork coal and a part of the acreage recently acquired by Henry Ford from the Peabody interests.

Plans have been submitted to the U. S. Engineer's office in Cincinnati **for the erection of a half million dollar coal-handling plant** to be installed at the foot of Freeman avenue on the river bank. Much mystery surrounds the undertaking but it is a well established fact that this is to be put in by the Island Creek Coal Co. interests. The plans call for the erection of a 70-ft. crane that will swing the coal from the river barges clear to land or to the cars that may be waiting to be filled for rail-river coal. While a great amount of this coal will go to use in Cincinnati and the surrounding territory, in advantageous seasons it will also be shipped to nearby territory where the combined rates apply.

The federal government and especially the Department of the Interior has been called upon **to aid in extinguishing the fire which has been raging in mines around Straitsville and Shawnee in Perry County for the past 40 years.** Representative Randolph, of Perry County, introduced a resolution in the Ohio Legislature asking federal aid. His resolution requests the U. S. Bureau of Mines to co-operate with the Ohio Mining Department in an effort to stop the destruction of coal deposits.

G. M. Richards, general manager of the Cumberland Manchester Ry., a coal line that feeds in to the Louisville & Nashville in southeastern Kentucky, was in Cincinnati recently making purchases. He stated that **many improvements are to be made to the physical properties of this road.**

PENNSYLVANIA

Representative John E. Stavitski, of Luzerne, has introduced a bill which requires that all anthracite knocked from the miners' cars en route from the mines to the breaker shall be weighed and the companies made to pay for it at the prevailing rates, the money to go into a miners' reserve fund for the benefit of injured and aged employees of the said mine. "The miners lose thousands of dollars through the dockage resulting from coal knocked from the cars. It's the miner's coal; they should be paid for it," Stavitski said in introducing his bill.

State Senator C. M. Barr, Allegheny County, has introduced in the Senate **a bill providing for the appointment of mirers' examining boards.** It is identical with the Heffran House bill introduced Feb. 19.

Representative Chaplin, Cambria County, has **introduced a bill** duplicating that of Senator Stineman's measure in the upper house, intended to protect bituminous-coal miners in the determination of the amount of coal to be used as the basis for calculating wages.

A measure that was defeated two years ago has been introduced by Representative Staudenmeier, Schuylkill County. **The bill would regulate the sale of anthracite and fix standards of size.**

Representative Thomas, Luzerne County, has offered a bill in the House that **requires the carrying of mine water from mines and washeries to streams and rivers in proper sluices or drains.** It is unlawful to permit this water to flow over the land. Overflows and leaks are not allowed. A fine of $100 a day is provided for violations.

Representative Post, Washington County, **introduced a bill** in the House March 27 **to relieve life tenants of land from payment of taxes on underlying veins of coal which they have no right to operate.** The bill provides that the owner of the veins shall pay the taxes. The owner is to be assessed up to an amount equal to the taxes on similar acreage of coal in the same vicinity and the life tenant shall only be required to pay the residue of the taxes assessed on the land after deducting the portion of the tax required to be paid by the owner of the veins of coal. Assessors are empowered to assess coal and surface separately in cases where the life tenant of land has not the right to operate the coal underlying the surface.

A Court of Industrial Relations, to consist of three judges, is created by a bill introduced in the House by Representative Parkinson, Greene County. The court would have jurisdiction over mining industries, those engaged in the manufacture and transportation of food and clothing and would have power to investigate controversies arising between employer and employee or between groups of workers in these industries. Its powers extend under the provisions of the bill to wages, working and living conditions and the conduct of the industries. The judges would be named by the Governor and would receive $5,000 a year and serve for four years. The proposed court would sit at Harrisburg.

A bill introduced last week by Representative O'Boyle, Lackawanna, **requires owners and operators of coal mines and operations to furnish coal at current prices for the use of hospitals, poorhouses and other charitable institutions, schools, churches and buildings of municipal or quasi-municipal character.** A provision in the bill is that the mine owner may demand that the coal be paid for at the mine.

Bituminous-coal companies recently incorporated in Pennsylvania are as follows: **Monongahela Fuel Co.**, Pittsburgh; capital $25,000; treasurer, John Robinson, Pittsburgh; incorporators, John Robinson, Jr.; H. L. Robinson and David P. Lindsay, all of Pittsburgh. **W. R. Calverley, Inc.**, Pittsburgh; $5,000; Harry V. Wyld, Pittsburgh, treasurer; incorporators, Walter R. Calverley, Joseph G. Calverley and Harry V. Wyld, Pittsburgh. **Sterling-Graham Coal Co.**, Masontown, $150,000; W. W. Sterling Graham, Masontown, treasurer; incorporators, William L. Graham, Estella S. Graham and E. W. S. Graham, Masontown. **Godfrey Hill Coal Co.**, Irvona; $10,000; E. W. Turley, Irvona, treasurer; incorporators, E. W. Turley, G. W. Turley and B. M. Turley, Irvona. **Browns Run Coal Co.**, Uniontown; $50,000; Amedee J. Hagan, Uniontown, treasurer; incorporators, Amedee J. Hagan and Altha M. Craig, Uniontown and James S. Rush, Masontown.

At the annual election of the Pittsburgh Coal Co., March 28, F. J. LeMoyne, formerly secretary, was chosen to succeed F. M. Wallace, vice president in charge of finance. Mr. Wallace resigned to give his attention to his banking interests in Erie, where he is president of the First National Bank. The other officers elected were: President, W. F. Field; Vice-President in charge of operations, J. A. Donaldson; Vice-President in Charge of Sales, James H. Woods; Vice-President in Charge of Ohio and Kentucky operations, G. C. Weitzell; Vice-President and Comptroller, J. B. L. Hornberger; General Counsel, Don Rose; Secretary, Aaron Westlake; Treasurer, A. F. Fell; Auditor, J. D. McPherson. Vacancies among the directors were filled by electing George B. Taylor, Henry Oliver Rea and Peter Reiss.

Thirteen miners after being entombed for ten hours in the No. 1 drift of the Nesquehoning mine of the Lehigh Coal & Navigation Co., in Panther Creek Valley, **were released in good health** and removed to their homes in automobiles.

Bids for the sale of anthracite veins underlying the River Common at Wilkes-Barre were opened March 28. James J. Powell, of Scranton, presented a bid of 52c. a ton, explaining that the minimum amount to be paid the city would be arranged by him and council if he is awarded the contract. Mr. Powell is believed to represent the Glen Alden Coal Co. The second bid was from James F. Bell, also a Scranton attorney, who it is believed represents the Hudson Coal Co. His bid was 47c. a ton, with $10,000 as a minimum to be paid the first year and $25,000 as the minimum to be paid during succeeding years.

John Collins, of Nanticoke, **has announced his candidacy for secretary-treasurer** of District No. 1, United Mine Workers of America. Mr. Collins is a former president of the district. In addition to W. J. Brennan, the president of the district, other candidates for that office are Rinaldo Cappelini and P. J. Philbin.

Production of coal in the Second Bituminous district during 1922 was 5,395,115 tons, according to the report of C. B. Ross, mine inspector. This is an increase of 1,373,641 tons over 1921. Coke production during the year was 1,091,676 tons, as compared with 377,041 tons in 1921.

The Pennsylvania Coal Co. in a communication to the Board of Education of Olyphant stated that it would **erect a new two-story school building at Underwood** on account of the increasing number of children attending the schools there. The board will co-operate with the company in selecting a site for the building.

Following the annual meeting of the stockholders of the **Bertha Coal Co.**, Pittsburgh, and the Consumers' Fuel Co., an associated interest, held March 21 in the company offices, Chamber of Commerce Building, the board of directors of the respective companies **re-elected John H. Jones president** for the ensuing year. **Isaac J. Jenkins was re-elected president of the Consolidated Fuel Co.**, which also is an associated interest.

Madeira, Hill & Co., removed their offices on March 30 from the North American Building to 260 South Broad Street, Philadelphia.

TENNESSEE

The Enterprise Foundry & Machine Works, Bristol, has **changed its name to the Enterprise Wheel & Car Corporation.** There has been no change in officers, sales force or shop organization.

UTAH

The Columbia Steel Corporation has awarded to the Link-Belt Co. a contract for the steel structure and machinery for its 4,000-ton tipple. As far as capacity is concerned this will be **the largest tipple in the Rocky Mountain region.** Its cost is probably only exceeded by the tipple of the United States Fuel Co.'s Blackhawk mine.

The **Badger Coal & Lumber Co.**, Ogden, has been reorganized. S. F. Norton becomes manager and treasurer of the company. O. P. Badger will be president. The organization is being enlarged with a view to doing a bigger business.

The Mutual Coal Co. has purchased the property of the Moreton Coal Co. in Carbon County. The consideration is said to have been $350,000. The Mutual will now become one of the largest producers in the state with an output of 1,000 tons per day. The acreage involved totals 380. It adjoined the Mutual's property. This company will now be in a position to mine a single vein of coal throughout its entire holdings, which run into 2,000 acres.

Four miners who risked or lost their lives in attempting to save their fellow workers **have been awarded gold hero medals** by the Joseph A. Holmes Safety Association, which annually selects distinctive acts of bravery in the mining industry. The presentation of the medals will form a portion of the program of the Seventh International First Aid and Mine-Rescue meet to be held in Salt Lake City, Utah, on Aug. 27, 28 and 29, under the auspices of the U. S. Bureau of Mines. **Warren A. Hoy, Frank Carter and Peter G. Rumpf**, all of whom were employed in the Lincoln Colliery, Rausch Creek, Pa., are awarded medals for rescue work when three men were overcome by dynamite fumes in a drainage tunnel. Carter, one of the men overcome by the fumes, was revived and without assistance re-entered the tunnel and rescued one of the men who was yet in the tunnel. Hoy lost his life and the medal awarded him will be presented to his widow, Lilliam M. Hoy, Tower City, Pa. The fourth medal is awarded to **William H. McKiernan**, who lost his life after rescuing a fellow miner from black damp in the bottom of a coal mine shaft on the property of J. M. Williams, Kimberly, Mo. The medal will be presented to his widow, Cora A. McKiernan.

VIRGINIA

The L. A. Snead Co., Washington, D. C., announce the opening of a Norfolk office at 515-17 Flatiron Building. S. T. Snead will be manager of the new office, but will continue to give a portion of his time to the accounting business.

The City of Norfolk rejected all bids received for supplying the city with 12,000 tons of coal during 1923. The Stewart Coal Co. bid low, at $3.65, the L. A. Snead Co., next with $4.10, and C. G. Blake & Co., third with $4.50. There were no other bids. The specifications called for New River or Pocahontas run-of-mine coal at the mines.

Clyde E. Smith has been named president of the High Carbon Coal Corporation, at Pulaski, and H. V. Smith has been elected secretary. The company was recently incorporated with a capital of $150,000.

WASHINGTON

The annual spring excursion of the College of Mines, University of Washington, was made this year from March 21 to 27 to the property of the **Britannia Mining & Smelting Co.**, on Howe Sound, British Columbia. The party of thirty, under the direction of Dean Milnor Roberts and Prof. Joseph Daniels, divided its time between the Britannia mine and the new concentrating plant of 5,000 tons capacity which recently went into operation. C. P. Browning, general manager, accompanied the party during its stay.

WEST VIRGINIA

Owing to an increase in the revenue from the gross sales tax law in this state during the first quarter of nearly $400,000 as compared with the corresponding quarter of 1922, it is estimated now by the State Tax Commissioner that **it will not be necessary to fix rates on coal** and other commodities **quite so high as was originally contemplated** when the Arnold bill was introduced at the initial session of the Legislature. Instead of a rate of 1 per cent on the value of all coal produced and sold, it would be necessary to impose a rate of only $\frac{3}{4}$ of 1 per cent as against the rate of $\frac{5}{8}$ of 1 per cent now provided by law, or $8 as against $4 per thousand dollars' sales proceeds. In other words the rate would be just doubled. It is probable that the Legislature of West Virginia will pass either the Arnold bill with the rates fixed as above or the Zimmerman bill which carries a rate of 1 per cent on the gross value of all coal mined and shipped. The gross sales tax law is now yielding a return of about $1,000,000 a quarter, or approximately $4,000,000 a year. If the rate is increased as proposed it would yield a total revenue of $5,400,000 a year, it is estimated.

The Dry Fork Smokeless Coal Land Corp., chartered under the laws of Virginia, has been granted authority to do business in West Virginia.

An important deal has just been consummated under the terms of which **C. H. Mead**, of Beckley, **has disposed of his holdings in the Ingram Branch Coal Co.** to Lynchburg interests. James Gorman, of Lynchburg, has been elected president of the purchasing company.

By May 1 the **Fenimore Collieries** at Freedie, in Boone County, expect to be in a position to operate, as development work is proceeding rapidly. A number of miners' dwellings are being erected and a town established at the seat of operations of this company.

One of the largest companies recently organized in northern West Virginia is the **Morgantown Gas Coal Co.**, which is capitalized at $3,000,000 and which will have its general office at Morgantown. James A. Paisley, extensively interested in West Virginia mining properties, is one of the larger stockholders in the new concern and associated with him are Gordon W. Wilcox, of Cleveland; Stephen Arkwright of Fairmont; Ross I. Davis and John McCarlney Kenney, of Pittsburgh; John Schweinsburg, of Parnassus, Pa.; P. W. Sherman, of Lakewood, Ohio; Thomas Skillcorn and John J. Snure, of Wheeling.

The Bear Run Coal Co. has been authorized to change the location of its principal office from Tioga to Richwood and to increase its capital stock from $5,000 to $25,000.

Officials of the United Mine Workers in northern West Virginia assert that **practically all the mines in Monongalia County** within the jurisdiction of subdistrict 4 of the Miners' Union **have signed the new scale** for the next coal year and they expect every mine owner in the Monongalia section eventually to sign the new scale. This scale will be effective from April 1, 1923, to March 31, 1924. James McCleary, district organizer, said late in March that there were only about eight independent operators in the Morgantown district who had not signed the scale and he did not expect any difficulty with the cases remaining to be settled.

WISCONSIN

Dissolution of the Wisconsin Coal Committee is presaged by a report issued by Paul E. Pressentin, secretary of the committee, detailing the accomplishments of that body. The report advises the people of the state to buy their supplies of hard coal for next winter's use as early as possible.

The Valley Coal Co., of Milwaukee, has been reorganized under the name of **Valley Coal & Dock Co.** B. M. Ainesworth is president; R. L. Clements, general manager; F. F. Kegel, treasurer; and J. F. Sweeney and F. H. Baker, directors. The company's dock is on the Menomonee River, just west of Muskego Ave.

Clifford F. Messinger, for the past three years general sales manager of the Chain Belt Co., Milwaukee, **has been elected second vice-president**, according to an announcement just made by the company.

WYOMING

Production in the southern Wyoming coal fields was the lowest in 1922 in the past 11 years, according to the annual report of Mine Inspector Robert T. Sneddon. **The total last year was 4,453,000 tons**, a decrease of 983,576 from the 1921 total of 5,436,576. There were 18 fatal accidents and 276 non-fatal accidents, giving a fatality rate of 2.7 per 1,000 men employed. The average number of miners working was 6,620, or 1,054 more than in the previous year.

WASHINGTON, D. C.

Plans for systematic research in the matter of **fireproofing mine timbers** were discussed at a recent conference in Washington attended by George S. Rice, chief mining engineer of the Bureau of Mines; W. J. Loring, former president of the American Mining Congress, and a representative of the Madison laboratory of the Forest Service. It is hoped that some material may be found which can be used as a coating for mine timbers which will at once preserve them from decay and make them slow burning if it is impossible to devise a substance which would render them entirely fireproof.

The Bureau of Supplies and Accounts, Navy Department, solicits **bids for the transportation of one cargo of approximately 5,000 tons of Navy coal** from Hampton Roads, Va., to Navy Yard, Boston, Mass., in vessel of American registry. The loading date at Hampton Roads will be about April 18, 1923. The guaranteed daily discharge rate at Boston is 500 tons. Bids will be opened at noon, April 11.

The Navy Department awarded the following contracts for coal for navy yards and naval stations March 26 on the basis of bids opened March 22: W. H. Bradford Co., Philadelphia, 14,000 tons for delivery at New York, at $5.92 per ton; Maryland Coal & Coke Co., Philadelphia, 5,000 tons, for delivery at Philadelphia Navy Yard, at $6.10 per ton; 2,500 tons for delivery at coaling piers, Philadelphia, $5.85 per ton; Imperial Coal & Coke Co., Baltimore, 10,000 tons, for delivery at Washington, D. C., at $6.17 per ton; W. A. Merrill Sons & Co., Garrett, Pa., 50 tons, for delivery at Bellevue Magazine, D. C., at $6.34 per ton; 150 tons for delivery at Alexandria, Va., $6.34 per ton; Quemahoning Coal Co., Baltimore, 4,000 tons for delivery at Annapolis, Md., at $6.49 per ton; Chesapeake & Virginian Coal Co., Norfolk, 3,600 tons for delivery at Portsmouth, Va., at $7.28 per ton.

At the request of Secretary Hoover, of the U. S. Department of Commerce, **F. M. Feiker**, assistant to the president of the McGraw-Hill Co., Inc., has again been granted leave of absence to **undertake the organization and general direction of the world surveys of raw material supplies**, rubber, sisal hemp, nitrates, for which Congress recently made an emergency appropriation of $500,000. Mr. Feiker served as assistant to the Secretary of Commerce during the first year of Mr. Hoover's administration, acting as general assistant in organizing the personnel and industrial trade contact committees in relation to the Bureau of Census, the Bureau of Standards, and the Bureau of Foreign and Domestic Commerce. Out of his nine months' work came the monthly statistical survey of the Bureau of Census, the Division of Simplified Practice of the Bureau of Standards, Commerce Reports in new form, and fifteen so-called commodity divisions of the Bureau of Foreign and Domestic Commerce.

CANADA

COAL OUTPUT OF BRITISH COLUMBIA, FEBRUARY, 1923

VANCOUVER ISLAND DISTRICT

Mine	Tons
Canadian Collieries (D) Ltd., Comox.	15,803
Canadian Collieries (D) Ltd., Extension	17,107
Canadian Collieries (D) Ltd., South Wellington	7,324
Western Fuel Corporation of Canada, Nanaimo:	
No. 1 Mine	28,177
Reserve Mine	22,353
Wakesiah Mine	8,265
Granby M. S. & P. Co., Cassidy	19,111
Nanoose Wellington Collieries, Lantzville	9,527
Old Wellington, Nanaimo	722
Total	128,389

NICOLA-PRINCETON DISTRICT

Middlesboro Collieries, Middlesboro.	6,915
Fleming Coal Co., Merritt	1,109
Coalmont Collieries, Coalmont	16,599
Princeton Coal & Land Co., Princeton	1,826
Total	26,449

CROW'S NEST PASS DISTRICT

Crow's Nest Pass Coal Co., Coal Creek	48,038
Crow's Nest Pass Coal Co., Michel	33,971
Corbin Coal & Coke Co., Corbin	7,205
Total	89,214
Grand total, February	244,052

Anthracite imported by Canada from the United States during 1922 totaled 2,514,249 net tons, compared with 4,567,370 net tons in 1921 and 4,912,964 net tons in 1920. Imports of bituminous coal from the United States during the year amounted to 10,924,645 tons, as against 13,536,250 tons in 1921 and 15,902,632 tons in 1920. For the first time in many years coal was imported from Great Britain, about 817,000 tons having arrived during the last six months of the year.

The coal miners in **District 18**, United Mine Workers of America, numbering upward of 9,000, have **voted to accept the agreement fixing the wages for 1923** signed by their representatives and the Western Canada Coal Operators' Association.

The new shaft of the Dominion Coal Co. at O'Neil's Point, to be known as Dominion No. 26 Colliery, when completed will be, next to Dominion No. 2 Colliery, the biggest coal producer of all the mines of the Dominion Coal Co. At the end of February the shaft had been sunk to a depth of 441 ft. The total depth of the shaft when completed will be 670 ft., and with the fast rate of progress that is now being made **it should be ready to hoist coal by the middle of May.** The work of the sinking of the shaft is under the direction of W. H. Graham, construction superintendent of the Corporation, with W. H. Metcalf in charge of actual operations.

S. H. Butt, president and general manager of the Little River Coal Mining Co., of St. George's, Newfoundland, has announced that **boring will be commenced on his company's areas during this month.** It was also said that the new 4½-in. core drill recently purchased by the L. R. C. M. Co. had been shipped and will have a depth capacity of 2,000 ft. The company controls an area of coal lands of eleven square miles.

The East Wellington Coal Mines Ltd. has been incorporated **to develop coal lands situated west of Nanaimo** and adjacent to the abandoned workings of the "Jingle Pot" mine. H. W. Maynard is the president and J. J. Grant, the general manager. Good progress already has been made in the driving of the slope. The railway and wharves, together with much of the other plant of the old "Jingle Pot" are to be used. It is expected that production will be started within a month and that an output of 1,000 tons a day will have been reached in six months. It is the Wellington seam that will be exploited. Where it has been struck at a depth of 1,100 feet it is 5 ft. 6 in. thick. The property, it is estimated, will produce 6,000,000 tons.

The Webster Manufacturing Co., of Chicago, Ill., and Tiffin, Ohio, announces the organization of a new corporation, the **Webster-Inglis, Ltd.**, Toronto, Ont., which will design and manufacture elevating, conveying and power transmission machinery along the same lines as now manufactured by the Webster company.

Uehling Instrument Co., Paterson, N. J., manufacturer of C.O.2 recording instruments, has appointed the Combustion Engineering Corporation, Ltd., with head office in Toronto, and branches in Montreal, Winnipeg and Vancouver, as its Canadian sales agent.

Obituary

Alfred M. Shook, age 77, died at his home in Nashville, Tenn., March 18. Colonel Shook was one of the early developers of coal and ore properties in the Birmingham district and also was a pioneer in iron and steel manufacture. He was prominently identified with the early operations of the Tennessee Coal, Iron & Railroad Co. in Alabama and Tennessee and was vice-president and general manager of the corporation for a number of years. At the time of his death he had retired from many of his activities but was president of the Brush Creek Coal Co., a Tennessee colliery, and was identified with banking institutions in Nashville, a trustee of the Mutual Life Insurance Co. of New York, and was active in civic and religious work in his home state.

Frederic A. Potts died at his home in Lakewood, N. J., Saturday, March 24, in his 63rd year. He was the head of F. A. Potts & Co., wholesale anthracite coal dealers, 143 Liberty Street, New York. He was a member of the Lakewood Country, Union, Turf and Field, St. Anthony and Rumson clubs and the St. Nicholas Society. He had resided in Lakewood for twenty-five years. He leaves his wife and one son, David F. Potts.

Traffic News

The Interstate Commerce Commission, after a further hearing, rendered a decision March 5 in docket No. 10197, **The Avella Coal Co. et al. vs. the Pittsburgh & West Virginia Ry. Co.** and the Director General of Railroads, as agent. Finding that undue prejudice existed in the distribution of coal cars the **commission ordered that the defendant pay unto the complainants** named hereinafter on or before June 1, 1923, the amounts set opposite their respective names, with interest thereon in each case at the rate of 6 per cent per annum from March 22, 1918, as reparation: Avella Coal Co., $10,745.56; Duquesne Coal & Coke Co., $26,584.58; David L. Newill, receiver of Pittsburgh & Southwestern Coal Co., $3,451.33; Waverly Coal & Coke Co., $7,581.88; Meadow Lands Coal Co., $17,559.99. It was further ordered that **James C. Davis, Director General of Railroads,** as agent, be **directed to pay unto the complainants** named hereinafter on or before June 1, 1923, the amounts set opposite their respective names, with interest thereon in each case at the rate of 6 per cent per annum from March 22, 1918, as reparation on account of unduly prejudicial practices in the distribution to complainants' mines of coal cars for use in interstate commerce: Avella Coal Co., $1,036.08; Duquesne Coal & Coke Co., $28,558.53; David L. Newill, receiver of Pittsburgh & Southwestern Coal Co., $7,347.45; Waverly Coal & Coke Co., $735.37; Meadow Lands Coal Co., $1,671.47. The complaints of the Pryor Coal Co. and the Ferguson Coal & Coke Co. were dismissed for lack of proof of damage.

The Louisville & Nashville R.R. on March 19 **placed contracts with several car-building concerns for 8,000 cars,** of which 6,000 are steel coal cars, the contracts also including thirty-six engines. The orders amounted to over $18,000,000. The Pittsburg Pressed Steel Car Co. got the order for 6,000 coal cars.

C. A. Pennington, superintendent of terminals of the Cleveland, Cincinnati, Chicago & St. Louis R.R. (Big Four) and also for the Chesapeake & Ohio R.R., on March 21 stated that plans have been made for **spending $7,000,000 in rebuilding and double tracking the C. C. C. & St. L. bridge across the Ohio River at Louisville,** which will materially reduce terminal congestion there. This bridge has not been used for some time in handling the heavier coal trains or big locomotives, resulting in breaking up of trains at Louisville and remaking at Jeffersonville, Ind., which has retarded big coal movement through Louisville materially.

Coal users operating on the Norfolk waterfront will have to provide their own barges for hauling coal supplies after April 15. **The Norfolk & Western and Virginian railways have published tariffs** effective that date **discontinuing the barging practice** in the inner harbor. A protest has been made to the Interstate Commerce Commission by the Chamber of Commerce and representatives of both coal dealers and consumers, seeking to have the proposed regulation revoked.

Colonel H. C. Nutt, president and general manager of the Monongahela Ry., **denies a report** coming from some purchasing agents for railroad companies or purported to have been made by them to the effect **that the Monongahela Ry. would not honor assigned-car orders.** Colonel Nutt said: "This company has been accepting cars of railroad ownership for loading fuel coal for the owning company ever since the car shortage developed last fall and expects to continue the practice unless and until it is prohibited by the Interstate Commerce Commission or other competent authority." Wholesalers in Morgantown, W. Va., report having had considerable difficulty with old customers who refused to enter into new contracts and several assigned as the reason that co-operation could not be obtained from the Monongahela Ry.

On account of accumulation **an embargo was placed March 30 by the New York Central R.R.** against the acceptance of all shipments of bituminous coal from New Jersey Central R.R. stations and from all connections at all junctions for points on or via the Boston & Maine R.R., except B. & M. R.R. fuel.

Coming Meetings

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey. The registration fee of $15 will include all meals except breakfast, transportation to and from the mines which will be visited, and the banquets. The only other expenses to be incurred will be hotel room and transportation to and from Scranton. Executive secretary, J. E. O'Toole, Philadelphia, Pa.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The Virginia Coal Operators' Association will hold its annual meeting on April 21 at Norton, Va. Secretary, G. D. Kilgore, Norton, Va.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24. Secretary-treasurer, J. G. Crawford, Chicago, Ill.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Indiana Retail Coal Merchants' Association will hold its annual meeting April 25 and 26 at the Severin Hotel, Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

The Canadian Retail Coal Association will hold its nineteenth annual convention at the King Edward Hotel, Toronto, Ontario, Canada, on April 12 and 13. Secretary, B. A. Caspell, Brantford, Canada.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Fair and Timely Warning

RAILROAD activity exceeding anything so far recorded is forecast by the American Railway Association in an announcement issued last week. Taking time by the forelock the railroad executives have outlined and agreed upon a program that calls for a reduction in bad-order cars and locomotives to normal by Oct. 1, for a minimum of road construction and maintenance after Sept. 1 and that stocks of railroad fuel coal for next winter be put in the ground by Sept. 1. Above all in interest to the coal industry, however, is the implication that a car shortage is on the way and that it will be of huge proportions next autumn unless many things are done.

The warning is timely and fair. The roads are expending something over $1,500,000,000 for equipment and betterments in two years and they may fairly ask the shipping public to co-operate with them in meeting the transportation needs of the country. Between Jan. 1, 1922, and March 1, 1923, the roads of the country have purchased and there have been delivered to them 117,280 new freight cars and 2,106 new locomotives. More than 100,000 more cars and 1,000 locomotives are on order and will be delivered by Oct. 1, 1923. The railroad executives believe that they are doing their utmost to prepare themselves for the deluge of traffic that they see coming. They ask the country to help.

It is quite true, as pointed out by the *Railway Age*, that "there is very good reason for believing that as the activity of business increases the shortage of transportation will be felt more actively than ever before, because it is far greater than any but a few people realize." The shortage has been with us since the coal strike was terminated last August, and because it affects all kinds of freight it is a factor to be considered in forecasting the program this year of general business expansion. There may be, as has been pointed out, a definite relation between available transportation and credit expansion, for if producers of manufactured goods cannot make deliveries they must increase their loans to carry stocks, or curtail production.

Literal fulfillment of the agreement among the railroads to complete their normal proper stocking program of fuel coal by Sept. 1 will have its effect on the soft-coal trade this summer. A fuel coal consumption of 400,000 tons per day, or 150,000,000 tons per year, is indicated by the present and expected railroad activity. Thirty days' supply—a fair normal average for winter—by Sept. 1 means at least the doubling of present stocks, or the addition of 6,000,000 tons this summer. If the roads should get their stocking program well under way within the next thirty days, they would have fifteen weeks remaining for its completion, or an average of 400,000 tons per week of storage coal to originate, move and put down. Such an increment to the usual summer requirements of the country will help hold up the rate of production.

This tonnage will be on contract and negotiation of fuel-coal contracts is well under way. Some of the largest buyers, as the New Haven and the New York Central, have been closing contracts during the past week. An early decision of the Interstate Commerce Commission on the assigned-car case will facilitate the buying program, particularly if it be in the direction of restricting this method of getting fuel coal.

The railroads urge the public to buy and store coal this summer. The Federal Fuel Distributor gives the same advice, likewise the U. S. Coal Commission. The navy purposes, as an example, to put some 200,000 tons into stock at once. If buyers, particularly the railroads and large industrials, take advantage of their opportunities this summer and get a large part of next winter's coal off the rails, they will most certainly have more transportation for their products and less car shortage than if they do otherwise. The incentive is not so great nor the reason so clear as that which preceded the accumulation of huge reserves prior to April 1, 1922, but it is before us nevertheless.

Virtuous Indignation at Brophy

JOHN BROPHY, president of district No. 2 of the United Mine Workers, is not popular at headquarters. That is quite apparent from the last issue of the *United Mine Workers' Journal*. His friends on the outside, who have supported his drive against the non-union fields in Somerset County, his nationalization program and his general liberal policies are cartooned as riding for a fall. The *Journal* vigorously assails the tactical error of his legal representative in declaring before the Interstate Commerce Commission that the mine workers would accept a 20-per cent reduction in wages if the assigned car were abolished. At the same time Brophy's lone efforts to continue the strike in Somerset County get no support from the official organ of the union.

It happens that Brophy is acknowledged by many as the strongest opponent of John L. Lewis, which explains much, inasmuch as Lewis may be supposed to control the policy of the *Journal*. Brophy is a real "liberal," and to the following he has attained on that account are to be added those who go along because they are opposed to Lewis, among whom are such as Farrington and Howat.

Intermingled with the shafts aimed at Brophy, the *Journal*, editorially and in its news columns, stresses the law-abiding character of the miners' union. To break the law or any man's head is farthest from its purpose, it seems. Ellis Searles' letter to John Brydon, of the operators' association, makes it clear that were there to be any measure of violence in Somerset County, which is in Brophy's jurisdiction, it would be no fault of the International union—far from that headquarters to countenance trouble! One can almost see the finger pointing at Brophy, who is at least suspected of having

"reds" about him. Indianapolis with much show of virtue declares that it will have no reds in its ranks.

But why pick on Brophy in this fervor of spring housecleaning? Lewis' drive on the reds in his organization and the double repudiation of the acts of Brophy are converging. One may be pardoned for suspecting that Brophy is to be made the goat. And yet what has he done? Was the Herrin massacre in district No. 2? Was the Cliftonville episode in Somerset County? Did Brophy engineer the Willis Branch attacks or command the armed march on Logan County?

So far as we know, the only laws that Brophy and his liberal-minded friends would violate are economic laws. The gentle folk who hold his radical views—or should we say, whose radical views he holds?—are more given to the use of the pen than the gun. They seek not to destroy the law but to make it all in their favor. The spotlighting of Brophy cannot make us forget the bloody happenings that occurred outside of central Pennsylvania and Somerset County.

Business Cycles and the Coal Industry

NO ONE is more affected by and has less actual control over the business cycle, the ebb and flow of prosperity than the coal man, particularly the producer of soft coal. None therefore will be more interested in knowing that there is some ground for hope that that elusive thing inflation of which is concurrent with the bubble of unwarranted prosperity, is in some measure controllable and that a sober unheated study has been made with recommendations for its control.

Whether the methods recommended by the eminent committee that made the study for the President's Committee on Unemployment, the summary of which has recently been published by the Department of Commerce, will, if followed, serve to flatten out the peaks and fill the valleys of industrial activity, is a matter on which opinions may differ.

Among the proposed remedies—which include control of credit expansion, of inflation, of public construction, unemployment reserve funds and public employment bureaus—that with respect to control of private construction bears especially on the soft-coal industry. It is true, as stated, that "few subjects in recent years have attracted more attention from business men than the stabilization of business operations." It is axiomatic that the operation of coal mines at uniform rates throughout the year and from year to year is more satisfactory and in the end more profitable than going by fits and starts. But the coal man has little or no control over the factors that influence the demand for his product. Car shortage puts the brake on his operations at times of peak demand but lack of market serves as no buffer to prevent him from hitting the bottom. Where the coal companies as individuals may become factors in controlling the business cycle is in respect to extension of plant—that is, of mine capacity.

Beyond question the capacity of the bituminous-coal mines today is well in advance of the capacity of the railroads to move the coal to market or the country to consume the coal. Yet there is witnessed today a steady increase in plant capacity; new mines are being projected, built and started into production apparently with no regard for actual market requirements and presumably with no sounder justification than that other mines have been operated at a profit.

What happens to an overdeveloped industry in the way of idle capital and unemployment of workers is nowhere better illustrated than in soft coal.

Aside from the small influence exerted on the general situation by the equipping of coal mines at times of high prices and on the peak of the cycle, it must be conceded that the soft-coal industry is more the victim of business cycles than it is or can be the cause.

At Last We Know

MYSTERIOUS no longer is the origin of coal. Prof. Barton Scammell, president of the Radium Institute, at its meeting at Dover, England, asserted that he had discovered where it comes from and how it comes to be as it is. He has been making researches into the composition of the lava from Mt. Vesuvius, which is being used as a fertilizer, and he asserts that this led him to the discovery that the layers of "bind"—the "mysterious substance found on the top and bottom of all coal seams," according to the Associated Press—are identical in analysis with lava.

In both he finds the lime, iron, magnesium, potash and other elements required by plant life. On this slim ground, Professor Scammell says, we are told, that coal is a cellulose of trees and vegetable matter carbonized by hot lava, and sunk at a remote period into the depths of the earth by disturbances of the crust of the latter. So at last are all our mysteries solved.

The only difficulty is to know where first to prick a hole in Professor Scammell's bubble. Does he seriously believe that vegetable matter could be laid on hot lava without being burned? Can he tell how the vegetable matter grew in the hot lava or how it was spread in a more or less even bed over its surface? Can he explain how the sheet of lava could be laid over the vegetable matter without burning it, seeing that coals have been metamorphosed by sills of lava that did not come within many feet of the seam and have been coked in volcanic intrusions and were saved from burning apparently only by the absence of the air necessary to sustain combustion? Does Professor Scammell not know that coal is found in regions where volcanic action is absent in the coal measures themselves and in those above them?

That bind contains lime, iron, magnesium, potash and other elements required by plant life is doubtless true, but this may be asserted of more than bind and lava. It is true also of coal. Moreover, sometimes we find coal with a sandstone roof and no bind, and it does not seem to be one whit less coal despite the absence of the bed of lava or bind which Professor Scammell says is essential to the formation of that mineral. Large beds of indurated argillaceous shale or clay—thus is "bind" defined—are found in every coal field, but despite the fact that it has constituents similar to those of lava it proves singularly sterile.

Apparently, from the newspaper story, Professor Scammell thinks that what the bind needs is to be made radioactive with radio-phosphate of potash, whatever that may or might be. Maybe that is so. That chemical might be expected, if it existed, to negative the acidity of the shale. Radioactive material and phosphates of potash are expensive, but the latter doubtless would help greatly to give fertility to any kind of soil. However, while we plead guilty to a lack of agronomy, we confess that whatever faith we might have had in Professor Scammell as a guide has been quite rudely shattered by his speculations on the origin of coal.

Methods of Working Highly Inclined Coal Seams by Room-and-Pillar and by Longwall

Modifications Where Two Seams Are Mined, Where Interval Between Them Is Small and Where It Is Large—Lower Seam Kept 25 Ft. Ahead of Upper Seam—Level Roads Driven from Seam to Seam

By James S. Chalmers
Montevallo, Ala.

In SEAMS that dip heavily—from 45 to 90 deg. from the horizontal—longwall or some modification of it generally is found the preferable system of extraction, whether the seams are moderately thick or very thin. Especially is this true when the depth of the seam is as much as, or exceeds, 700 ft. The pressure at that depth is great, particularly where the seams have steep inclinations. Until they reach that depth, however, they may be worked by room and pillar.

Workings thus dipping may be approached either by shaft or slope. They should be worked in lifts measuring 500 ft. down the pitch and 2,000 ft. on the level. In each panel, near its center, carriage-, balance- and manways are driven to the rise. By means of the carriage- and balance-way the coal is lowered from any intermediate roadway to that at the bottom level of its own panel along which it is conveyed to the shaft or the slope.

General Method of Opening Up Coal Seam

Fig. 1 shows a general outline of a method of procedure detailing the manner in which these roadways should be laid out in relation to the hoisting slope. Roadways *AA* and airways *A'A'* are driven level for a distance of 1,000 or more feet. The size of the pillars *B* and *B'* depends upon the depth from surface, the inclination of the seam, the condition of the roof and floor and the nature of the coal. The carriage-, balance- and manways are laid off and driven to the rise a distance of 500 ft., room roadways being started on 56-ft. centers.

Fig. 2 shows how the workings are driven. Pillars

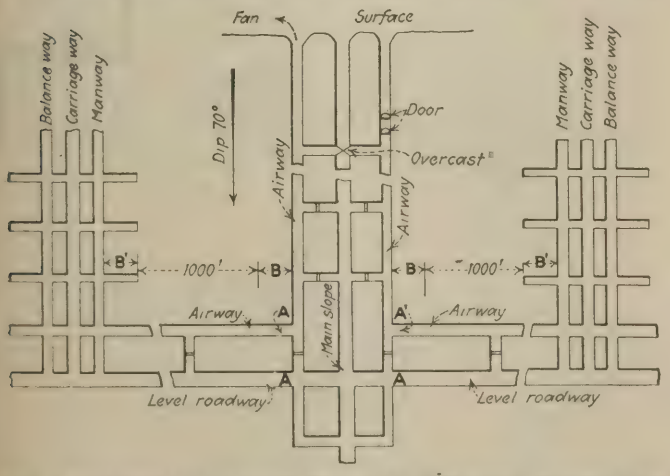


FIG. 1—GENERAL LAYOUT FOR ALL SYSTEMS DESCRIBED
The main slope with two airways goes down the full pitch of the measures. Levels are driven right and left, and from these, three roadways are driven straight up the pitch. One is a roadway in which a carriage, or cage, runs carrying a single car. A second is one in which a balance car is provided to retard by its upward movement the downward movement of the cage and to cause by its downward motion an upward motion of the cage. The third road acts as a manway.

are blocked out 40 ft. square by roadways driven 16 ft. wide so as to allow 6 ft. on the low side for the stowing of bottom rock (see Fig. 3). The pillars are cut through to the rise by crosscuts spaced on 52-ft. centers. These crosscuts are started away 7 ft. wide and are necked to 12 ft. after they have been driven 9 ft. They maintain an even width of 12 ft. until they are within 9 ft. of the roadway above, when they again are narrowed down to 7 ft. (see Fig. 4). Fig. 5 shows the

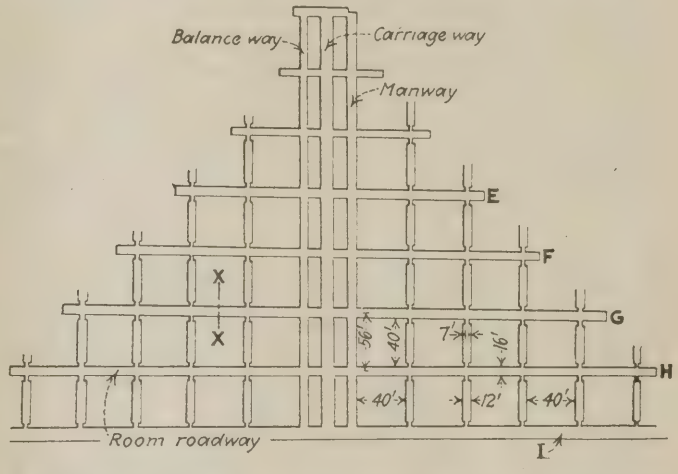


FIG. 2—PANEL LAID OUT FOR ROOM-AND-PILLAR MINING
Rooms and crosscuts are driven so as to cut the panel into pillars 40 ft. square, the rooms being 16 ft. wide and crosscuts 12 ft. wide. The dimensions are to be taken in the plane of the seam, which is 70 deg. from the horizontal.

method of laying track in a room past the point where a crosscut has been driven into it from the room below it.

The blocking out of these pillars continues till the specified length and width for the panel has been reached. It will be noticed that in laying out Fig. 2 the lower room roadways will attain their ultimate length much sooner than at the top of the panel. As soon as the first two roadways, *I* and *H*, reach the end of the panel, the pillars are brought back. Crosscuts *C* and *C'* are driven to the rise through the ribs, which are then drawn, the upper pillar, *D*, being kept 15 ft. in the lead of the lower pillar *D'* (see Fig. 6).

It should be added that a 9-ft. pillar is left above *D* to protect the room roadway *G*, (see Fig. 6). Diligent attention must be given to the timbering in the extraction of these pillars. Props should be set not more than 3 ft. apart and precautions should be taken to see that none at any time is left standing in the gob. When roadways *G* and *F* (see Fig. 2) reach the end of the panel they are brought back in the same way as *I* and *H*. The 9 ft. of coal below the lower roadway, *G*, is taken out, and 9 ft. of coal is left on the lower side of room *E*. This method is continued until all the pillars are extracted.

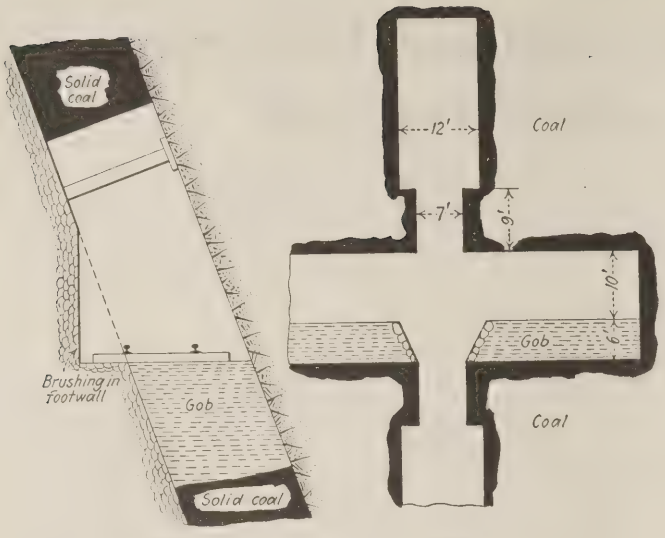


FIG. 3 FIG. 4

FIGS. 3 AND 4—METHOD OF DRIVING ROOMS AND CROSSCUTS

Fig. 3 is a sectional side elevation along the line *XX* in Fig. 2. It shows how a foothold is excavated in the footwall and how the material thus loosened is stowed in the lower part of the room. Fig. 4 is a plan on the plane of the seam.

Fig. 7 shows the method of extracting a seam by longwall. The general layout from the hoisting slope is just the same as for the room-and-pillar work. The roadways branch off every 56 ft. as before and are driven through the solid coal for a distance depending upon the dip of seam and the local conditions, thus leaving a pillar of coal to protect the entry. As soon as roadway *A* has been driven through the coal pillar the neck is widened to the rise so as to connect *A* and *A'*. When these places are connected all the coal *A* and *A'* is taken out, making the first wall of the longwall face. These connections eventually are made between the necks for the full depth of the panel.

The walls must be kept in position as in Fig. 7, wall *B* leading wall *B'* by 15 ft., wall *B'* leading wall *C* by an equal distance and so to the full height of the panel.

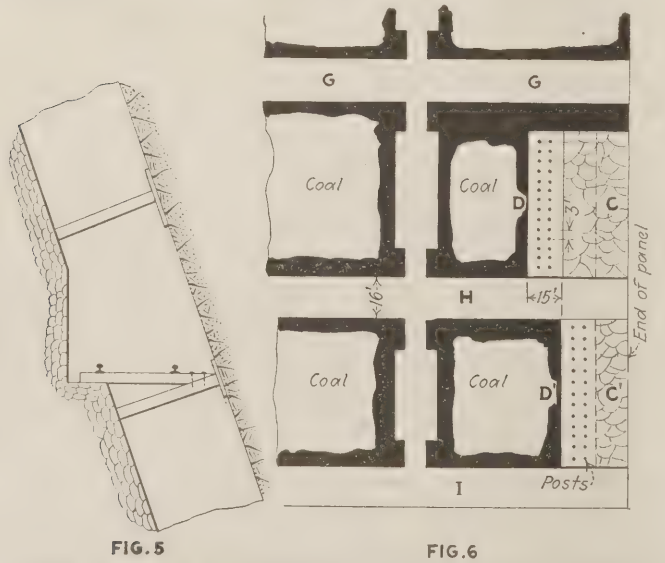


FIG. 5 FIG. 6

FIGS. 5 AND 6—SUPPORTING TRACK OVER CROSSCUT AND DRAWING PILLARS

Where the crosscuts intersect the room roadways, what closely resembles a shaft is formed in the floor of the room and the track has to rest on heavy posts each tightened by a cap. One end of the tie rests on the recess in the footwall and the other end of the tie is beveled and securely spiked to the prop, which, being only 20 deg. from the horizontal, is more like a crossbar than a post. Fig. 5 is an elevation, whereas Fig. 6 is on the plane of the seam. A 9-ft. pillar protects the upper room of the three shown.

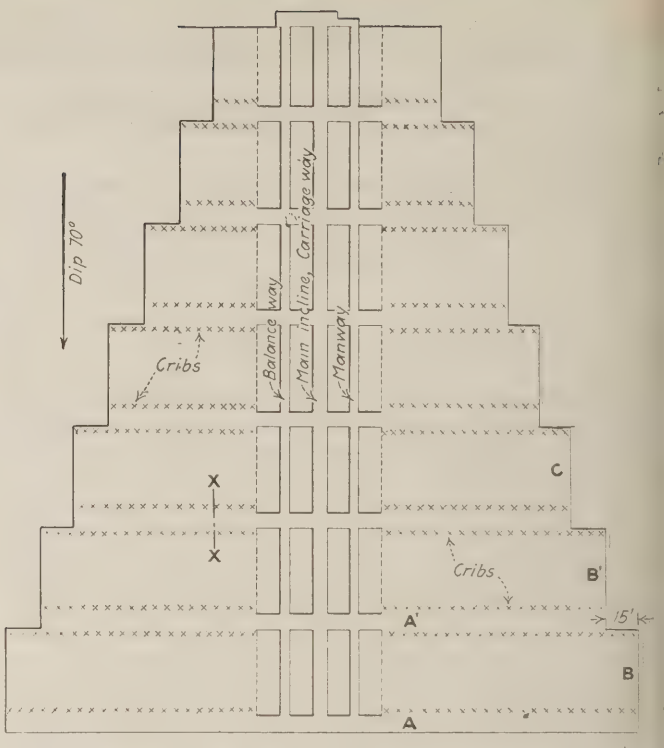


FIG. 7—MINING COAL WITH PITCHING LONGWALL FACE

With precisely the same initial development longwall faces are started which run directly up the pitch, a pillar being left on either side of the inclined roadways. This illustration is on the plane of the seam.

Cribs of soft wood are built on both high and low sides of the roadways, as shown in Figs. 8 and 9. The footwall is brushed, as in Fig. 8, so as to afford material for leveling the track, any surplus rock being thrown into the open space in the "wall" below. The longwall workings must be timbered in a systematic manner, and the timber must be extracted from the gob in a manner equally systematic.

Fig. 10 shows a cross-section with two seams of coal having 5 ft. 6 in. of rock and fireclay between them. It also is represented as lying at an inclination of 70 deg. The triple roadways are driven in the upper seam for the full depth of the panel, and roadways are branched

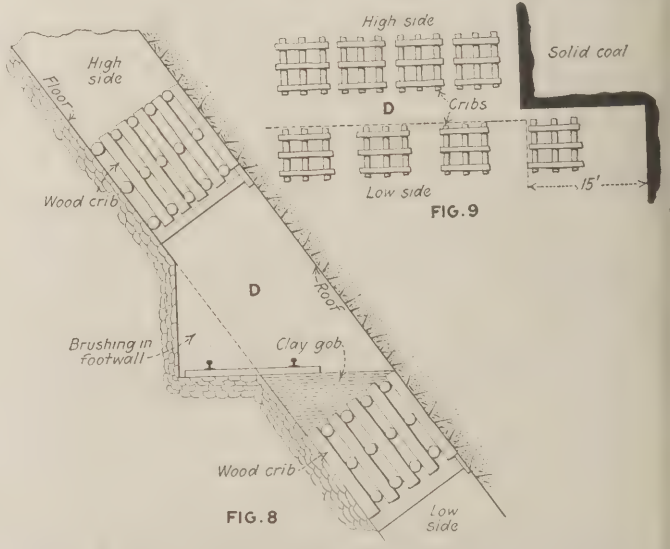
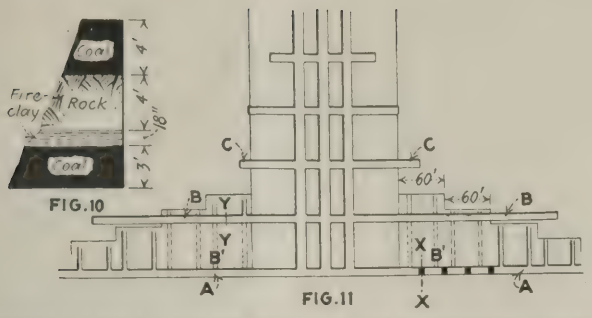


FIG. 9 FIG. 8

FIGS. 8 AND 9—LONGWALL GATEWAY IN ELEVATION AND IN PLAN ON PLANE OF SEAM

Fig. 8 shows how the material shot out of the footwall is used as ballast to support the road, which has to pass not so much alongside the wood cribs as resting on the sides of them. Fig. 8 shows elevation *XX* in Fig. 7. Fig. 9, which is a plan on the plane of the seam, shows how the cribs are placed and the face is offsetted.



FIGS. 10 AND 11—SEAM SECTION AND WORKING PLAN

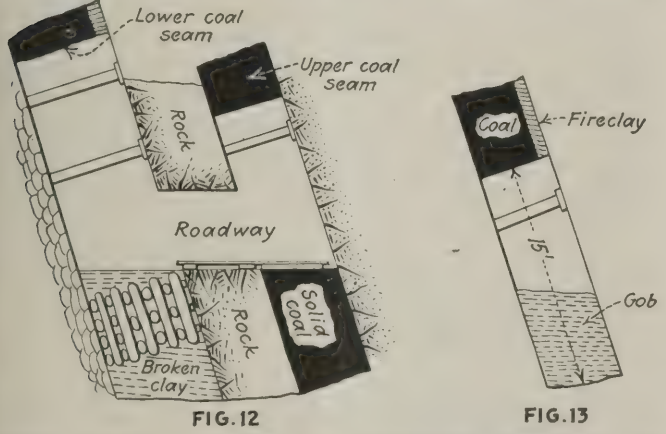
Here the longwall face is level and not pitching. The roads pitch and not the working face. Cross-sections *XX* and *YY* in this illustration are shown in Figs. 12 and 13 respectively. The coal and fireclay together being 4 ft. 6 in. thick, enough to admit a car, no excavation in the footwall is necessary.

off as before at 56-ft. centers. Also, as before, a pillar of coal is left to protect the triple roadways. The level roadway *A* is driven first, but all the others are left standing until they are needed (see Fig. 11).

From roadway *A* in the upper seam, level roadways are driven every 56 ft. through the rock and fireclay to the lower seam. A 15-ft. slab, 60 ft. wide, is taken to the rise in the lower measure (see Fig. 12), the 18 in. of fireclay being thrown back as shown in Fig. 13. This slabbing forms the first wall. The level roadway in the lower seam being extended from level roadways from the upper seam the requisite number of walls required to reach the end of the panel are developed in turn, each wall being stepped back a few feet from the one nearest it.

These walls, as stated, are 60 ft. long and are worked to the full rise, each wall having two chutes down which the miner slides his coal, which is shoveled into cars at the end of the chute. Each chute is lined with wooden boards and cribs built as shown in Fig. 14.

As the longwall faces progress from roadway *A* toward *B*, the roadway in the upper seam is extended, and roadways are driven through to the lower seam every 56 ft. By this means the chutes have to be maintained only for the distance between the two adjacent roadways *A* and *B*. As the walls advance to roadway *C* that roadway is driven, and the same method is followed as in the roadways below. Fig. 11 shows the general outline and position of walls going to the rise in the lower seam, also the roadways in the upper seam. These latter roadways are excavated 15 ft. wide, and cross-



FIGS. 12 AND 13—LEVEL ROADS DRIVEN BETWEEN AND ALONG THE COAL SEAMS

As the seams are nearly vertical it is quite easy to drive a level roadway from the upper to the lower seam through the intervening rock. The roadways along the seam, as shown in Fig. 13, are made 15 ft. wide. The space in the lower side of the room in the lower coal seam is used for the gobbing of the fireclay removed from the roof of that measure. Fig. 12 is a cross-section taken at *XX* in Fig. 11, and Fig. 13 is a cross-section taken at *YY* in the same illustration.

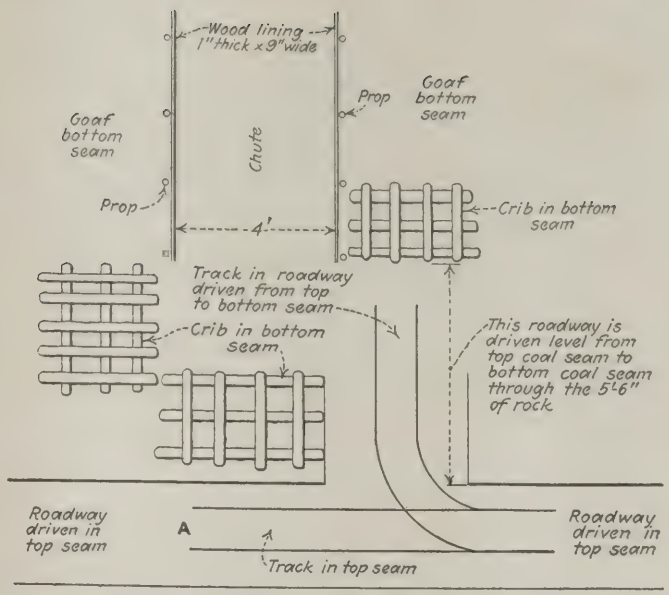


FIG. 14—CHUTE IN LOWER SEAM, ROAD IN UPPER SEAM AND BETWEEN SEAMS

Unfortunately it is not practicable to raise the chute and build a battery in the lower seam, for the quantity of coal to be dropped down the chute before its abandonment is not large. The coal, therefore, falls to a shoveling floor and not directly into the mine wagon and is loaded by a miner into a car standing on the extension of the cross road between seams.

cuts are driven to connect the roadways whenever these are needed for the supplying of air. When these roadways reach the end of the panel, as roadways *A* and *B* will first, this seam is worked back as illustrated in Fig. 6.

Fig. 15 shows two seams separated by 52 ft. 3 in. of rock and lying also at an inclination of 70 deg. Triple entries, similar to those already described, are driven in this case in the lower seam and roadways set off from them at 56-ft. centers, leaving as before the required width of pillar to protect the entries. They then are opened out by longwall, as has been described above. The lower seam only is provided with triple slopes, the upper seam being prepared for opening by passageways through the rock from the lower seam. Even though the upper seam has no triple slopes to be protected, its level roadways are also driven narrow until they reach the end of the pillar left to protect the triple entry as in Fig. 16. Level roadways are driven from the lower to the upper seam, as in Fig. 17, at every alternate roadway—that is, at *A*, *B*, *C* and similar locations (see Fig. 16)—and as soon as the top seam is reached roadways are set away to the right and left.

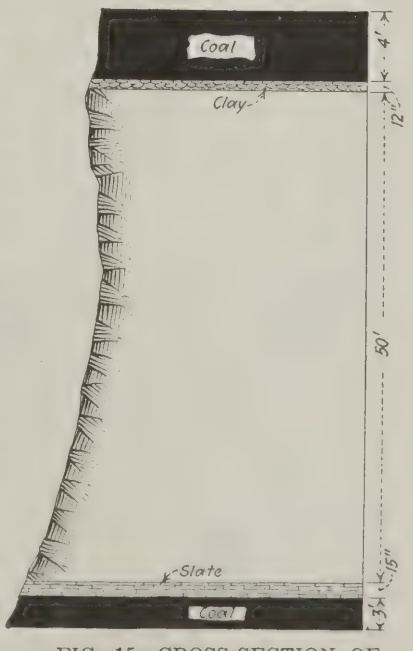


FIG. 15—CROSS-SECTION OF ANOTHER SEAM

Though these two seams are far enough apart that they usually would be mined separately, except that they would be brought to a common main slope or shaft, they are here described as being operated in close conjunction.

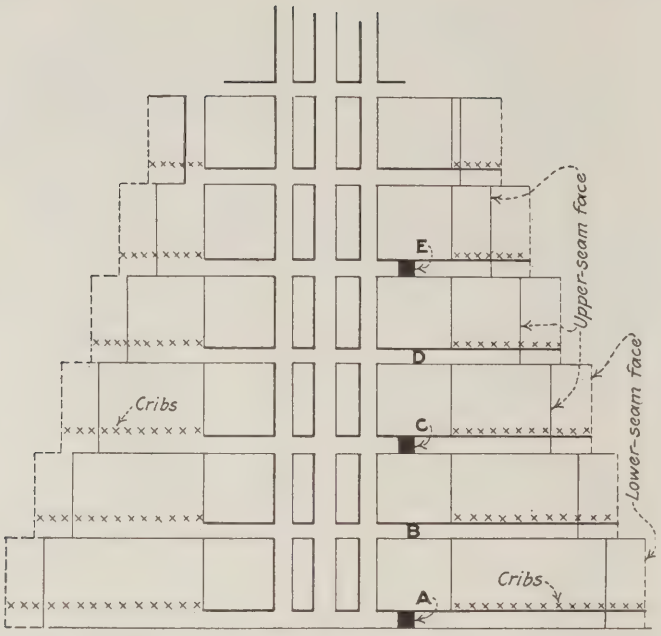


FIG. 16—LONGWALL WORKINGS IN BOTH SEAMS

The workings are kept under one another, as seen in a front elevation, which in this case is only slightly different from a plan in the plane of the coal seam. The excavations in the bottom seam are kept 25 ft. ahead of those in the upper seam.

When the roadway to the left has been driven a distance of 40 ft. an inclined road is started in the coal so as to rise one foot in four (see Fig. 18). This is continued until the slant roadway is 40 ft. from the high side of roadway *A*. Here roadway *B* is started and driven to the point at which the longwall is opened out. The same method of opening out is applied in both seams.

The line of face is stepped both in upper and lower seams, as is shown in Fig. 16. The distance between the faces of the lower and upper seams must not exceed 25 ft., the lower seam being kept in advance. In the bottom bed the 15 in. of slate in the roof is taken down and is put in the gob. In the upper seam the 12 in. of fireclay in the floor is lifted, and it also is gobbed. Lines of cribs are built on both the high and the low sides of both upper and lower seams. The floor may be lifted if necessary; this depends entirely on the size of the car being used.

Fig. 19 shows an arrangement for lowering cars from the upper of alternate roadways in the upper seam to the roadway in the same seam just below it. A roadway to the full rise of the bed is driven from *A* to *B* (see Fig. 16) to a point 20 ft. from *B'*. It is in this roadway that the balance car works. This balance is so arranged that it runs only half as far as the car. The full car on descending hauls up the balance and the balance on descending hauls up the empty car. To prevent the balance car from running back when the full car is disconnected from the rope at the foot of the slope, the rope is held fast as shown in Fig. 20. A short piece of chain is attached to the end of the rope. To this an auxiliary piece of chain is attached, the end of which can be hooked over a bolt when the car reaches the foot of the inclination. This holds the balance car in position until the empty car is attached.

Figs. 21 and 22 show a side view and plan of the arrangement at the mouth of each level road near the carriageway. Rails *AA* are built up level with the deck of the carriage (see Fig. 23). The roadway is continued at the same level as at this point and driven accordingly. Fig. 22 shows the safety and signal arrangement combined in *BB*. Fig. 23 shows a side view of the carriage, which is built specially to suit both the inclination of the seam and the size of the car. Fig. 24 shows a side view of the balance car. This is built of long and narrow cast-iron plates bolted together as shown. Fig. 25 shows the general outline of drums *D* and *D'*, carriage- and balance-ways *W* and *W'*, also the sump *S* at the bottom of the carriageway and the layout of the tracks.

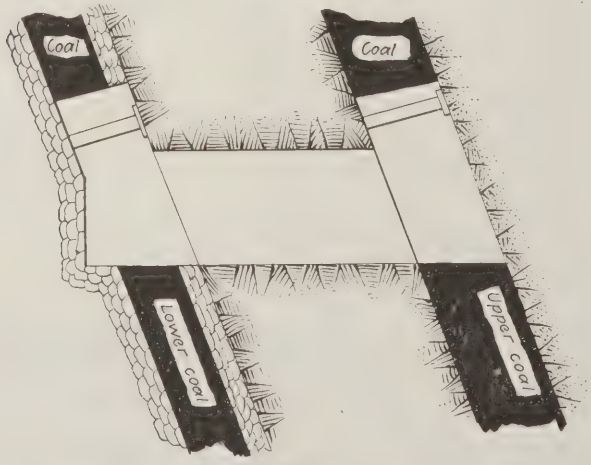


FIG. 17—SHOWING CONNECTION BETWEEN TWO SEAMS

The roadway is not driven as high as those within the seams, where the material to be excavated is coal.

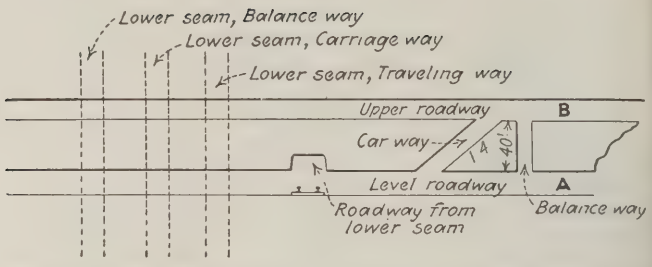


FIG. 18—HOW ADJACENT LEVELS IN UPPER SEAM ARE CONNECTED BY A 25-PER CENT INCLINE

By means of this incline the need for interseam roadways at each level is obviated.

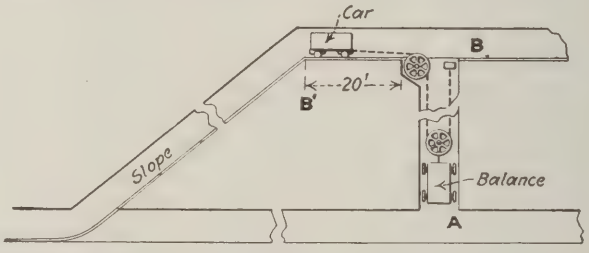


FIG. 19—METHOD OF LOWERING CAR DOWN INCLINE

The balance car travels only half as far as the coal car but on a much steeper pitch.

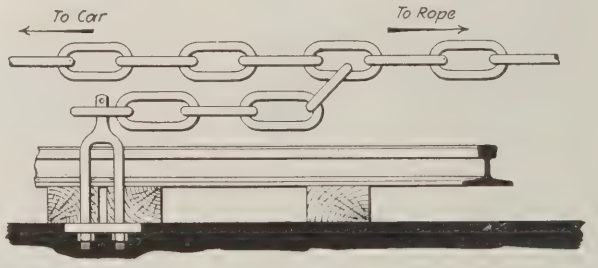


FIG. 20—CHAIN HOLDS ROPE WHEN CAR IS DETACHED

The balance car would immediately descend as soon as the car was detached, but by a hook attached to the track and a short chain, the chain by which the rope is attached to the car is held till an empty car arrives and is hooked on. Then the short chain is released.

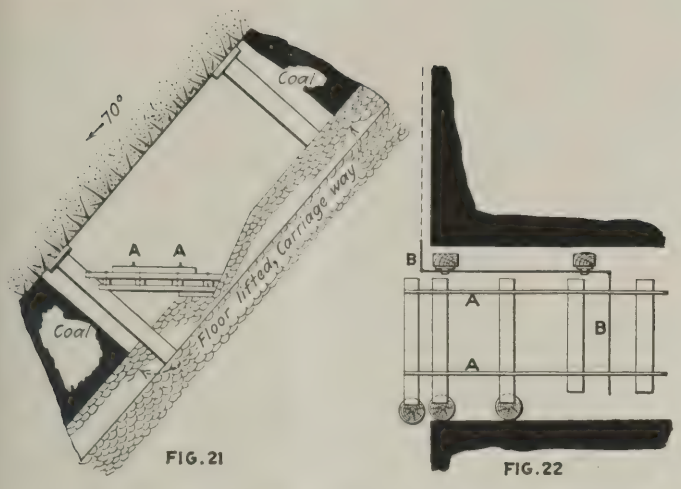


FIG. 21

FIG. 22

FIGS. 21 AND 22—SIDE VIEW AND PLAN OF LEVEL ROAD AT CARRIAGEWAY

The level road is set at such an elevation that cars can run from it to the deck of the cage as shown in Fig. 23. Fig. 22 shows not only this road but the safety and signal arrangement to prevent cars from running down the carriageway.

In operating this self-acting arrangement the rope to the carriage comes off drum *D'* at the bottom. The rope balance comes off drum *D* at the top. The balance is so loaded that in going down the inclination it will bring up the carriage with the empty car. The man operating the drums applies the brake, stopping the carriage at any landing desired. He keeps the brake tightly applied while the empty car is taken off the carriage and the full car put on. When the signal *BB* is lowered (see Fig. 22), the brake is eased off and the carriage with a full car will bring up the balance. When the carriage lands at foot of the slope into sump *S* (see Fig. 25), the deck of the carriage is level with the track on each side of the sump. The brake again must be kept tightly applied until the full car is taken off and the empty car put on.

It will be noted that both cage and balance car have long wheelbases, so that there is little chance of a derailment even if the roadway laid for these carriages is somewhat out of line.

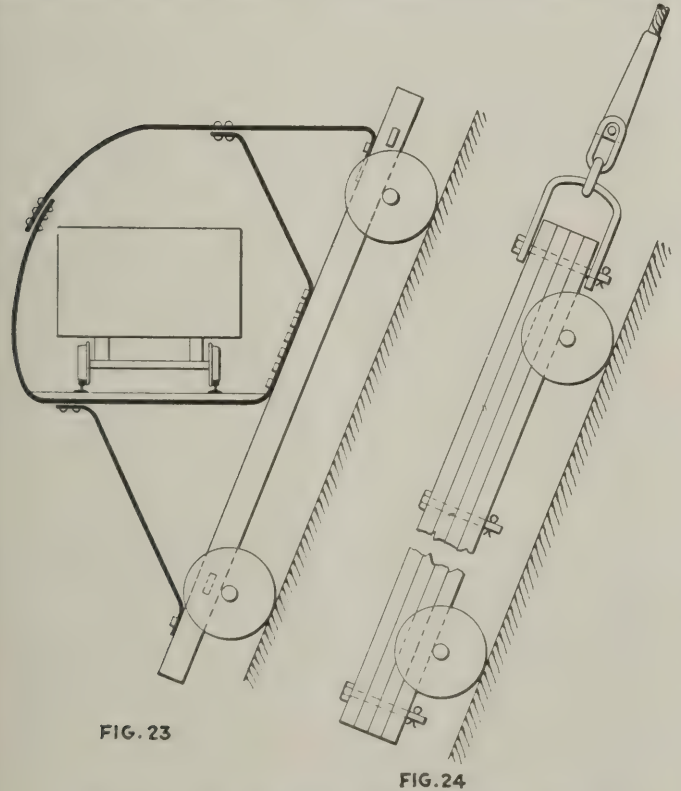


FIG. 23

FIG. 24

FIGS. 23 AND 24—CAGE AND BALANCE CAR

The car is lowered so that the surface of the coal is as level when in the cage as when it is hauled along the longwall gateways. The balance car has a body made of heavy cast-iron plates bolted together.

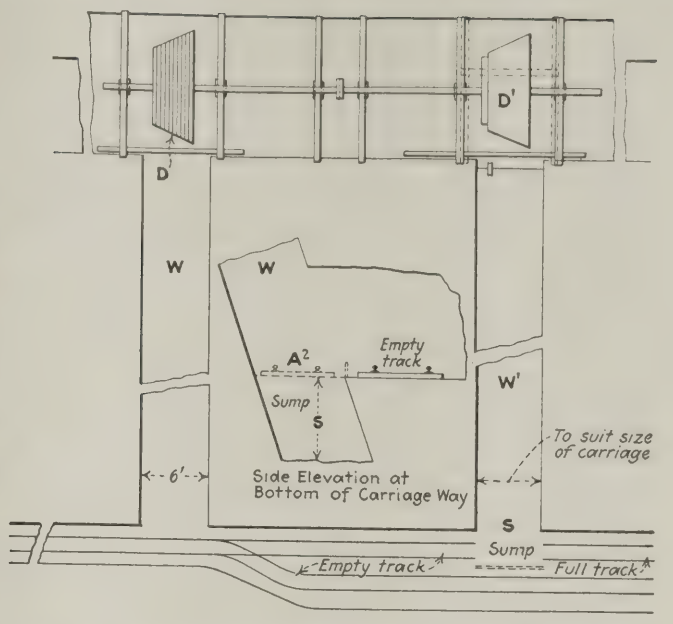


FIG. 25—ELEVATION SHOWING DRUMS AND PARTING

The illustrator has taken some license with the facts, the parting at the bottom being in plan and not in elevation like the rest of the drawing.

Belting to Revolutionize Mining Methods

PERHAPS because belting has been so tardy of introduction in American coal mines is why one has such large anticipations of what it will do when it is properly recognized. If the mines had to create the belting industry; if belts had to submit to the experimentation of men who did not understand the limitations of their own material there might be some fear, but long ago every other industry but coal mining learned the value of the belt. When the power houses were running sharp cinders over belts and the metal-mining industry was loading them with gritty material, the coal industry was wondering if perchance it would chafe a belt overmuch to take a load of soft coal. It seemed not to be realized that coal, being a light, not particularly abrasive material, should have led the way instead of following.

In the very nick of time comes a book on "Belt Conveyors and Belt Elevators," by Frederic V. Hetzel, who for thirteen years was chief engineer of one of the largest companies in the business and who for thirty years has been working on this class of machinery. Mr. Hetzel is practical and straightforward. He tells the story from within, not from without, giving the information of a man who has designed and erected belt conveyors. His book, containing 333 pages measuring 5¾x9 in., is published by John Wiley & Sons, of New York City.

We warn our readers that the book treats coal men with the attention they deserve as belt users but nevertheless it has several interesting references to coal and much that is of value to coal men where it is discussing the subject in general or the matter of the transportation of other material than coal in particular. In the

ACTUAL LIFE OF CERTAIN RUBBER CONVEYOR BELTS

Belt Width, Belt Plies, Belt Cover	Length of Conveyor, Center to Center, Ft.	Speed Feet per Minute	Material Carried	Actual Tonnage	Length of Service	Belt Cost Per Ton of Material Carried, Cents
36 in. x 5, 1/16 in.	62	275	Screened coke, 30 lb. per cu.ft.	238,237	14 months, worn out	80.11
36 in. x 8, 1/8 in.	570	493	R. of M. coal, 50 lb. per cu.ft.	2,808,350	5½ years, worn out	.13
36 in. x 6, 1/8 in.	265	595	R. of M. coal, 50 lb. per cu.ft.	1,134,631	2½ years, worn out	.12
36 in. x 6, 1/8 in.	265	595	R. of M. coal, 50 lb. per cu.ft.	1,084,640	2 years, worn out	.13
36 in. x 7, 1/8 in.	510	500	R. of M. coal, 50 lb. per cu.ft.	1,461,520	3 years, worn out	.20
36 in. x 6, 1/8 in.	75	500	Large coke, 30 lb. per cu.ft.	237,286	3½ years, worn out	.19
36 in. x 5, 1/16 in.	62	275	Small coke, 30 lb. per cu.ft.	217,644	1 year, worn out	.12
36 in. x 5, 1/16 in.	25	400	Furnace coke, 30 lb. per cu.ft.	522,205	2½ years, worn out	.03
48 in. x 8, 1/16 in.	612	400	R. of M. coal	1,339,352	41 months, still running	...
48 in. x 8, 1/16 in.	361	350	R. of M. coal	2,786,396	38 months, still running	...
48 in. x 8, 1/16 in.	150	350	R. of M. coal	3,172,915	53 months, still running	...
42 in. x 8, 1/16 in.	674	350	R. of M. coal	2,651,300	57 months, still running	...
54 in. x 11, 7/32 in.	740	500	R. of M. coal	2,500,000	70 months, still running	...

matter of power it says of a 48-in. belt between 387-ft. centers, sloped 18 deg., with a lift of 109 ft. and carrying 795 tons of run-of-mine coal per hour at 483 ft. per minute, a 150-hp. motor was used, but only 107 hp. was needed, as shown by electrical instruments. Roller bearings were used for the five-pulley idlers by which the belt was supported. A belt conveyor on similar roller-bearing idlers 48-in. wide on 405-ft. centers, sloped 19 deg., with a lift of 119 ft. and carrying 1,030 tons of run-of-mine coal per hour at 506 ft. per minute was equipped with a 150-hp. motor. Electrical instruments showed that it used 162 hp. A 42-in. belt conveyor with 600-ft. centers, sloped 18 deg., with a lift of 114 ft. and carrying 324 tons of run-of-mine coal per hour at 242 ft. per minute was equipped with a 100-hp. motor, but only 52 hp. was used. This also had roller bearings in five-pulley idlers.

The author says that with roller bearings the conveyor takes less power, the belt is subject to less tensile stress and requires less attention and lubricant, the idlers are less likely to stick tight and thus drag and injure the belt, and that the additional cost of the idlers is offset by a substantial reduction in the size of the motor needed and by a similar reduction in the number of plies in the belt.

Replacing Mine Haulage by Rubber Belt

An interesting quotation should now be made as to the possibilities of replacing mine cars by belting. "With a level belt conveyor one ton per hour can be conveyed a distance of 5,000 ft. over plain grease-lubricated idlers by one horsepower, or roughly 1 hp.-hour will convey one ton one mile. On the basis of power consumption alone a belt conveyor that carries one ton one mile in one hour is not so economical as a horse and cart, and for handling large quantities of material over long distances a train of cars drawn by a steam or electric locomotive will require much less power than a belt or a series of belts. To buy belts with their carrying idlers and driving machinery and build a structure to support the conveyor generally will cost more than to lay track and provide cars and motive power suited to the quantity of material to be handled.

"There are, however, conditions in which a long belt system may cost so much less for operating labor and attendance than will a car system that it will pay to install belt conveyors. For example, an important mining company had under consideration for several years a plan to carry 8,500 tons of coal per day from three inland mines to a shipping point on a river over four miles away. The choice lay between mine-car haulage with electric locomotives on the one hand and a belt-conveyor system on the other.

"From costs derived by the company from the operation of many haulage plants and several large belt conveyors, comparative estimates were made which showed: (1) The total cost of installation of the belt-conveyor system was about 25 per cent below that of the haulage system, and the annual charge for interest was correspondingly less. (2) The annual charge for depreciation for the conveyor system was about 15 per cent higher; this was based on an estimated life of three years for belts, five years for idlers, fifteen years (average) for other machinery and thirty years for steel and concrete work. (3) The estimated power cost for the belts was double that for the haulage. (4) The probable cost of labor and attendance for the belt system was about half the corresponding charge for the car system. This one item showed a difference of about $85,000 between the annual operating costs, and when balanced with the other items mentioned it was sufficient to show an estimated saving of over 3c. per ton of coal carried.

1 Hp.-Hr. to Transport 2½ Tons One Mile

"As a result of this comparison it was decided to install the belt system, and the work is now under construction (1922). The distance from the loading station in the mine to the bin at the river is 23,500 ft., and the total rise is about 200 ft. The conveyors, twenty in number, will be entirely underground and will be installed in existing mine passages which have been widened and straightened for the purpose. The idlers will be fitted with either roller or ball bearings. From power readings of similar conveyors installed at other mines it is expected that 1 hp.-hr. will convey 2½ tons one mile. This is more than twice the quantity which, according to the usual formulas, can be carried over ordinary idlers with grease as the lubricant of the bores of the pulleys."

The table at the head of the page is one of the many valuable tabulations this useful book contains.

It would serve little to list the subjects covered. Suffice it to say that the subject is exhaustively treated and the material up to date.

An Agreement Has Been Made between the U. S. Bureau of Mines and the Refractories Manufacturers' Association for the utilization of the laboratory car "Holmes" and crew for an investigation of fuel-burning equipment at refractories plants in the central district, with a view to determining wherein changes in equipment or practice will result in decreasing fuel consumption and increasing the output of fired ware. As planned at present, the crew will investigate the burning conditions at seven plants, including those manufacturing chrome, silica, magnesite, and fireclay wares. The burning conditions on round, square and rectangular-down draft kilns will be investigated.

Should High Pressure and Small Volumes Be Used in Underground Fire Fighting and How?

Pressure Can Be Regulated by Tanks with Floats, by Reducing Valves and by Throttles Placed in Hose Valves—½-In. Nozzle with 1½-In. 750-Lb. Test Rubber Hose Recommended—Peril in Mixing Impure with Pure Water

IN MANY coal mines fire fighting by direct methods is a subject of keen interest—in the anthracite region because large quantities of timber make the mines peculiarly subject to rapid and expensive conflagrations; in the Middle West and still more in the Rocky Mountains because of the extreme dryness of the timber and its tendency to dry rot.

Perhaps the problem must be attacked in coal mines in a different way from that in use in metal mines, where there is frequently more timber, but the remarks of B. F. Tillson, of the New Jersey Zinc Co., Franklin, N. J., entitled "Notes on the Installation of Fire-Fighting Equipment in Mines," at the recent meeting of the American Institute of Mining and Metallurgical Engineers will be found of interest.

It is noteworthy that they found their occasion in part at least in a bulletin of the U. S. Bureau of Mines published soon after, and as a result of experiments in connection with the Cherry Mine fire in Illinois. The Bureau at that time favored low pressure, and Mr. Tillson presented this paper in the hope that the bureau might make experiments of its own and subject that conclusion to further inquiry. Mr. Tillson remarks:

Not Only Extinguish Fire But Reduce Heat

"Although portable fire extinguishers are valuable for fires that are in an incipient stage, some medium that will dissipate a large quantity of heat is needed to fight a fire in mine timbers, because of the size to which it probably will have grown before discovery. Any method of sealing off or otherwise smothering such a fire with gases that will not support combustion, is often ineffective, for the residual heat will cause reignition when the area is opened, so that fresh air reaches the hot charred sticks of timber. It is therefore obvious that the most effective ways are to drown and cool the hot zone with water and to 'load out' the partly burned material and remove it from the mine.

"Either of these methods requires a direct attack of water upon the inflamed material; therefore every mine containing a large quantity of timber or other combustible should be as completely equipped with a fire-hydrant system as it is with compressed-air mains. Mine managers may at times object to the expenditure, especially if they have not suffered from mine fires and cannot realize the enormous loss of life and property resulting therefrom. The cost of such preventive measures against fires is small in proportion to the losses that may be incurred if a fire gains headway. Furthermore, the system of water pipes installed for fire protection can be used for other purposes, which will pay its carrying charges."

Mr. Tillson's reference to the other purposes for, or uses of, water pipes for fire service, as he himself explains in his article, has in view the need for water for use in wet drilling, but in coal mines the use would be rather the sprinkling of the mine to keep the dust moist. In regard to hand extinguishers he says:

"The old soda-acid extinguisher, or the more modern 'foam' types, are preferable. The former probably does not rely for its efficacy on the carbon dioxide generated but on the smothering and cooling effect of the water and the trajectory of stream that may be obtained because of the gas pressure developed. A foam having a tough film which will smother a fire, even on overhead surfaces, and which will have the added advantage of holding a greater quantity of cooling water against the burning surfaces would seem to be the best medium for fighting incipient fires in mine timbers.

"Fire patrols should examine a mine between the regular working shifts; one round should be made immediately after the last working shift and a second one within four hours. Time clocks should be provided to assure proper watchfulness. It is possible to get time clocks for servicing 100 or more stations. Ours are for sixty-four stations, which is as large a territory as one man can inspect. In a large mine the fire-patrol routes should also have several mine telephone stations.

"It is customary to have telephones at shaft landings, but these lose their value when access to the shaft is cut off. The interior telephones also save time in the patrolman's report of a mine fire and in the promptness with which help may be given him. It also will enable him to keep in touch with the hoisting engineer or some other centralized party, who would know, by the fire patrol's failure to report, that some accident had befallen him in making his rounds and thus could direct the other patrols or outside parties to render assistance.

"Some mines have avoided the expense of carrying

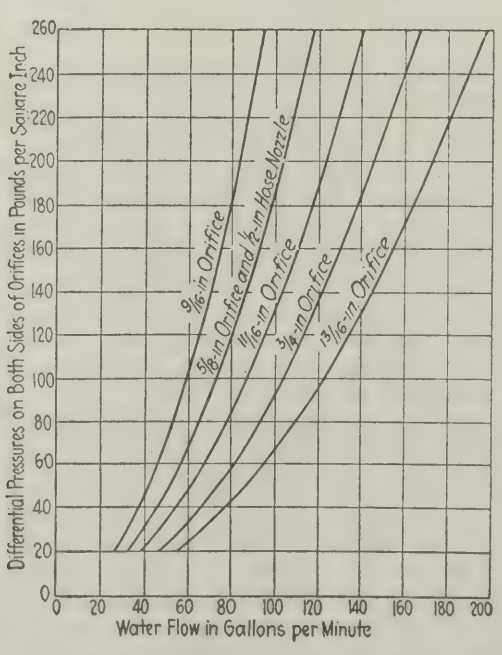


FIG. 1—DISCHARGE THROUGH ORIFICE AT VARIOUS PRESSURE DROPS

Loss of pressure for given flow of water in gallons per minute when a 1½-in. valve has its orifice reduced as noted on the various curves.

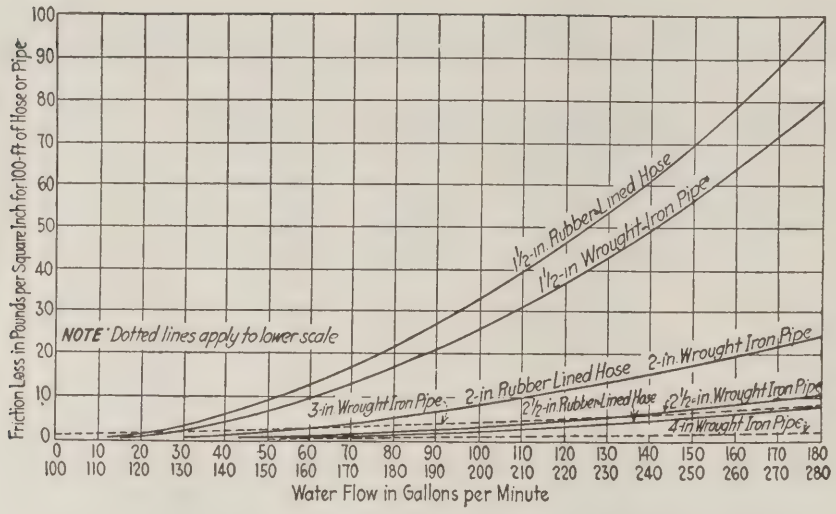


FIG. 2—FRICTION LOSS IN THE DISCHARGE OF WATER THROUGH RUBBER HOSE AND PIPE

The size of the pipe which is recommended for a rubber hose by the author of this paper is 1½-in., the distribution lines being of 3 or 4 in. diameter.

special fire-hydrant mains throughout the underground workings by arranging to turn water into the compressed-air lines in case of fire. There are several drawbacks to this plan. The compressed-air mains usually are smaller than is desirable for fire mains. The air-pipe joints and fittings possibly will be too weak to stand the hydraulic pressures that may be desirable."

Mr. Tillson discusses the use of compressed-air lines for an air supply in fire-fighting, a practice which coal men have never adopted and which most of them would look on with great disfavor. He regards this as a reason for not using compressed-air lines as a possible means of introducing water to a mine fire and then goes on to explain the shortcomings of the device of installing tanks at each level, for service in that level, with connections to the compressed-air lines which would make it possible to give the water a pressure it would not have hydraulically. He calls attention to the way in which such tanks might be depleted of their water and how meager would be the supply in any event. He adds:

Special Piping for Fire Fighting Only

"In view of the foregoing considerations it was decided to equip the Franklin Mine with a complete system of water piping. This system was connected with the mine-pump discharge column, which discharges into the bottom of a 25,000-gallon tank at the surface so that water will always be available even though the mine pumps should happen not to be running when the fire occurs. As insurance against an accident in the main shaft which might destroy the fire-fighting water supply, a second pipe is carried up a supply shaft and manway remote from the main shaft, where it can be joined to the town water supply and fire-hydrant system through the medium of a water tank.

"In planning the size and installation of underground fire-hydrant pipe lines the following factors must be considered: (1) The maximum volume of water effective from a single nozzle and hose line. (2) The minimum headroom clearances and the trajectory desired of the fire streams. (3) The maximum water pressures available. (4)) The number of streams it is desirable to play upon a fire at one level. (5) The greatest length of hose that should be relied on to carry the water from the pipe line to the fire. (6) The extent to which the hose will have to be transported, especially up confined ladderways. (7) The outcome of a decision as to whether advantage will be taken of the light weight and accessibility of the hose to rely upon the fire patrolman to make a prompt attack upon the fire while awaiting more extensive help.

"The New Jersey Zinc Co. has come to the conclusion that underground fire-fighting measures are widely different from those of fires in surface buildings. The exposed areas of the inflammable materials in a mine are not so large, the material is more concentrated, its height is not so great, nor is it exposed to the action of winds. On the other hand, the hot gases are likely to come into the faces of the fire fighters and the confinement of the workings will require the nozzle men to approach closer to the blaze than is customary at surface fires. Surface fire-fighting technique and equipment should not therefore be closely followed.

"A standard surface fire stream is based on a discharge of 250 gallons of water per minute, which will be passed by a 1¼-in. nozzle when the water at that point has a pressure of about 45 lb. per square inch. The smallest pump approved by the National Board of Fire Underwriters must discharge 500 gallons per minute or serve two such streams. It seems unnecessary to handle such volumes of water for the direct attack of mine fires and, in fact, it would appear undesirable to have such quantities draining through filled ground, undermining the timbers which the ground supports and unnecessarily taxing the mine drainage system.

Higher Pressures Give Flat Trajectories

"At the same time it seems desirable to have flatter and longer horizontal trajectories than are obtainable from the comparatively low pressures used with surface fire streams; flatter trajectories are easily obtained with the high static pressures obtainable from mine-pump columns, because of the depth of the mine workings below the surface. To reduce the volumes of water discharged the New Jersey Zinc Co. uses much smaller nozzles than those used in surface fire fighting for any given range of pressure, for if the nozzle is not made of sufficiently small cross-section, the water is ejected too much in the form of a spray instead of a fairly solid stream and will not carry well through the air.

"Some tests were made along these lines about ten years ago under the direction of George S. Rice, of the U. S. Bureau of Mines, and the results were published in Technical Paper No. 24, "Mine Fires," of which he is the author. However, these tests were not carried out under pressure anywhere near as high as we considered desirable and at which we have carried out a few experiments.

"Probably the chief reason why other tests were not made by the U. S. Bureau of Mines, which was cooperating with the Illinois Mining Commission and the National Fire Underwriters' Association, is its conclusion 'that one man cannot readily handle a 1½-in. hose with a ½- to ¾-in. cone nozzle in a narrow place, such as a mine entry or heading, when the water pressure exceeds 40 lb. per square inch and only with difficulty when the pressure is 50 lb. or over.'

"I take exception to this statement, which was repeated last fall in the report of the Standards Committee of Mine Fire-Fighting Equipment of the American Mining Congress. Our experience under the operating conditions below ground is that with either a ½- or a ⅝-in. nozzle and with a 2½-in. hose one man has no difficulty in controlling the nozzle reaction under pressures ranging from 150 to 186 lb. per square inch (the latter being the highest available under the conditions of our tests).

"I cannot but wonder whether the above adverse opinions were due to tests made in the handling of, say, 1¾-in. nozzles where the considerably greater volumes of water discharged naturally greatly augment the nozzle reactions. I would, therefore, strongly urge a renewed study of this subject by the U. S. Bureau of Mines and feel confident that its data and opinions will then be revised.

"We have adopted as a normal condition a ½-in. smooth-bore conical nozzle 12 in. long which will pass about 90 gallons of water per minute under what we consider to be a proper working pressure of 150 lb. per square inch. We have further adopted a 1½-in. rubber-lined rubber-covered fire hose with the intent that the maximum length of hose to serve a nozzle will be 200 ft., as it will then pass 90 gallons per minute with a pressure loss from friction of about 56 lb. per square inch.

"Under these operating conditions it would be possible to use a 'Siamese' connection on the end of 150 ft. of 1½-in. hose and connect two nozzles each with a 50-ft. length of hose and have a pressure of 90 lb. per square inch at each nozzle and pass 70 gallons per minute from each nozzle, or a total of 140 gallons per minute from the one hydrant connection if the pressure at the hydrant was 200 lb. per square inch.

Rosette Spray to Blanket Back Hot Gases

"It would seem that one of these nozzles might well be employed to form a rosette spray to blanket back the hot gases and form a fire-insulating shield which would permit the second nozzle crew to approach the flames more closely. If the headroom in the drift were 6 ft. in the clear, each of the above streams might be expected to strike a point in the roof about 55 ft. from the nozzle or to wet a point on the floor 100 to 110 ft. away.

"One of the factors to be decided is the method to be employed for regulating the hydrant pressures on the different levels and the maximum static pressures which will be permitted on the water lines. A reduction in these static presures may be obtained: (1) By breaking bulk through the installation of water tanks on different levels; (2) by the installation of pressure-reducing valves for the water supply at each level; (3) by the installation on each level of individually proportioned throttling orifices for the fire-hydrant outlets. The last method was chosen as the cheapest to install and to maintain.

"The first method requires one or more water tanks to serve each level (depending on its length); these must be located several levels above the one to be served, in order to give sufficient water head, and each tank must be of sufficient depth to afford a velocity head sufficient to assure the free passage of water from the tank to the pipe to supply the maximum water demand. Each tank must be equipped with float valves which will control its water supply. Unfortunately these valves are not easily kept in good operating condition. Furthermore, instead of a single pipe or two, the second being provided for safety, there is one or two for each level, and as the levels are close those for different levels overlap.

'The second method is that of using pressure-reducing valves. This requires a large investment for these rather expensive appliances. Moreover, they are not satisfactory for controlling static pressures and are likely to get out of order, especially when used with the dirty water from the mine. Their maintenance in working condition is sure to be expensive.

"As engineering literature appears to have no data covering the design of such pressure-reducing orifices, I have plotted, for the convenience of those who may wish to use such a pressure control, a number of curves showing the discharge ratings for a number of orifices of different sizes adapted to such an installation (see Fig. 1). The discharge of a ½-in. hose nozzle is practically the same as that of a ⅝-in. plate orifice. A chart also is given showing the pressure losses from the friction of various quantities of water flowing through 1½-, 2-, and 2½-in. rubber-lined hose and through wrought-iron pipes ranging from 1½ to 4 in. in diameter (see Fig. 2).

"Another chart shows the total pressure needed at the hydrant outlet for a ½-in. nozzle combined with 100 ft. and 200 ft., respectively, of 1½-in. rubber-lined hose,

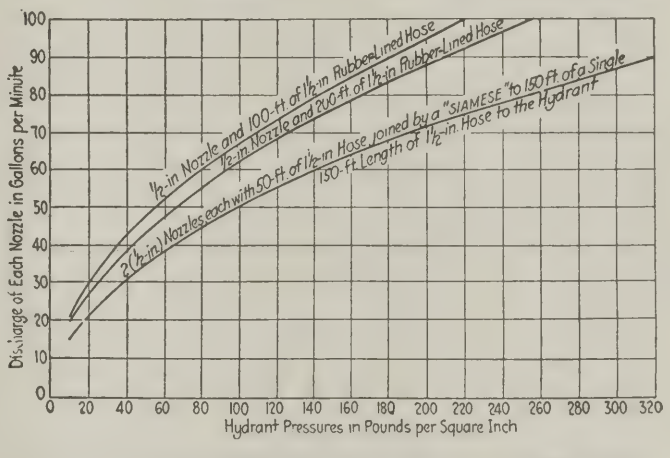


FIG. 3—TOTAL PRESSURE REQUIRED AT OUTLET SIDE OF HYDRANT ORIFICE

This allows for hose and nozzle friction and for a discharge of the stream indicated on the vertical co-ordinate on the left.

and also the pressure needed when two ½-in. nozzles (each with 50 ft. of 1½-in. hose) are 'Siamese-connected' to a single 1½-in. hose line 150 ft. long attached to one hydrant outlet (see Fig. 3).

"The fourth chart shows the approximate maximum distances that may be reached by fire streams from ½-in. nozzles operating at various pressures when the nozzle is elevated about 12-in. above the floor of a drift which is only 6 ft. high in the clear (see Fig. 4).

As the maximum static water pressure in the mine was about 500 lb. per square inch and as 3- and 4-in. lap-welded wrought-steel standard-weight pipes are rated to stand 1,000 lb. pressure per square inch and under tests have shown bursting pressures of 5,000 to 6,000 lb. per square inch, it seemed advisable to carry full pressures on the water lines and take advantage of the large drops in pressure then available to overcome friction losses and to install smaller pipes than otherwise would be required. It seemed that excellent results would thus be obtained in spite of the fact over 3,000 ft. of pipe was required on a level. It was not necessary, therefore, to use 4-in. pipe on levels more than 420 ft.

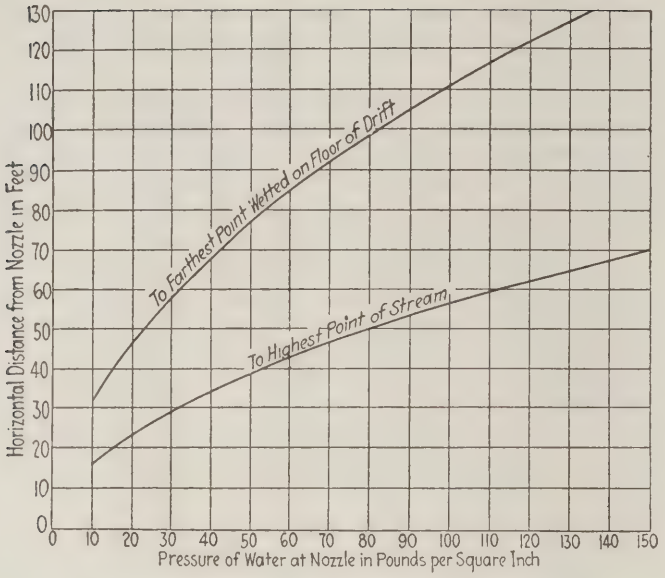


FIG. 4—TRAJECTORY OF HOSE STREAMS

This is the distance the stream will travel and the point at which it will reach its greatest height when escaping from ¾-in. nozzle elevated 12 in. above the ground with a maximum height of stream limited to 6 ft. above the floor of the drift.

below the surface, and some of the pipes used even on these levels are of 3-in. diameter.

"In general, screwed joints were provided, some flange joints, however, being introduced to make the installation of various bends easy. Malleable-iron standard refining-oil fittings are used from the surface to the 400-ft. level and extra-heavy malleable-iron fittings for the lower levels. These fittings were chosen in order to assure ample strength against mechanical strains which may be added to the water pressures. The lighter pipes are rated to withstand a water pressure of 200 lb. per square inch and the heavier are adapted for pressures up to 1,000 lb.

"The hose outlets are 4x4x2-in. and 3x3x2-in. tees with bushings to 1½-in. to which are attached by screwed nipples standard brass 1½-in. hose gate valves with male hose-coupling threads on one end. Brass caps attached by chains to the valve protect the hose-coupling threads when not in use. These valves are rated at 125-lb. steam pressure and 200-lb. water pressure, but our tests showed that they would stand 800 lb. per square inch hydraulic pressure without deformation or leakage. The hose coupling end was internally threaded with twenty-four threads per inch (as shown in Fig. 5) to permit the screwing in of the orifice plug which is used to control the outlet hydrant pressures. This threading also proved tight under a pressure of 800 lb. per square inch.

"These orifice plugs were installed as described on the outlet side of the hose valves so as to facilitate their removal should it be necessary to clean out any pieces of bark or wood fiber that might lodge behind and constrict them. This can be done easily and quickly after the hose gate valve is closed. As only open nozzles are permitted on the hose lines, the maximum pressures on the fire hoses will be the dynamic pressures permitted by the orifice dimensions. As there is a remote possibility, however, that a kinking of the hose might place it under a higher static pressure of possibly 500 lb. per square inch, the fire hose must stand 750 lb. per square inch bursting pressure for 5 minutes and some of the hose is built to stand a bursting pressure of 1,000 lb.

"We have been working for over six months with a number of hose companies testing special constructions of 1½-in. rubber-lined rubber-covered wrapped duck fire hose of different plies to get great strength and durability, maximum flexibility and portability with minimum weight, and have finally obtained hose that will meet the specifications that will be given later.

"This hose will be supported in 50-ft. lengths stretched out in V-boxes or launders suspended from the backs of the drifts at a slight gradient to insure natural drainage. Water will be passed through it once every six months to wash out the sulphur 'bloom' and stretch the rubber so as to keep it 'lively.' We are led to expect, under these conditions and in view of the darkness and humidity of the mine, that the hose will have a life of about fifteen years, without a depreciation in strength that will reduce the bursting pressure below 500 lb. per square inch.

"In general the hose valves are spaced from 150 to 250 ft. apart, except where the width of the mineral body makes it advisable to place them 50 to 60 ft. apart. The intent is to make the most remote points, even in top slices 50 ft. above a level, easily accessible with 200 ft. of hose. The levels on which the water lines and hydrants are located are about 50 ft. apart in elevation, so approximately 27,000 ft. of 3-in. pipe and 4,000 ft. of 4-in. pipe and about 160 hose valve outlets are required for this fire-protection system.

"Over 40,000 ft. of mine workings on the levels are thus given fire protection, to say nothing of the length of lateral drifts and parallel workings that likewise are protected. Cast-iron nozzles were adopted rather than brass because of their lower cost and because they would offer no temptation to anyone to steal and sell them to junk dealers. Thirty-five such nozzles and about 3,200 ft. of 1½-in. hose seem sufficient to supply complete fire protection.

Fire Lines Interconnected Between Levels

"In general, the fire lines on the levels have three or four vertically connecting pipe lines in ladderways, so that for any fire location the water is supplied in circuit from both sides of the fire area, thus normally reducing the friction losses by splitting the flow in any single pipe line on a level and also insuring a supply, even though a fall of ground should damage a fire line at some point on the level. Of course, enough gate valves are inserted in these mains to permit their necessary segregation under such emergency conditions.

"From 100 to 300 ft. of hose in 50-ft. lengths is allotted to a level, depending on its lengths, and by transportation up or down 50 ft. of ladderways the total quantity of hose on three levels—that is from 300 to 800 ft. hose—can readily be made available on any one level, as ten levels each have 100 ft. of hose, five levels 200 ft. each, and four levels 300 ft. each.

"The new (1922) National Fire Protection Association standard threads for 1½-in. hose couplings have been adopted and are recommended for general adoption by the mining profession, as they also have been adopted by the National Fire Protection Association, the National Board of Fire Underwriters and the Associated Factory Mutual Fire Insurance Companies.

"These male-coupling threads have the following specifications; nine threads per inch with a root diameter of 1.8376 in., a pitch diameter of 1.9138 in., and an outside diameter of 1.9900 in. The threads in the female coupling have a root diameter of 2.0150 in., a

pitch diameter of 1.9388 in., and an internal diameter of 1.8626 in.

"The mine should be equipped with several 'siamese' connections and with transformer couplings to permit under emergency conditions the coupling of the 1½-in. mine hose with the 2½ in. or other sizes of fire hoses used by the town fire departments in the communities adjacent to the mine.

"Although it may be possible to develop a four-ply hose which may approach the performance shown by the actual bursting test described in this paper, the five-ply hose described herewith is unusually strong for its weight and represents the best product we have tested. Its weight, uncoupled, is about 39½ lb. per 50-ft. length, and the pair of expansion-ring type brass couplings will add about 3 lb. more per 50-ft. length. When empty it will bend around about an arc of 8-in. radius without buckling on its inside periphery.

"It was built under a guarantee to stand for five minutes without bursting a test pressure of 800 lb. per square inch. The inside diameter is 1½ in. and the outside diameter 2 1/16 in. The five plies of fabric are cumulatively about 0.155 in. thick in a wall of the hose, so that the rubber lining and rubber cover are each about 1/16 in. thick.

"The rubber in the lining and cover is a high grade compound with good density and so prepared that it will prevent fungus growths from penetrating to the fabric. It should have a small quantity of an antiseptic, such as creosote, incorporated in it in order to insure this mildew-resisting property and should be designed to give a long life—say twenty years—with relatively small depreciation.

Hope Hose Will Last Fifteen Years In Mine

"We expect that a hose that will stand safely 750 lb. per square inch hydrostatic pressure when new will be in condition to stand at least 500 lb. pressure after having been kept in the mine fifteen years, as the exclusion of sunlight, the fairly uniform temperature of about 55 deg. F. and the uniform humidity underground in a mine are excellent conditions for its storage.

"The fabric used in this hose was a high-quality tire duck weighing 17½ oz. per square yard, made of Egyptian quality cotton fiber having a length of 1⅜ in., which is about the maximum obtainable in a staple fabric. The Scott machine used in testing the fabric had a capacity of about 400 lb., so the sample used was a strip 1 in. wide and 3 in. long clamped in the jaws of the machine and the jaws were separated at the rate of 20 in. per minute. When tested this way the duck shows 305 lb. as the strength of the warp and 335 lb. for the filler.

"Sufficient attention does not appear to have been given to the determination of a proper standard method of testing fire hose under pressure for acceptance or rejection. Underwriters' approved hose is commonly marked 'Tested at 300 lb. pressure' and during such tests the hose is under a pressure (varying from zero to 300 lb.) for a total time usually less than twenty seconds. Hose that stands this test may burst if the same pressure is maintained on it for a longer period. The hose manufacturers arbitrarily assume that hoses are suitable for a working pressure of about one-fifth of their instantaneous bursting pressures.

"Even when hoses are tested at certain pressures for five or ten minutes they are under stress too short a time for the test to be of practical value, as longer periods would be involved when in service. I would urge research in regard to the cumulative effect of such strains on the bursting strength of hose and a study of the lasting injury that may be done to the hose by longer testing periods under varying pressures, and would suggest that until such knowledge has been developed, one out of every five lengths of hose be taken at random and submitted to cumulative bursting pressures, each pressure stage being held for five minutes and arrangements for the hose to be under substantial pressures for forty to forty-five minutes in a manner somewhat similar to the performance test on the excellent 1½-in. hose to which reference has already been

BURSTING TESTS ON A FIVE-PLY, WRAPPED DUCK FABRIC, RUBBER LINED AND RUBBER COVERED, 1½ IN. WATER HOSE

Time during which pressure is maintained, min.		Pressure, lb. Per sq.in.	External Diameter, In.
0		0	2 1/16
0		100	2 ⅛
0		200	2 ⅛
0		300	2 5/16
5		400	2 11/32
5		500	2 ⅜
5		600	2 ⅜
5		700	2 13/32
5		750	2 13/32
	Pressure relieved and external diameter measured as		2 3/16
5		800	2 13/32
5½		880	2 7/16
5		970	2 7/16

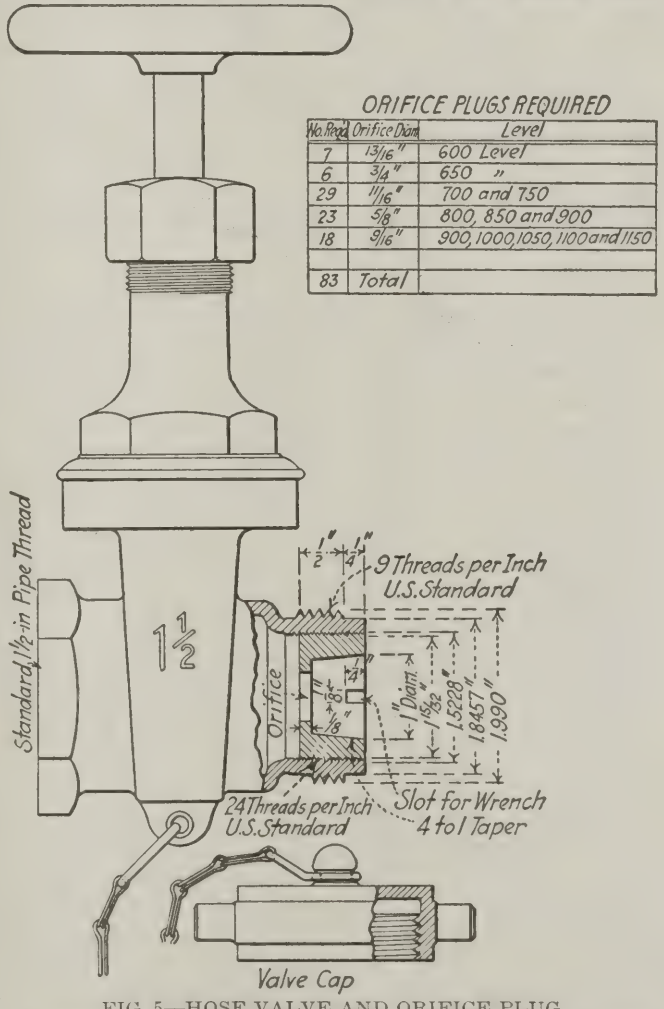


FIG. 5—HOSE VALVE AND ORIFICE PLUG

In order to lower the pressure of the moving stream of water a plug having an orifice which can be varied to suit the line pressure is inserted in the valve. This, of course, does not prevent the full line pressure being imposed on the rubber hose provided it should kink or clog. It prevents the man who is holding the hose from getting the "kick" that goes with fire fighting with hose which is subject to the full-line pressures. It also saves the hose from excessive strain provided it is kept from kinking, assuming, of course, that it does not clog and is not fitted with a spray nozzle.

made. As in this instance, the test can be made on a 3-ft. length, preferably cut from the end of the standard 50-ft. length, and the acceptance of the entire order of hose should be contingent on a perfect showing of all the 3-ft. samples.

"At this pressure the hose was bent in an arc of about 15-in. radius with no noticeable effect on it. The pressure was then raised to 1,025 lb. per square inch and the hose then burst, but not in the portion under tension during the bending test.

"The advisability or inadvisability of connecting, even as an emergency measure, a non-potable water system with a drinking water supply should be given far more serious consideration than has in general been accorded to it. The result of such connections may be an epidemic of typhoid fever or other water-borne disease. Such cross connections, however, are recommended by fire-insurance companies and fire-protection associations.

Helpful in Fire But Destructive to Health

"In general there are two reasons why for fire protection it is desirable to cross-connect the potable system designed for town fire fighting and domestic use with the non-potable system introduced into the industrial plant, whether for its protection against fire, for a supply of cooling water to its condensers, for providing water for its boilers or for other purposes. The first of these reasons is because increased fire protection will be afforded the plant by having a second source of supply for the sprinkler and fire-hydrant systems, and the second is because with this cross-connection the town dwellings and stores will be protected against the possibility of a general conflagration which might occur if the water supply in the town standpipe were to run short or if the mains feeding into, or leaving, the standpipe were damaged.

"In that case it is argued that it would be well to be able to introduce the non-potable plant water into the town system by means of the plant fire pumps. However, I am convinced that it would be far better to suffer whatever property loss might be involved by fire than to run the chance of infecting the public water supply. It is true that precautions might be taken for the disinfection and sterilization of the town water pipes subsequent to the passage of non-potable water. But this later act of grace would not prevent the probability that persons would drink some of the non-potable water during the period in which it was being used for fire fighting.

"The following methods I would condemn, though they have been considered acceptable practice in making cross-connections between non-potable and potable water systems: (1) The use of one or more check valves, or gate valves, or combinations of both in a cross-connecting pipe. (2) The use of a tee with an open outlet in the connecting pipe with a gate valve on each side of the open tee. Provision may be made to close the open outlet of the tee by a plug or blank flange, which can be applied when it is desired to use the connection, or a gate valve (normally open) may be mounted on the outlet of the tee. (3) A section of pipe may be removed between two gate valves in the connection and an emergency section of pipe, fitted with flanges or union couplings, of proper length to span this gap, may be kept available and ready for installation when an emergency demands the completion of such a connection.

"All these methods make possible the pollution of the potable supply when a connection is made, and therefore should be condemned. It is true that the conditions of the relative water pressures between the two sources of water supply may indicate that the only direction of flow may be from the potable to the non-potable system, but no confidence should be placed in such a state of affairs. Some years after this connection has been made, changes in the nature or operation of the plant pumping equipment may reverse these conditions and it is unlikely that the effect of such changes in regard to water pollution will be given any thought.

"Again, it will place an unfair burden upon responsible parties to resist the appeal that plant water be pumped into the town mains at some time when the town water supply is too low to meet a serious conflagration. The immediate urgent need of such a serious situation is likely to outweigh the seemingly more remote possibilities of pollution. If the connection is impossible the temptation for weakness in such a decision will be removed. Therefore, under no circumstances should it be possible to turn a non-potable water supply into a potable water system.

"A potable water supply, however, may be added to a non-potable water system, without danger of polluting the former, by placing a water tank between the two systems. This tank should have the inlet of the potable water supply above the maximum high-water level of the tank. Although this high-water level might seemingly be controlled by the location of overflow orifices or pipes, these might be choked by floating refuse or ice, so it would be safer to have the inlet pipe above the upper rim of the tank; even when so located a float valve may be placed to control the inflow of water. It is obvious that the interposition of a definite minimum air space between the two sources of water will furnish positive assurance against the pollution of the potable water supply from such a cross-connection."

Kingston Coal Co. Opens Community House

The Kingston Coal Co., which produces a sizeable tonnage of anthracite, annually, has opened a community house in Courtdale. The company donated the property some months ago, and the remodelling was completed in time to permit public inspection late in February. While the Kingston company was the prime mover in the community-house project, it has put control into the hands of the public.

The place is designed for the use of Courtdale citizens, and particularly children from the age of six years upward. The controlling organization is the Courtdale Community Club, which is open to everybody twelve years old or over, on the payment of 10c. a month dues, or $1 a year. The executive committee includes a member from every civic, patriotic and religious organization in the town, and every nationality is likewise represented. This committee controls expenditures absolutely.

Provision is made for club rooms for young men and young women. Children from 8 to 12 years have the use of the house Mondays and Thursdays from 5 p.m. to 7 p.m. They also may use it Saturday from 3 p.m. to 5 p.m., for annual membership dues of 25c. A little later there will be free kindergarten classes two days a week for children under eight years. Under the eye of F. E. Zerbey, general manager, the Kingston Coal Co. has maintained a kindergarten in Kingston for some years, and if the Courtdale House maintains the same good grade of work it will be doing a civic service of no small magnitude.

No provision for Sundays is made absolute, but the by-laws give the executive committee power, if they think wise, to open the house Sunday afternoons for reading or congregating, but with no games on that day.

Germany has given up the goose step for the sidestep.—*Washington Post.*

Developments in the Theory of Centrifugal Fans

"Equivalent Orifice" and "Orifice of Passage" Mere Befuddlement of Fan Problems—Analytic Methods of Obtaining Air Columns Generated by Fan—Relative Efficiencies of Single Fans and Fans in Series and in Parallel

By Henry Briggs*
Edinburgh, England

THE centrifugal fan, with its single moving part, is in one respect the simplest machine in or about the mine, but it has always been difficult to formulate a coherent theory respecting the principles of its action and design. Much that has been written on the subject is open to question, and some of it is definitely incorrect.

Yet a more perfect theory of the centrifugal fan would be of much assistance in practice, for it would help us greatly in understanding the reason for an undue wastage of energy and loss of efficiency or why it is that the machine acts so unexpectedly when the conditions under which it operates are apparently only slightly changed.

The writings of the French engineer Daniel Murgue have profoundly influenced the trend of thought in relation to fan ventilation, but the influence, in my opinion, has been out of all proportion to the real value of his work. Progress can be made only by relegating most of Murgue's notions and conclusions to the scrap heap.

Easier Conceptions Unmuddle Reasoning

The time has come for us to abandon the clumsy convention of the "equivalent orifice" as the means of evaluating the ventilating resistance of a mine and to seek for a simple and direct measure of the resistance of the ventilating circuit, equivalent to the electrical engineer's method of expressing the resistance of an electrical circuit in ohms.

Further, we must reject the "orifice of passage" of a fan, which, as it stands, is useless to the designer; it canot be determined by the process Murgue described because some fans produce a higher depression when passing air than when the inlet is closed. Unless we adopt a straightforward, direct unit by which to express fan resistance and unless we also devise an equally straightforward method of obtaining that resistance, progress in fan design must be retarded.

That many points of similarity exist between the flow of electricity in a conductor and the flow of air in a passageway is no new observation, but it was left to David Penman, principal of the Government School of Mines, Dhanbad, India, and an old student of mine, to make the most complete use of the analogy in one of the most suggestive papers on mine ventilation[1] that has been written in late years.

As Penman observes, the usually accepted relation between the ventilating pressure, p, required to urge the air round the mine and the volume, Q, of air passing per minute is:

$$p = RQ^2 \qquad (1)$$

Moreover, as R includes factors which remain constant so long as the mine resistances are unaltered, R evaluates those resistances. Equation (1), indeed, is the parallel of Ohm's law and differs from the latter only in involving the second power of the current instead of the first. As I elsewhere pointed out, it will be necessary to adopt a name for this unit of resistance before it can come to its full usefulness, and J. Parker has suggested the "atkinson" as that name. If p be measured in pounds per square foot and Q in hundreds of thousands of cubic feet per minute, the resistance of the mine in atkinsons is $p \div Q^2$. Here, then, we obtain a direct measure of mine resistance which is at once simpler in conception and more useful in application than the "equivalent orifice." The latter is an *inverse* measure of resistance connected to R by the relation:

$$\text{Equivalent orifice} = \frac{c}{\sqrt{R}}$$

where c is a coefficient determined by the units used.

In like fashion, we may express the pressure, p_0, needed to overcome the resistance, r, of the fan itself as:

$$p_0 = rQ^2 \qquad (2)$$

Therefore the total pressure, P, required to circulate the volume Q, against the resistance of both mine and fan is

$$P = p + p_0 = (R + r)Q^2 \qquad (3)$$

The most useful relation in connection with a fan is the manometric efficiency; it is the best criterion we possess of the suitability of its design.

The usual definition of this relation, F, is the ratio between the actual pressure (or depression) produced by a fan and the "theoretical" pressure (or depression), and by the latter is meant the pressure that would be produced were the fan perfect.

The hypothetical perfect fan is one of 100 per cent efficiency; it gives out as much energy as it receives, and it has no internal resistance; none of the pressure it creates being wasted in the fan and ajutages, the factor p_0 of equations (2) and (3) is zero; in other words, whereas the actual fan yields a pressure p, the

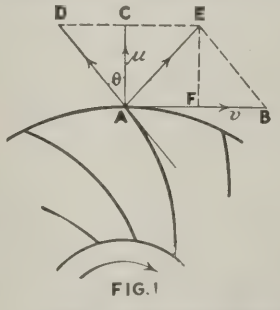


FIG. 1

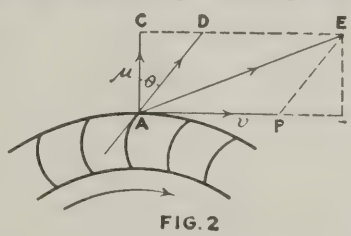


FIG. 2

FIGS. 1 AND 2—VELOCITY DIAGRAMS OF TWO FANS

The left-hand fan has the blades turned back and the right-hand is of the Sirocco type with the blades turned forward. AC is the radial component of the velocity of the air, or u. AD is the velocity of emission of the air relative to the peripheral speed of the tip of the blades. AB is the peripheral velocity of the fan. AC is the resultant of these velocities, which is less than the peripheral velocity when the blades are turned back as in Fig. 1 and greater than that velocity when the blades are turned forward as in Fig. 2.

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[1] "A New Method of Measuring Ventilating Resistances, with Special Reference to the Operation of Mine Fans in Combination," *Transactions Institute Mining Engineers*, LXII (1921-22), p. 39.

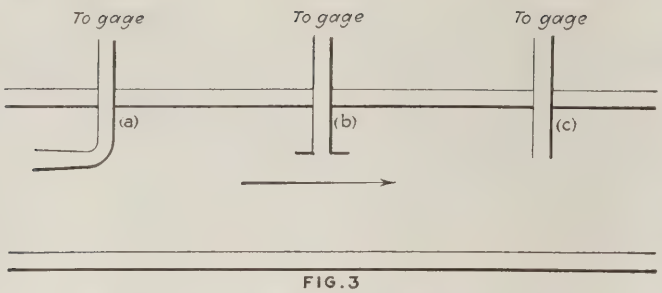


FIG. 3

FIG. 3—THREE WAYS OF SETTING A GAGE

The methods (b) and (c) both give faulty results. A zero or a negative indication may be obtained with a forcing fan and an excessively high reading with a suction fan. The gage should be placed as at (a) and should have limbs 3 or 4 ft. long. The glass should be clean. A little ox-gall in the water helps achieve this, but gasoline or benzine may be used instead of water.

perfect fan of the same dimensions and speed would be able to yield a pressure P when delivering the same volume of air. Thus we see that:

$$\text{Manometric efficiency} = F = \frac{p}{P} \qquad (4)$$

or, from equations (1) and (3)

$$F = \frac{R}{R + r} \qquad (5)$$

Hence the manometric efficiency allows us to determine the relation between the resistances in atkinsons of the mine and fan. For example, if a fan has a manometric efficiency of two-thirds (66.7 per cent), $r = \frac{R}{2}$, or the resistance of the fan is equal to half that of the mine. Again, if F is only 50 per cent, the mine and fan have equal resistances.

As it is obviously desirable that a fan resistance should be small in comparison with that of the mine, a high manometric efficiency is the best assurance we possess of the suitability of a fan to its task. In practice that efficiency, when rightly measured, usually lies between one-half and two-thirds; the fan resistance is therefore generally between 50 per cent and 100 per cent of the resistance of the mine. In such an expression of fan resistance, the losses due to imperfections of the casing and *évasé* chimney are included.

If the total pressure (or depression), termed P, in the above sections be multiplied by Q, the output of air, the product expresses the energy supplied to the fan to use or to squander. If Q is in hundreds of thousands of cubic feet per minute and P in pounds per square foot, that energy will obviously be in hundreds of thousands of foot-pounds per minute. As a matter of fact the quantity pQ is usefully employed in driving air through the workings and the remainder, or p_oQ, is wasted in the fan itself. Now the expression (equation 4) for the manometric efficiency can be rewritten:

$$F = \frac{pQ}{PQ}$$

or, if the numerator and denominator of the ratio be converted into horsepowers:

$$F = \frac{\text{Horsepower in the air}}{\text{Horsepower supplied to the fan}} \qquad (6)$$

The manometric efficiency is thus seen to conform to the accepted idea of an efficiency: It is a ratio of power given out to power put in. By the phrase "horsepower supplied to the fan" is meant the net power actually received by that machine without consideration of any external loss of power; it is the power that would be recorded by, say, a torsion dynamometer on the fan-shaft less the power lost by friction at the fan-bearings.

The "over-all efficiency" or "useful effect," E, of the fan plant is defined as:

$$E = \frac{\text{Horsepower in the air}}{\text{Electrical horsepower of driving motor or indicated horsepower of engine.}}$$

When both E and F have been correctly evaluated it is possible to draw up a useful energy balance-sheet, as in the following example:

A fan has a manometric efficiency of 60 per cent; the motor develops 80 electrical horsepower, the efficiency of the motor is 90 per cent, and the horsepower in the air is 40. The useful effect (from equation 7) is 50 per cent, and the brake horsepower of the motor, 72. From equation (6):

$$\text{Net hp. supplied to fan} = \frac{Hp.\ in\ air}{F} = \frac{40}{0.6} = 66.7$$

$$\text{Power lost in the drive} = 72 - 66.7 = 5.3 \text{ Hp.}$$

FAN PLANT: ENERGY BALANCE SHEET

Receipt	Hp.	*Expenditure*	Hp.
Electrical horsepower of motor	80	Loss in motor	8
		Loss in drive	5.3
		Loss in fan	26.7
		Horsepower in air	40
Total	80	Total	80

I have tried to emphasize the importance, in the practical sense, of the manometric efficiency; its value has never received proper recognition and has even been denied by some writers. Care must be taken in ascertaining it, and obviously the correct formulas must be used in the simple calculations involved. There is no doubt that these formulas are better understood by those dealing with centrifugal and turbine pumps than by those designing or running fans, and, as many books on mining contain serious blunders in this connection, it is perhaps advisable to look into the matter a little closely.

As most users of centrifugal fans are aware, the shape of the blades has a profound influence on the performance of the machine.

Figs. 1 and 2 show parts of the wheels of two fans, the former having vanes bent back from, and the latter bent forward toward the direction of motion. Both classes of machine are largely used. The angle at which the tips of the blades are bent is represented in each figure as θ, it being measured between a radius to the wheel and a tangent to the blade at its edge, A.

We will adopt the convention of giving θ a positive sign for a forward-trending vane (Fig. 2) and a negative sign for a back-turning vane (Fig. 1). The speed of the periphery of the wheel is in each instance v ft. per second, a velocity which is measured to scale along AB.

Let us consider the action of the perfect fan. It will deliver air in a uniform manner all round its circumference. If q cu.ft. be the air delivery per second, D ft. the diameter of the wheel, and B ft. its width at the periphery, the area of outflow round the wheel (neglecting the thickness of the blades) is πDB sq.ft. and the *radial* component of the velocity of the air on leaving the wheel must be u ft. per second, where

$$u = \frac{q}{\pi DB} \qquad (8)$$

AC (Figs. 1 and 2) represents this radial component in magnitude and direction.

The final velocity of delivery from the wheel must be the resultant of the velocity relative to the blade and of the velocity, v, of the wheel itself. AD represents,

in magnitude and direction, the velocity relative to the vane; that line is drawn as a tangent to the blade at A, and as the radial component is AC or u, its length must be correct. Taking the resultant of AD and AB, we obtain, in each diagram, the length AE as the velocity of emergence.

It will be observed that that velocity is less than the speed of the circumference when the blades bend backward and greater than that speed when they turn forward. In a fan like the Sirocco, in which the vanes point forward at about 45 deg., the speed of the air leaving the wheel exceeds the speed of the periphery of the wheel by about 80 per cent. In this we have the explanation of the high volumetric yield of fans of the type of Fig. 2.

Returning to the diagrams, the blades are responsible in each case for the creation, in the air, of the tangential component, AF, and, from the figures:

$$AF = v + u \tan \theta$$

(The sign becomes a minus for back-turning blades, for θ, under our convention, is then itself negative.)

If w lb. be the weight of a cubic foot of air, qw lb. are delivered per second; hence:

Tangential momentum gained per second

$$= \frac{qw}{g} (v + u \tan \theta);$$

and, as momentum gained (or destroyed) per second is itself the measure of the force creating (or destroying) the momentum, the last expression evaluates the tangential force in pounds, acting at the circumference, which has to be overcome by the source of power. As that force is moved a distance v ft. per second we obtain:

$$\text{Work done per second} = \frac{qw}{g}(v + u \tan \theta)v \text{ ft.-lb.}$$

Now in the fan of 100 per cent manometric efficiency under consideration all this work is used in delivering air against a pressure. A simple way of regarding that pressure is as the weight of a column of air H ft. high, and that is equivalent to a pressure of Hw lb. per square foot. The work done per second is therefore Hwq ft.-lb. Therefore

$$Hwq = \frac{qw}{g} (v^2 + vu \tan \theta)$$

or

$$H = \frac{v^2 + vu \tan \theta}{g} \qquad (9)$$

When the blades are radial at their tips, $\theta = 0$, and this important equation reduces to

$$H = \frac{v^2}{g} \qquad (10)$$

Again, when vanes point forward at 45 deg., $\tan \theta = 1$, and equation (9) becomes

$$H = \frac{v^2 + vu}{g};$$

when they point backward at 45 deg. it becomes

$$H = \frac{v^2 - vu}{g}.$$

Many of the older textbooks give equation (10) but lead the reader to infer that it applies to all kinds of fans. We have just seen that it relates only to fans having radially tipped blades and that the general form, equation (9), must be used in all other cases. The error involved by using equation (10) when equation (9) should be employed is often serious; it is always sufficient to render abortive any attempt to apply the manometric efficiency to any of the problems here discussed. In other works, and in papers by persons who should have known better but apparently do not, is to be found the expression $H = \frac{v^2}{2g}$

To illustrate the manner of applying equation (9) consider the case of a Sirocco fan 5 ft. in diameter and 6 ft. wide, running at 300 r.p.m. having vanes inclined forward at 45 deg. and delivering 90,000 cu.ft. of air at 2-in. water-gage. Here, as there are five revolutions per second, and as the circumference is 5π ft.,

$$v = 5 \times 5\pi = 78.6 \text{ ft. per sec.}$$

From equation (8):

$$u = \frac{\frac{90{,}000}{60}}{30\pi} = 15.9 \text{ ft. per sec.}$$

From equation (9):

$$H = \frac{v^2 + vu \tan 45}{g} = 230.5 \text{ ft.}$$

Taking 0.075 lb. as an average value for w, the weight of a cubic foot of fan-drift air, the equivalent pressure in pounds per square foot is 230.5 × 0.075, or 17.3.

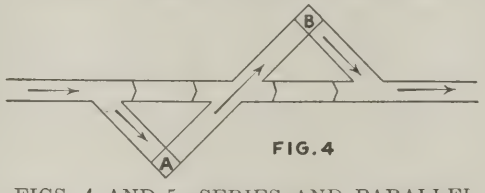


FIG. 4



FIG. 5

FIGS. 4 AND 5—SERIES AND PARALLEL FANS RESPECTIVELY

The author counsels, as have all other authorities, against series fans even where their manometric efficiency is high. It is better to run a single fan at a high speed. Where the manometric efficiency is low two fans deliver little more than one running at the same speed. Fans in parallel have a theoretical advantage and that is particularly evident where the manometric efficiency is quite low—that is, where the fan is based more in overcoming its own resistance than that of the mine. However, both fans in parallel must have precisely equal speed or one fan may draw air backward and through the other or at least take the most of the air.

The actual pressure realized, in the same units, is 5.2 × 2, or 10.4. Hence the manometric efficiency is $\frac{10.4}{17.3}$ or 60 per cent.

A large number of experiments on fans of various kinds have proved that when the mine resistance is kept constant the volume of air delivered per minute varies directly with the speed or if n be the number of revolutions per minute, and k a constant,

$$Q = kn \qquad (11)$$

A number of important conclusions follow from this simple relationship. For example, p varies as Q^2; therefore p varies as n^2, a result that is verified by experiment. Also power consumption varies as Q^3; hence power varies as n^3. Again, v varies as n and q as Q; therefore from equation (8), u varies as v, or the radial component of the air flowing from the wheel is proportional to the tangential velocity of the periphery of the wheel.

Let $\frac{u}{v} = c$; then equation (9) becomes

$$H = \frac{v^2}{g} (1 + c \tan \theta) \qquad (12)$$

As the terms in the brackets are constant so long as the mine resistance remains constant, and as H has been shown to be proportional to the total pressure, P, needed to circulate the air, again the combined resistance of fan and mine, we have P varies as v^2 and also as n^2, but, as just stated, p also is proportional to n^2. Hence the manometric efficiency $\left(\frac{p}{P}\right)$ is constant and

independent of the speed of the fan so long as the mine resistance is kept constant. As the manometric efficiency has been shown above to be equal to $\frac{R}{R+r}$, the satisfactory conclusion is reached that r, the resistance of the fan, also is independent of the speed of the fan.

Dozens of otherwise useful fan tests have been spoiled by taking the water-gage incorrectly. Most engineers now realize, however, that the end of the gage tube should be turned to face to windward as in Fig. 3 (*a*); otherwise the pressure or depression registered becomes affected by the velocity of the air, which in fan drifts is high. With either of the arrangements (*b*) or (*c*) it is quite possible, by placing

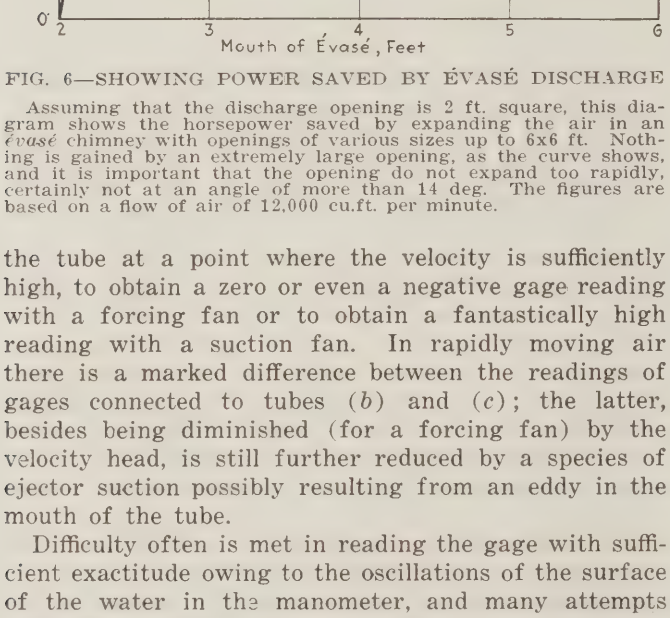


FIG. 6—SHOWING POWER SAVED BY ÉVASÉ DISCHARGE

Assuming that the discharge opening is 2 ft. square, this diagram shows the horsepower saved by expanding the air in an *évasé* chimney with openings of various sizes up to 6x6 ft. Nothing is gained by an extremely large opening, as the curve shows, and it is important that the opening do not expand too rapidly, certainly not at an angle of more than 14 deg. The figures are based on a flow of air of 12,000 cu.ft. per minute.

the tube at a point where the velocity is sufficiently high, to obtain a zero or even a negative gage reading with a forcing fan or to obtain a fantastically high reading with a suction fan. In rapidly moving air there is a marked difference between the readings of gages connected to tubes (*b*) and (*c*); the latter, besides being diminished (for a forcing fan) by the velocity head, is still further reduced by a species of ejector suction possibly resulting from an eddy in the mouth of the tube.

Difficulty often is met in reading the gage with sufficient exactitude owing to the oscillations of the surface of the water in the manometer, and many attempts have been made to damp the vibration by introducing a resistance at the bottom of the U-tube or elsewhere. It is inadvisable, however, to put in resistance at such a point; it becomes effectual only when the sensitiveness of the gage has been seriously diminished. After a number of trials of other methods I found that the best manner of steadying a gage is to make it large.

If the manometer be formed of a glass tube of 1-in. bore and having limbs 3 or 4 ft. long it is as sensitive as a small gage and the inertia of the water is sufficient to prevent rapid oscillations. It is important that the glass tube be thoroughly clean, or the meniscus does not form properly. A little ox gall in the water helps to keep the surfaces clean. A better way is to use gasoline or benzine instead of water; for these liquids, besides being lighter, are grease solvents and keep the tube clean.

The possibility of increasing the air volume by installing a second fan to run in series with the first has exercised the minds of many. When it has been tried the increase usually has been disappointing, though the adoption of fans underground working in series with a surface fan is a common expedient.[2]

Consider an arrangement such as that of Fig. 4, where there are two fans, A and B, which can be run either independently or in series. Let us assume that they are identical in every way. The resistance of the mine is R atkinsons, and that of either fan r atkinsons.

A test carried out with a single fan running enables the manometric efficiency to be ascertained, whence, by the aid of equation (5), the relation between R and r is determinable. When one fan only is running, the doors adjacent to the other being open, the total resistance is $(R + r)$ and from (3)

$$P_1 = (R + r)Q_1^2$$

Hence

Net power supplied to one fan

$$= P_1Q_1 = (R + r)Q_1^3 \qquad (13)$$

When the fans operate in series, delivering a volume Q_2, the total resistance of the system is $(R + 2r)$ and the total pressure required to overcome it is P_2, where: $P_2 = (R + 2r)Q_2^2$ or

Net power supplied to two fans in series

$$= P_2Q_2 = (R + 2r)Q_2^3 \qquad (14)$$

Let us inquire what happens when the power supplied to the fans in series is equal to the *sum* of the powers that would be supplied to the fans were they to run singly. From equations (13) and (14):

$$(R + 2r)Q_2^3 = 2(R + r)Q_1^3$$

$$\text{or } Q_2 = Q_1\sqrt[3]{\frac{2(R+r)}{R+2r}} \qquad (15)$$

It may be interesting to compare the results obtainable in this way when the fans have manometric efficiencies of 100, 67, and 50 per cent. For the perfect or 100 per cent efficient fan, $r = 0$; and, as has been shown above, for the 67 per cent fan, $r = \frac{R}{2}$, while for the 50 per cent fan, $r = R$. After applying equation (15) to each of these cases the results may be tabulated thus:

Manometric Efficiency	$\frac{r}{R}$	$\frac{Q_2}{Q_1}$
Per Cent		
100	0	1.26*
67	0.5	1.14
50	1	1.10

* This result was derived in the paper previously mentioned where a less rigorous method of analysis was followed. It is now seen to be correct only when the resistance of the fan is negligible, a condition never obtained in practice.

Had the same power been applied to one of the fans as has now been given to the two in series (and it could be so applied by increasing the speed of the fan by 26 per cent) the resulting increase in volume delivered by that fan running alone would have been 26 per cent. From the point of view of power consumption then it is clearly preferable to endeavor to increase the air discharge by speeding up a single fan rather than to place another fan in series with it; moreover, the lower the manometric efficiency the less effectual is the latter expedient.

In a few mines the circulation of air is altogether provided by means of underground fans operating in separate seams or in different sections of the same seam. Such fans work in parallel. In other cases there are two fans at the surface which can be arranged to operate either singly or in parallel. We will consider

[2] See "Uses for Underground Fans," by H. Briggs: *Coal Age*, vol. 8, 1915, p. 370.

the latter instance (see Fig. 5, where two exhausting fans are shown), and will assume the fans to be identical in every way, and to be running at the same speed.

When both are working each will deliver half the total volume passing, or $\frac{Q_2}{2}$, and the relation:

$$p_0 = r\left(\frac{Q_2}{2}\right)^2 = \frac{rQ_2^2}{4}$$

will hold true for the pressure needed to overcome the resistance of either machine. The usual formula: $p = RQ_2^2$ expresses the pressure required to overcome the mine resistance. Hence the total pressure to be exercised is $P_2 = \left(R + \frac{r}{4}\right) Q_2^2$ and the power to be applied $= P_2Q_2 = \left(R + \frac{r}{4}\right) Q_2^3$. The equivalent relation for a single fan is $(R + r)Q$. If these powers are made equal it is clear that a greater volume will be circulated when the fans are in parallel than when one is running alone. The benefit will be the greater the higher the resistance of the fans, and would in fact be zero if that resistance be negligibly small. An interesting exercise may in this case be made by comparing the power consumption when the quantity of air is kept the same, or when $Q_1 = Q_2$; that comparison is here set forth:

Manometric Efficiency	$\frac{r}{R}$	$\frac{\text{Power when both fans run}}{\text{Power when one runs}}$
100	0	1
67	0.5	0.75
50	1	0.62

To sum up: The conclusions as to fans in parallel differ radically from those relating to fans in series. The advantage of parallel running is small when the manometric efficiencies are high, but if those efficiencies are low considerable power is saved by that manner of operation. Experience shows that fans in parallel require careful speed regulation, and a ready means of speed adjustment thus becomes imperative. A small drop of speed in one causes the second to draw air in the reverse direction through it, with a corresponding increase of the load on the second fan.

The expanding, *évasé* or discharge duct of a fan, first introduced by Guibal, is, when correctly designed, an important means of improving efficiency. The function of a fan, like that of a battery on an electric circuit, is merely to produce a difference of pressure; any kinetic energy carried away by the air is so much energy wasted. The *évasé* effects a conversion from kinetic energy into pressure energy.

The chimneys used for suction fans may expand on opposite sides only, the other sides being parallel, or all four sides may be inclined outward. We shall here consider the latter form.

If the base or throat of an *évasé* be a ft. square, and the mouth b ft. square; if q cu.ft. per second be the volume of air passing up the chimney, and w lb. the weight of a cubic foot of air, then the air-velocity at the throat is $\frac{q}{a^2}$ and at the mouth $\frac{q}{b^2}$; hence, if the *évasé* is perfect in operation the saving in kinetic energy effected by the chimney

$$= \frac{qw}{2g}\left(\frac{q}{a^2}\right)^2 - \frac{qw}{2g}\left(\frac{q}{b^2}\right)^2$$

$$= \frac{q^3w}{2g}\left(\frac{1}{a^4} - \frac{1}{b^4}\right) \text{ ft.-lb. per sec.} \qquad (16)$$

In practice the term $\left(\frac{1}{b^4}\right)$ is so small in comparison with $\left(\frac{1}{a^4}\right)$ that it often may be neglected; for example, if $a = 2$, and $b = 4$ ft., the second term in the brackets is $\frac{1}{256}$ while the first is $\frac{1}{16}$; the error due to disregarding the former entirely would thus be only 6 per cent. We gather from equation (16) that the first part of the chimney is the most important. This fact is well shown by Fig. 6, which relates to an *évasé* 2 ft. square at the base and delivering 12,000 cu.ft. of air per minute ($q = 200$). If the air is allowed to escape direct from the 2 x 2-ft. opening, 1.06 hp. is lost in the form of kinetic energy; if a chimney expanding from 2 ft. square to 2 ft. 6 in. square were adopted a saving of 0.63 hp. would be effected. The saving would be 1.0 hp. if the chimney were enlarged until the mouth was 4 ft. square. Any further increase of size beyond that figure is of negligible service.

As a matter of fact it is highly doubtful whether a fan *évasé* ever effects more than 50 per cent of the saving indicated by equation (16). Many years ago Hennan and Gilbert carried out experiments on expanding chimneys of which two sides were parallel, and the others were capable of being set at different angles. Most of the efficiencies of *évasés* as determined by them lay between 40 and 50 per cent.

A duct of this character which expands too quickly is almost useless; the air stream does not fill it, choosing rather to follow one side or corner and producing a re-entrant current at the opposite side or corner. My experiments on air issuing from an orifice indicate that the stream expands at an angle of about 14 deg. The angle between opposite sides of a chimney square in section should be less than this, and one of 10 deg. is satisfactory. The further the inlet to the *évasé* is removed from the revolving blades the better the result.

Waste Fuels Are Grouped by the U. S. Bureau of Mines into two distinct classes—"Autocombustibles," which maintain their own combustion after ignition, and combustibles which will not burn without the addition of heat from an outside source or without mixture with an autocombustible. This second class may be termed for convenience "semicombustibles." With the improvement of furnaces for handling waste fuels, certain materials that were previously considered as semicombustible have joined the list of autocombustible fuels. Semicombustible fuels resist self-ignition mainly because they contain excessive moisture, ash and refuse, and have a physical structure that tends either to resist the passage of the draft or to form large openings in the fuel bed that admit much more air than is required for combustion; too little or too much air lowers the furnace temperature and the conditions that make for efficiency.

The Washington Society of Engineers and the Washington section of the American Society of Mechanical Engineers, in sending out an invitation to a joint meeting to be held this week, ran the following line of black-face capital letters on the invitation: "Order your coal early." Nothing pertaining to coal is to be discussed at the meeting. It apparently is an effort on the part of these societies to uphold the hands of the U. S. Coal Commission and of the Federal Fuel Distributor in the face of adverse criticism, in their advice to lay in stocks of coal at as early a time as possible.



Problems of Operating Men

Edited by James T. Beard



Featuring a Mine Explosion at Universal City, California

Filming a Mine Disaster—Chance to Instruct Public Regarding Mining Conditions—Picture Fails Because Mining Men Were Not Consulted

A MOVING picture director once told me that when he wanted advice on scenes involving mining operations he called on somebody at Los Angeles. That procedure might be all right for certain operations, such as those connected with metal mining, but for suggestions suitable to depict an explosion of gas at a coal mine our producer would have been wise if he had called on an engineer from, say the Pittsburgh district. Furthermore, to give the correct sequence of events in a scenario he should follow the story upon which the film is based.

I refer to a moving picture recently released by the Universal Pictures Corporation, and shown in New York and Pittsburgh, under the title of "The Flame of Life." A full-page ad. in *The Saturday Evening Post* of Feb. 5 drew my attention to the forthcoming production, and I lay in wait for it, as also did others. The picture is based on "That Lass o' Lowrie's," a novel by Frances Hodgson Burnett, and the locale of the scenes is at the coal-mining town of Riggan, Lancashire, England, in the seventies, when the early Davy safety lamps were used.

Opportunity to Educate Public in Mining Lost Because Film Portrays Unsafe Acts

This story affords a good chance to instruct the people in non-technical language, and at the same time to broadcast a lesson on the ventilation of gassy mines and the dangers from miners tampering with safety lamps and smoking underground. But the chance was lost. And to cap it all, after the explosion, at a dozen intervals of a minute or so there were great tongues of flame darting out of rooms into the entries and also out of the pit mouth. In spite of this flame shooting from the shaft, the heroine, with long hair, unprotected and nicely combed, clambered down to the bottom uninjured. There she pushed her way through an excited crowd of miners and eventually saved the "overman" (foreman), her lover, just as he was being swirled away by a rushing torrent of water (feet deep), presumably let loose by the explosion. Of course that was before the days of organized rescue crews or apparatus of any kind, and the heroine with others just battled against the afterdamp, although they were nearly overcome several times.

That's what the picture showed the public. But the real story briefly runs like this: This particular mine, and also near-by collieries, was gaseous. There had been explosions. Ventilation was effected by means of furnaces at the shaft bottoms, and at one mine, the return air, laden with methane, had been ignited at a furnace, with disastrous results. Derrick, a progressive overman at the mine of the story, had studied ventilating fans in Belgium, and wished to introduce them in place of the furnaces. But he encountered much opposition from miners and owners alike. Both were accustomed to a few casualties, which did not rouse anxiety unless there was a large loss of life.

Dangerous Practices of Miners Displayed as Prominent Features of Film

While Davy key-locked safety lamps were used, some of the men had keys, and lit their pipes from the flame of the lamp. Old Dan Lowrie was the worst offender, and hated the overman; but eventually he was caught and discharged. He tried to murder the overman, but was himself murdered on the surface, and not by a fall of roof underground, as shown in the picture. After repeated efforts to induce the owners to install fans the overman resigned, but on his last day, when underground, an explosion took place. A parson and Lowrie's daughter joined the rescuers and went below, and found the overman in a "gallery" (entry) which was perfectly dry. He recovered; the owners reinstated him, and adopted his plans for ventilation.

When will the moving pictures try to do the thing properly, A coal-mining engineer could have put them straight in a few minutes; so would the many mining films on file with the U. S. Bureau of Mines at its Pittsburgh Experiment Station.

Of course there were other scenes in this picture which were fairly well portrayed, but they concerned the sorting of the slate from the coal, and the everyday life of the people of Riggan, including the drinking bouts of Dan Lowrie, the inevitable fight, and a sentimental scene or two. And, by the way, the acting of the overman was pretty good.

Pittsburgh, Pa. M. W. von Bernewitz.

Relative Safety of Safety Lamps

Study intention of protective parts—Principle of wire gauze—Purpose of shield or bonnet—Precautions in removing gas and use of lamp.

WHEN reading the letter of W. H. Moore, regarding the relative safety of safety lamps, *Coal Age*, Jan. 25, p. 184, it seemed to me that the proper assembling and testing of a flame safety lamp are not the only important matters to which attention should be given in the use of the lamp. We should study carefully the intention and purpose of each protective part and use the lamp in a way that will not violate such purpose.

The account given by Mr. Moore, in reference to the supposed failure of the Wolf double-gauze safety lamp carried by the fireboss, at the time of the Wakesiah mine explosion, Nanaimo, B. C., leads me to think that

one or more of the vital principles of the lamp were violated by the fireboss and he suffered the penalty of his disregard of what makes a safety lamp safe.

In the first place, it is hardly necessary to refer to the oft repeated principle of the wire gauze that protects all openings in a safety lamp. It is well known that the wire must be kept cool so as to cool the hot or burning gas within the lamp, as the tiny streams of gas and air pass out through the mesh of the gauze. The temperature must be kept below the temperature of ignition of the gas in order to prevent the passage of flame through the gauze.

Lamp Unsafe in Strong Air Current

Besides keeping the gauze cool, there is another important item to be considered; namely, guarding the lamp against a strong air current traveling at a high velocity. The bonnet of the Wolf lamp, or the shield of the Davy is intended to protect the flame of the lamp in this regard. A high velocity of the air striking the lamp greatly assists the miniature streams of air and gas in passing through the mesh of the gauze.

Experiments have shown that an unbonneted Davy lamp is unsafe when exposed to a current having a velocity greater than 6 ft. per sec.; and the bonneted Wolf lamp is found likewise unsafe in a current of over 40 ft. per sec. Mr. Moore expresses the belief that, in the Wakesiah disaster the lamp had become heated by long use during seven hours prior to the explosion.

In addition to this heated condition of the lamp and with a full knowledge of the fact, the fireboss appears to have carried the lamp up the pitch against a current that Mr. Moore estimates as having a velocity of anything from 2,000 to 3,500 ft. per min., which would be considerably in advance of the safe limit of the Wolf lamp.

Constructive Principle of Lamp Violated

Assuming this summation is correct, who will deny that the constructive principles of the safety lamp were grossly violated and two lives were forfeited by reason of the act. Considering the plain intent of the wire-gauze chimney and the protecting bonnet with which the Wolf lamp was equipped, was not the safety value of the lamp depreciated when the fireboss carried his heated lamp against a strong current of air highly charged with gas?

A word, before closing, regarding the safe removal of a body of gas accumulated in a lodgment in the roof, as in this case. To attempt to remove such explosive gas at a high velocity is extremely dangerous. More time should be taken to enable the gas to be moved at a low velocity that would be safe.

A common error among mining men is to use any means that will drive out a body of gas in the quickest way possible. As in this instance, compressed air under high pressure is often employed, the air blast being directed against the gas at a very high velocity.

Brushing Gas a Dangerous Practice

Accumulated gas should always be moved by the ventilating current. Any method of brushing out the gas with a coat or a gunnysack, or blowing it out with compressed air involves many risks and should be prohibited by the law in every coal-mining state, as it is in many. The ventilating current should be made to sweep all cavities or lodgments in a manner that will prevent gas from accumulating in such places.

By way of summation, let me repeat the following precautions that should be taken in working a gassy seam:

Remove all gases with the ventilating current of the mine properly directed, and use no other means for that purpose. Allow no workmen in the mine, other than those employed in the work when removing a large body of gas. Gas should never be disturbed from its lodgment, however small the accumulation may be, without first notifying and withdrawing all men working on the return air current.

Test all flame safety lamps before they are taken into the mine, using for that purpose an explosive mixture, in a manner similar to that described in *Coal Age*, Dec. 28, p. 1042. Avoid any rapid movement of a safety lamp. When testing for gas never expose the lamp longer than to observe the first indication of a flame cap. Such indication is a sufficient warning to remove the lamp slowly and promptly from the mixture. Never expose a lamp to a high velocity of the current.

If an electric cap lamp is used, never break any connection or contact in order to cut out the light; but when making a test, the glare of the electric light should be prevented by screening the lamp.

Walsenburg, Colo. WILLIAM H. JAMES.

Bumping in Pillarwork

Instances of bumps in drawing back pillars—Bumping distinct from outbursts of gas in virgin coal—Flushing as a means of preventing bumps.

WITH much interest I read the letter of R. W. H., writing from Victoria, B. C., on the subject of outbursts of gas and bumps. In taking exception to the suggestion of a previous writer regarding the efficacy of the proposed stowing of waste in the worked-out portions of mines to prevent the occurrence of bumps, he asks if that writer had ever known of bumps occurring in worked-out areas.

If he will permit me, I can refer him to at least three instances where severe bumps occurred in mine areas or sections from which the pillars were being removed. Two such instances occurred in the State of Washington and one in the State of Wyoming. In neither case did the bumping occur in the live workings, which would seem to refute the idea he sets forth that bumps are always associated with the working of solid coal.

Severe Bumps Occur in Worked-Out Areas, Under Similar Conditions

In these three instances there is much similarity in respect to the surrounding conditions. In each case the bumping began in areas from which the pillar coal was being removed, under a depth ranging from 1,800 to 2,100 ft. of vertical cover, the roof being exceedingly strong while the floor was much weaker. The bumping was severe and resulted in the killing of three men and three locomotives were buried on the haulage roads.

In my opinion, there is an absolute distinction between outbursts of gas in virgin coal and bumps such as these occurring in areas from which the pillars are being removed. In the State of Washington, outbursts of gas have occurred in the solid coal of the advance workings. The same phenomenon occurred, also, in a mine on Vancouver Island and in several mines of the Crows Nest Pass district of British Columbia.

To my mind, the question of bumps in coal mining is an important one and should receive the serious consideration of mining men, both in the States and in Canada. It would be deeply interesting if the matter could be discussed in *Coal Age* and the experiences given of men who have studied the subject from an intimate association with such occurrences.

Facts and Data Regarding Occurrence of Bumps and Outbursts of Gas Wanted

Undoubtedly, the narration of incidents and citation of facts would throw much light on conditions in the mines that invite or make possible these occurrences. As far as practicable, measurements of the quantities of gas set free should be given, the condition of the mine described, and the possible relation of the bumping to the area worked out and the depth of cover and character of the roof and floor.

Personally, I am of the opinion that the proposed method of filling worked-out areas in mines, by the stowing of waste or by flushing, as the case may be, would be helpful in preventing the occurrence of bumps in areas from which pillars are to be removed.

However, the distance of movement of the roof, under the enormous pressure due to the weight of the overburden, can be comparatively small and still create a considerable disturbance within the area when the roof lets go. For this reason, the filling of the waste must be reasonably complete and the material well settled if good results are to be accomplished.

G. W. Evans,
Seattle, Wash. Consulting Coal-Mining Engineer.

Inquiries Of General Interest

Gobbing Slate in Rooms in Mines

Rooms Turned Right and Left Off Pair of Entries—Slate to Be Gobbed in Each Room —Manner of Gobbing Depends on Conditions

HAVING recently opened a mine on the room-and-pillar system and being desirous of securing the best possible economic results in respect to cost of operation and complete extraction of the coal, I take the liberty of asking the opinions of *Coal Age* and its practical readers regarding the most feasible and best method of gobbing the slate that must be taken down in the rooms.

In deciding this question we wish to have in mind and take into consideration the later extraction of the pillars, driving of breakthroughs, trackwork and timbering of roads. Realizing that each and all of these features have an important bearing on the economic working of a coal mine, we desire to start right.

The question we would like to ask is, Which is the most practical side to gob the slate in these rooms? It would be interesting to have the various features of gobbing slate in rooms broadly discussed and hoping for this we shall watch these columns each week to learn something new.

A. L. Trimble,
Big Shoal, Ky. James Hatcher Coal Co.

The question of the most practicable method of gobbing slate, in driving rooms in mines, is so closely allied to many other features that unfortunately are omitted, it is only possible to reply in a very general way to this inquiry.

In the first place, conditions may make it advisable to drive double rooms, with track laid along each rib to facilitate the taking out of the wide pillars separating the rooms. In that case, the slate is gobbed in the center of the room between the tracks.

In driving single rooms, the track is generally laid along the straight rib and the slate is then gobbed on the opposite of the track, keeping it clear of the other rib so as not to hinder the drawing of that pillar. Under certain favorable conditions of roof and floor, it often becomes advisable to lay the track in the center of a wide room, gobbing the slate on one side of the track only, preferably the low side.

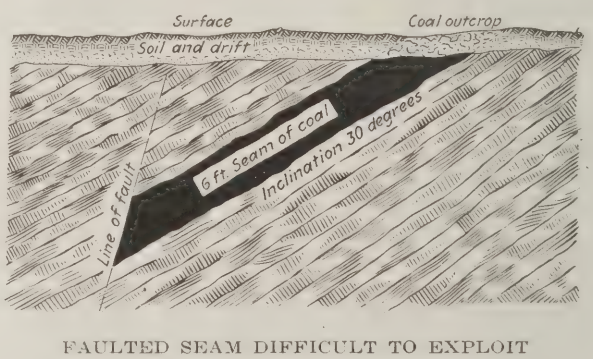
Locating the Coal Beyond a Fault

Bore holes in roof and floor to determine whether fault is normal or reverse—If normal, follow the greater angle the seam makes with the line of fault—If reverse, follow the lesser angle.

SINCE reading recent references to finding the coal beyond a fault, which have appeared in *Coal Age*, I am anxious to present a case that has puzzled us and which, as yet, we have not been able to solve. As shown in my sketch, we have a 6-ft. seam of coal outcropping on the surface and dipping at an angle of about 30 deg. We were driving a slope in this seam and had gotten down to a considerable depth when the coal was suddenly cut off by the slip or fault such as I have shown in my sketch. All efforts to find the coal beyond this point have, thus far, proved unavailing and I would like to ask how we should proceed with some assurance of success.

Joseph Lawrence.
Hazleton, Pa.

Judging from the sketch, which is here shown in the accompanying figure, assuming the fault to be normal,



FAULTED SEAM DIFFICULT TO EXPLOIT

it is a downthrow. This, however, must be determined before the work of finding the continuation of the seam can be prosecuted with any assurance of success. It may happen that the fault is a reverse fault, in which case it would be an upthrow.

In order to determine whether the fault is normal or reverse, a borehole must be sunk in the floor if the lesser angle between the fault line and the seam is at the roof; or a borehole must be put up in the roof if the lesser angle is at the floor. If the fault is a reverse,

one of these boreholes should find the coal if extended sufficiently far. If the fault is normal, the borehole will not reach the coal in either case.

Again, if the fault is normal, the continuation of the seam will be found by following the direction of the lesser angle. In the case of the reverse fault, it is necessary to follow the greater angle to find the continuation of the seam.

Examination Questions Answered

Examinations Under the Mine Act, Alberta, June, 1922

(*Selected Questions*)

QUESTION—*Give the relative advantages and disadvantages of the Wolf and Edison safety lamps. State under what conditions you would adopt the use of either of them. Give reasons.*

ANSWER—There is no Edison safety lamp. As has often been explained in *Coal Age*, the term "safety lamp" has reference to a gauze-protected lamp designed to admit air and gas to the combustion chamber, while the passage of flame to the outside air is prevented by the cooling effect of the wire gauze. The question probably refers to the Edison electric cap lamp, as compared with the Wolf flame safety lamp. Both of these types of lamp are in common use in mines.

The Wolf lamp is particularly useful in determining the percentage of gas present in mine air, by observing the effect of the gas on the flame of the lamp. This is one of the chief advantages of that lamp over the electric cap lamp. The Edison lamp possesses the advantage, however, of giving a bright light that greatly reduces the danger of accident in mine workings. While the electric lamp has the advantage of reducing to a minimum the possibility of the ignition of gas in the mine, the lamp affords no means of detecting the presence of gas, which is its chief disadvantage. The principal disadvantage of the Wolf lamp is its liability to extinction when being introduced into a body of gas. Owing to the highly inflammable oil burned in the lamp there is often produced what is called a "fuel cap," formed by the volatile oil and which is often mistaken for a gas cap when practically no gas is present.

The Wolf lamp should be adopted and used for the examination of any mine generating gas. In general, the Edison electric lamp gives better service as a working lamp, in mines generating gas or dust. The electric lamp is also far superior to the open torch where a mine generates no gas.

QUESTION—*If it requires 10 hp. to pass 20,000 cu.ft. of air per minute through a mine, the pressure being 5 lb. per sq.ft., how many horsepower will be required to pass 25,000 cu.ft. per min., under the same pressure?*

ANSWER—For a constant pressure, the horsepower required to circulate air in a mine varies with the circulation, which gives the proportion, calling the required horsepower x,

$$x : 10 :: 25{,}000 : 20{,}000 = 12.5 \text{ hp.}$$

QUESTION—*In a mine where shotfiring is carried on, it is noticed that at different times the air contains approximately 2 per cent of methane (CH_4), but this does not occur at regular intervals. The coal is of a very hard nature and it is essential that shotfiring be done. State what is the highest percentage of gas in the air in which you would allow shotfiring to be carried on and what steps you would take to see that your orders were being obeyed.*

ANSWER—From the statement of the question, it appears that shotfiring must be performed in the working of this mine, owing to the hardness of the coal. It also appears that gas is generated at irregular intervals to such an extent that the mine air is charged with 2 per cent of gas, which would be a dangerous condition in the working of a softer or more inflammable coal. However, in this mine, it is important that, not only should the morning examination be carefully made, but competent firebosses should be in charge throughout the day, each having charge of a limited section of the workings. No shots should be permitted to be fired without having first been examined by the fireboss and the place tested for gas. Preferably all shotholes drilled by the miners should be examined, charged and fired by competent shotlighters, after the men have gone home. Constant inspection should determine any violation of the rules and such should be promptly and suitably furnished.

QUESTION—*Describe in detail how you would place the shotholes in driving an entry 10 ft. wide and 8 ft. high; and state how you would arrange the work so that drilling and loading could take place simultaneously. State the number of men you would employ on each shift.*

ANSWER—Much will depend on the hardness of the coal, but ordinarily it may be assumed that the coal at the face of this 10-ft. heading should be sidecut and mined before any holes are drilled or fired. The placing of the shots will depend on the character of the seam in respect to any partings that would make it advisable to work out the coal in benches. Also, much will depend on the relative hardness of the several layers making up the full height of the seam.

However, assuming a uniform quality of the coal from the top to the bottom of the seam, good results will probably be obtained by starting the first row of holes about the center of the coal face. These holes should be given a slight inclination toward the sidecut. Perhaps two holes will be all that will be required to break down the coal in this half of the heading. Care must be taken not to drill the holes beyond the depth of the sidecut or mining.

With proper care, the coal on each side of this heading can be worked out alternately, by shooting first on one side and then on the other. It may not be necessary to sidecut the coal on more than one side of the heading. Instead, the holes for the extraction of the second half of the face may be drilled as close as convenient to the rib. Experience will determine the best position of the holes and the number required. In any case, care must be taken not to locate the charts in the upper hole too close to the roof, to avoid danger of shattering the roof slate. In this arrangement, mucking and loading out of the coal can proceed on one side of the heading, while drilling is in progress on the other side. In general, two or three men at the most should be employed on each shift.

Strike Fails in Central Pennsylvania

The second edition of the 1922 strike in central Pennsylvania, which the United Mine Workers of America called on Monday, April 2, is a failure, so far as the union is concerned, resulting in tying up for a time the mines of the Bird Coal Co., at Kelso, and the Cambria Fuel Co., both in Somerset County, but on the other hand resulting in a large number of union miners who have been out on strike at Windber for one year applying for their old places when they saw there was nothing doing there.

When the strikers at Windber found they were not being backed, many of the men sought their old places, it being apparent that there would be nothing doing this summer and as the strike was called only to force recognition of the union and the collection of the check-off, they had nothing to gain, as the open shop mines are paying union wages and working the eight-hour day.

Because of embargoes on roads controlling the northeastern market and a continued inadequate car supply, conditions are improving but little in the central Pennsylvania field. The car supply on the Pennsylvania lines is but little in advance of 25 per cent. Production in the district during the month of March was 77,518 cars, as compared with 69,297 cars in February.

Normally there are approximately 13,000 men employed in the Somerset field, affected by the strike call. Approximately 1,200 have been on strike for one year. J. C. Brydon, president of the Somerset Coal Operators' Association, states that these men are divided into three groups: First, those who are following their honest convictions; second, those who are satisfied to accept the relief and are not anxious to resume work, and third, those who refuse to work under any conditions as long as they can exist without working.

As a result of the dynamiting of a steel car on Sunday night, April 1, at Jenners No. 2, Somerset County, all bridges and tunnels on the Somerset and Cambria branch of the Baltimore & Ohio R.R. are being guarded. John Brophy, president of District No. 2, issued an order to union men against violence, urging them to respect the law and property. It has not been fully determined who placed the charge of dynamite under the car at Jenners.

A slight disturbance occurred at Carpenter Park, where the Cambria Fuel Co. operates. It is charged that a crowd of women and children threw pepper into the faces of two deputy sheriffs as they were on their way to the mines. Two women were slightly injured when the deputies fired several shots to scatter the mob. The injured were taken to Johnstown for treatment and later taken to their homes.

Judge John Berkey, hearing the cases in the Somerset County Court against twenty-five men and women charged with contempt of court, the charge growing out of the strike one year ago, discharged four women and five men. Fifteen women were sentenced and one youth was paroled. The fines ranged from $10 to $100. The fines were paid.

Failure to Reach Agreement in Seattle Keeps 2,000 Idle in Washington

Because no way has been found of breaking the deadlock that ended a wage conference held nearly a month ago, 2,000 union mine workers have drifted into a strike in the Roslyn-Cle Elum coal field. The wage conference held in Seattle between representatives of the Washington Coal Oprators' Association and state district officers of the United Mine Workers ended when the mine workers declined to accept a cut of $1.50 a day in the wages of the day men.

It is the contention of the union representatives that not more than 15 per cent of the mine workers in the Roslyn-Cle Elum field would be affected by the day wage cut, as virtually all the coal is mined under the contract system.

The contention of the employers is that the wages now paid in the Roslyn-Cle Elum field are higher than are paid in the non-union mines of western Washington and that a reduction of the wages down the line would be justified.

The strike affects approximately 2,000 men. Of this number approximately 1,700 are employed in the mines of Northwestern Improvement Co., a subsidiary of the Northern Pacific Ry. The others affected are on the properties of the Roslyn Fuel Co., the Independent Coal & Coke Co. and the Roslyn-Cascade Coal Co. Ten mines will be shut down.

A unionized coal mine at Tono in Lewis County, western Washington, operated by a subsidiary of the Union Pacific R.R., also is involved. This mine employes about 200 men.

Martin J. Flyzik, state district president of the United Mine Workers, and John H. Wallace, commissioner of the Washington Coal Operators' Association, are now in the East to confer with officers of President Harding's fact-finding commission over the Washington situation.

1,000 Kanawha Miners Strike

Approximately 1,000 miners went on strike April 3 at the mines of the Oakland Coal Co., Crescent Coal Co., E. L. Michie and Edwin Marmet, in the Montgomery district of the Kanawha field, according to an announcement by D. C. Kennedy, secretary of the Kanawha Coal Operators' Association.

The strike came at the termination of the individual agreements between the miners and operators, Mr. Kennedy said. A delegation of the striking miners reported to headquarters of District 17, United Mine Workers, their action in refusing to go to work when the agreements expired. E. L. Michie was a member of the operators' scale committee and signed the scale on which the individual contracts were negotiated, Mr. Kennedy said.

Western Kentucky Strike Is Softening

The first sign of disruption has appeared in the ranks of the coal operators of Hopkins, Christian and Webster counties in western Kentucky who refused to sign a one-year contract with the miners' union, thereby drawing a strike on April 1. The Circle City Coal Co., at Nebo, is reported to have signed the one-year contract on the same basis as the rest of the unionized districts of the country. The company's mine employs about seventy-five men. Although there were reports that some of the other forty mines involved in the strike were to be reopened on an open-shop basis, nothing of the sort has occurred. All the rest of western Kentucky is working unaffected since the West Kentucky Coal Operators' Association has already signed with the union for one year.

Contract Not Renewed, Alabama Men Out

About half of the miners at the Beltona mine of the American Fuel Co., near Warrior, Jefferson County, Ala., are reported on strike as a result of refusal of officials of the company to renew the union contract which expired April 1. This was one of the few operations in the Alabama field working under a contract with the United Mine Workers, and it is understood that the management of the company will decline to negotiate another contract with the union. The daily production of the mine is about 1,000 tons.

Union Granted Appeal from McClintic Injunction; Argument May 2

Following arguments made on March 31, the United States Circuit Court of Appeals at Richmond on April 2 granted an appeal to the United Mine Workers of America from the injunction of Judge George W. McClintic, of the United States District Court for the Southern district of West Virginia, prohibiting the use for unionization of non-union mines of funds collected through the check-off from certain coal companies operating on a union basis in the Kanawha field. The appeal operates as a suspension of the injunction of Judge McClintic until a final determination of the case or until further order of the court. The case will come up for final argument at Richmond on May 2. Appearing for the United Mine Workers at the hearing on March 31 was William A. Glasgow, Jr., of Philadelphia, and for the non-union operators were S. B. Avis, A. M. Belcher and E. L. Greever.

Bituminous Coal Stocks Fall 2,000,000 Tons in Month; 22 Days' Supply on Hand March 1

Commercial consumers had in storage approximately 36,000,000 tons of soft coal on March 1, 1923, according to a survey undertaken by the Bureau of the Census and the Geological Survey under authority of the Federal Fuel Distributor. The steady upward trend in stocks since the end of the miners' strike early in September was interrupted in February and the reserves on hand decreased 2,000,000 tons. Stocks on March 1, 1923, were about midway between those on March 1, 1920, when the reserve supply was close to the lowest recorded, and those on March 1, 1922, when a very heavy tonnage had been stored in anticipation of a general strike of union miners.

Measured in tons, stocks decreased 5.3 per cent between Feb. 1 and March 1. Measured in terms of days' supply, the decrease was 8.3 per cent. The larger decrease in days' supply was due to the fact that the rate of consumption increased in February.

Assuming that the stocks were evenly divided, the supply on March 1 was sufficient to last 22 days, against 24 days on Feb. 1. When stocks dropped to 20,000,000 tons on June 1, 1920, the market was seriously disturbed, and on Sept. 1, 1922, when the supply on hand was 22,000,000 tons, there were urgent appeals for coal.

Stocks of anthracite in the yards of retail dealers on March 1 were 40 per cent less than on Feb. 1. The quantity of anthracite on the Lake docks was less than a fifth of what it was a month ago.

TABLE I—ESTIMATED TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL IN THE UNITED STATES *a*

(In net tons)

Oct. 1, 1916	27,000,000	Aug.	1, 1921	41,100,000
Oct. 1, 1917	28,100,000	Nov.	1, 1921	48,500,000
July 15, 1918	39,700,000	Jan.	1, 1922	48,000,000*b*
Oct. 1, 1918	59,000,000	March	1, 1922	52,500,000*b*
Day of the armistice	63,000,000	April	1, 1922 at least	63,000,000*bc*
Jan. 1, 1919	57,900,000	Sept.	1, 1922	22,000,000*b*
April 1, 1919	40,400,000	Oct.	1, 1922	26,000,000*b*
March 1, 1920	24,000,000	Nov.	1, 1922	32,000,000*b*
June 1, 1920	20,000,000	Jan.	1, 1923	36,000,000*b*
Jan. 1, 1921	45,800,000	Feb.	1, 1923	38,000,000*b*
April 1, 1921	39,500,000	March	1, 1923	36,000,000*b*

(*a*) The figures for 1918 in this table are based upon an actual count. Beginning April 1, 1919, the figures are estimates based upon reports from a selected list of 5,000 consumers whose stocks in 1918 bore a known relation to the known total stocks. (*b*) Subject to revision. (*c*) No canvass of consumers was made on this date. The total stock was estimated from the stock on March 1, ascertained by questionnaire.

The total quantity of soft coal in the hands of commercial consumers on March 1, 1923, was between 34,000,000 and 38,000,000 net tons, probably 36,000,000 tons. In this estimate no account is taken of coal in the cellars of householders, concerning which no statistics are available, nor steamship fuel, nor coal on the Lake docks, which is classed as coal in transit.

From Table I and Fig. 1, which presents the same data graphically, it is seen that coal was withdrawn from storage during February. Observers who have been watching the downward trend in production will not be surprised at the decrease of 2,000,000 tons in stocks. Indeed, the actual draft on available coal was greater than is indicated by the decline in consumers' stocks, as there was an appreciable decrease in the tonnage in transit. There is a considerable lag between the production of coal and its arrival at points of consumption, and the quantity to be accounted for on March 1 was that mined from Jan. 15 to Feb. 15, which was approximately 45,600,000 tons. It is estimated that consumption, including foreign bunker coal, plus exports, during February was approximately 47,600,000 net tons, or at the rate of about 1,700,000 tons per day.

The average stocks for all consumers on March 1 were sufficient to last 22 days at the rate of consumption in February. At the rate of consumption in January the stocks on Feb. 1 would have lasted 24 days. These statistics, shown by classes of consumers in Fig. 2 and in the table below, are based upon reports of tons on hand and actual consumption received from about 5,000 consumers, so selected as to be fairly representative of all commercial consumers. The rate of consumption used in calculating the days' supply on March 1, 1923, was the quantity actually consumed in February. The days' supply on March 1, 1922, was calculated by using the rate of consumption in January and February, 1922.

TABLE II—DAYS' SUPPLY OF BITUMINOUS COAL IN HANDS OF VARIOUS CLASSES OF CONSUMERS IN THE UNITED STATES, JAN. 1, 1919, TO MARCH 1, 1923 *a*

(Figures represent number of days supply would last at current rate of consumption at time of stock taking.)

	Jan. 1, 1919	Mar. 1, 1920	Jan. 1, 1921	Apr. 1, 1921	Jan. 1, 1922	Mar. 1, 1922	Sept. 1, 1922	Oct. 1, 1922	Nov. 1, 1922	Jan. 1, 1923	Feb. 1, 1923	Mar. 1, 1923 *b*
Byproduct coke plants	32	15	29	28	42	39	11	14	18	19	20	19
Steel plants	42	9	42	38	46	48	12	17	21	27	26	26
Other industrials	65	27	64	47	51	56	32	33	39	40	36	34
Coal gas plants	81	31	55	66	89	82	34	38	55	60	62	58
Electric utilities	49	21	44	48	51	54	26	30	32	33	35	34
Coal dealers, bituminous	39	13	30	26	33	23	11	18	21	16	15	11
Railroads	32	11	23	24	35	42	13	15	13	16	18	16
Total bituminous	42	18	39	36	41	43	17*c*	21*c*	23*c*	26*c*	24*c*	22*c*

(*a*) The figures in this table are estimates based on incomplete data. (*b*) See text for rate of consumption at which these figures were calculated. (*c*) Subject to revision.

Fig. 3 shows graphically the variation in stocks in each state. The map shows the days' supply held at general industrial establishments, excluding steel and byproduct coke plants. This is the largest group of consumers and the one that shows best the distribution of stocks. Changes in activity in this group are quickly reflected in the coal market, and likewise changes in the coal market soon become apparent in the reserve stocks of industrials.

Taking the country as a whole, the stocks held by general industrials were sufficient to last 34 days. This was a decrease of 2 days from the supply on Feb. 1, 1923. Comparison with corresponding dates in preceding years shows that the supply would have lasted 7 days longer than the stocks on March 1, 1920, and 22 days less time than those on March 1, 1922. In 23 states the supply on hand was sufficient for less than 30 days. In New England and the Atlantic Coast States, with the exception of New Hampshire, Maryland and North Carolina, the supply would have lasted more than 30 but less than 60 days.

It is evident from the quantity of bituminous coal delivered by the retailers that the deficit in the supply of anthracite has not been entirely made up and that the gap between production and requirements of anthracite is largely being filled with bituminous coal. For this reason

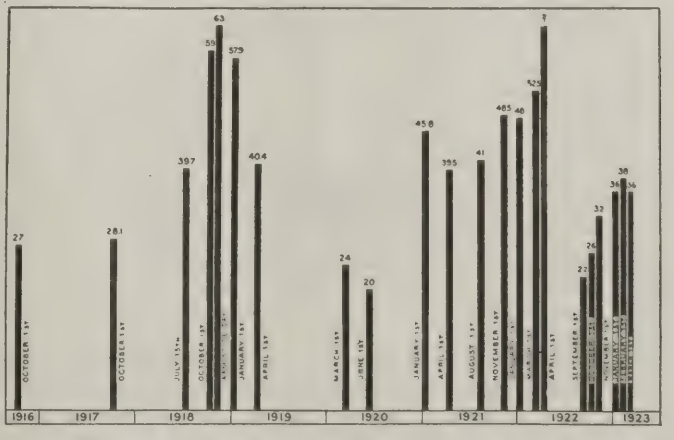


FIG. 1—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO MARCH 1, 1923

Figures represent million net tons and include coal in hands of railroads, industrial consumers, public utilities and retail dealers. Coal for steamship fuel, on Lake docks and in transit is not included. Figures for 1922 and 1923 are subject to revision.

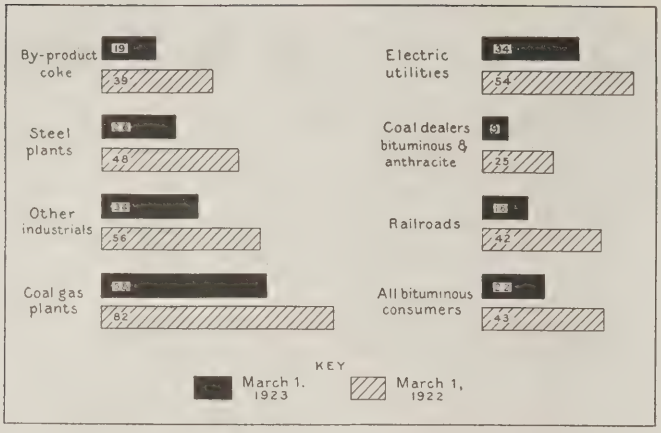


FIG. 2—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON MARCH 1, 1923, AND MARCH 1, 1922

At the rate soft coal was burned in February, 1923, the stocks on hand March 1 were sufficient to last 22 days. The stocks on March 1, 1922, when heavy reserves had been accumulated in anticipation of a miners' strike, were sufficient to last 43 days at the rate of consumption in January and February, 1922. The stocks on March 1 were sufficient for 2 days less time than those on hand Feb. 1, 1923.

it is desirable to consider bituminous and anthracite combined in the territory where hard coal is burned.

Outside the anthracite territory the situation was as follows: Stocks decreased in every state except Arkansas, Louisiana and Wyoming, where there was no change. Over the country as a whole retailers' stocks of bituminous coal decreased nearly 23 per cent. Increases occurred only in New Hampshire, Massachusetts and Virginia.

The quantity of unbilled coal at the mines increased from 165,000 tons on Feb. 1 to 183,000 tons on March 1, an insignificant part of the available supply. The tonnage at junction points and terminals awaiting reconsignment decreased from 65,000 to 43,000 tons.

Reports from an incomplete list of producers equipped to store show that nearly 950,000 tons were in storage on March 1 at the mines, against 860,000 tons held by the same producers on Feb. 1. The number of producers who store is small, but the quantity in storage may at times be considerable.

Stocks of byproduct coke decreased 40 per cent in February and the quantity on hand on March 1 was but 87,000 tons. This was barely one-tenth the stocks on March 1, 1922, when the reserve was heaviest.

Severe winter weather maintained the demand for anthracite at a high level throughout February, and retailers' deliveries so far exceeded receipts that stocks dropped

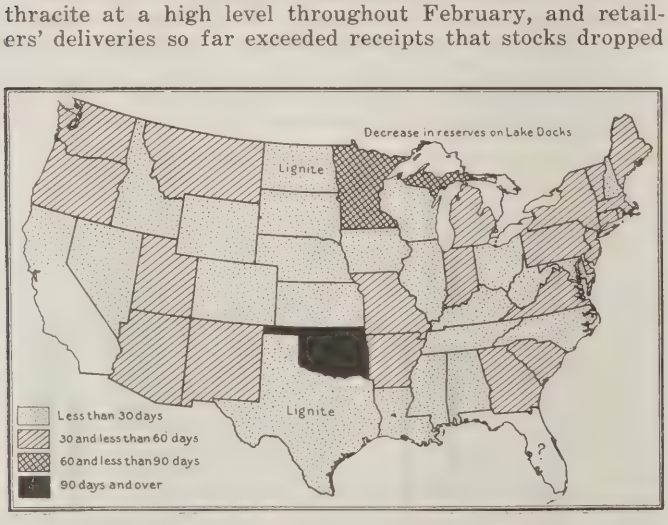


FIG. 3—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON MARCH 1, 1923

At the rate of consumption that prevailed in February, 1923, reserve stocks at industrial plants other than steel and byproduct coal would last on the average 34 days. The map shows how the supply varied from state to state. Note the absence of the darker shading which would indicate heavy stocks. Any change in business activity after March 1 which affected coal consumption would be reflected in the days' supply. Based on reports from 2,260 plants.

TABLE III—ANTHRACITE IN YARDS OF A SELECTED LIST OF RETAIL COAL DEALERS *a*

Date	Net Tons	Days' Supply *b*	Date	Net Tons	Days' Supply *b*
1919–Jan. 1	904,712	36	1922–Jan. 1	1,336,953	44
April 1	785,840	31	March 1	1,093,734	28
1920–March 1	727,727	21	1923–Jan. 1	403,605	11
June 1	515,149	15	Feb. 1	356,121	8
1921–Jan. 1	685,615	24	March 1	215,063	6
April 1	1,140,757	36			

(*a*) Based on statements from 368 identical dealers who reported on each date
b) Calculated at current rate of delivery to consumers, which varies.

sharply. The supply in the yards of 368 retail dealers on March 1 was 215,063 net tons, a decrease during February of 141,058 tons, or 40 per cent. Stocks were 80 per cent less than on March 1, 1922, 81 per cent less than on April 1, 1921, and 70 per cent less than on March 1, 1920. Retailers' stocks of anthracite on March 1, 1923, at the rate of delivery in February, would have lasted an average of 6 days, whereas the supply on March 1, 1922, was sufficient for 28 days, and on March 1, 1920, for 21 days.

Anthracite was mined at a high rate in March, but as cold, stormy weather prevailed in most sections of the anthracite-consuming territory during a large part of the month, it does not seem likely that reserves have increased greatly.

Reports from retailers in the anthracite-consuming territory indicate an increased demand for bituminous coal as a

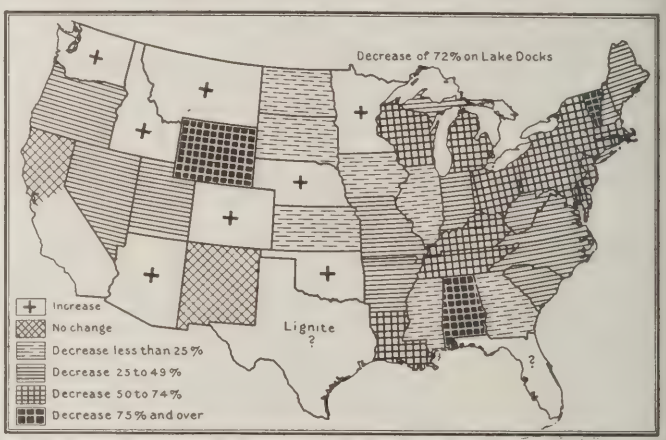


FIG. 4—HOW RETAILERS' STOCKS OF ALL COAL—ANTHRACITE AND BITUMINOUS—ON MARCH 1, 1923, COMPARED WITH THOSE ON MARCH 1, 1922

Stocks of bituminous coal in retail yards decreased in February and on March 1 were 24 per cent less than on Feb. 1. Stocks of anthracite were 40 per cent less than they were a month ago. The map shows how the supply of all coal—bituminous and anthracite—on March 1, 1923, compared with that on the corresponding date in 1922, when retailers had heavy reserves. All states east of the Mississippi except Minnesota had smaller stocks than a year ago.

substitute for anthracite. The February rate of delivery of bituminous coal in that territory was nearly 17 per cent higher than in January, which in turn was 20 per cent higher than the average rate of delivery in November and December, 1922.

Although large quantities of bituminous coal were secured by retail dealers to replace anthracite, demand in February was such that deliveries to consumers exceeded receipts, and total stocks of anthracite and bituminous combined fell off sharply. On March 1, 1923, the total reserve was 14 per cent less than that on Feb. 1, 1923, less than half that on March 1, 1922, and barely three-quarters that on March 1, 1920. The map in Fig. 4 shows how the stocks in each state on March 1, 1923, compared with those on March 1, 1922. It is seen that retailers east of the Mississippi had less coal on hand than a year ago. The only increase worthy of mention was that of 38 per cent in Minnesota, those in the Western States being small and of little importance.

Reports from the Northwestern Coal Dock Operators' Association indicate that the docks had been practically cleared of anthracite on March 1. It is estimated that the total quantity on hand on that date was approximately 10,000 net tons. On Feb. 1, 1922, there was 1,030,170 tons, on March 1, 1922, 821,448 tons, and on Feb. 1, 1923, 57,636 tons.

With Operators', Miners' and Public's Viewpoint Shown Coal Commission May Prescribe New Ethics

By Paul Wooton
Washington Correspondent of *Coal Age*

The outstanding feature of last week and one of the most significant events since the President's Coal Commission was formed, was the presentation of the argument and brief by Henry L. Stimson, counsel for the Bituminous Operators' Special Committee, on the policy and methods of the United Mine Workers of America. This presentation was in response to Governor Marshall's request for specific charges and evidence of violation of the rights of American citizens. There is abundant evidence that the commission realizes that the matters raised in this brief and which will be raised when the United Mine Workers make a similar presentation constitute the most dangerous rapids through which the commission must steer its craft.

The Senate Committee on Education and Labor, under the direction of former Senator Kenyon, of Iowa, undertook a similar investigation. The experience of that body was that it soon was flooded with a mass of testimony from each party to the controversy setting forth isolated cases and drawing from them a considerable variety of deductions. The history of the Kenyon investigation was that one outrage grew out of another and that it was impossible to trace back and ascertain who was responsible for the first overt act. Senator Kenyon soon gave up the effort to fix responsibility. He accepted the abundant evidence that a very unhealthy state of affairs existed and drew up a code of principles which recognized the rights of operators and mine workers and called upon each to put an end to the type of activities in which they were engaging.

It is fully expected that the Coal Commission will follow practically the same course. It is known that it will find indefensible acts for which each of the contesting interests is responsible. Since the police powers are vested in the state the opinion is held by some that the commission can do nothing more than set up a code and recommend that it be followed in the future.

Take Statements with Grain of Salt

There are no salt shakers on the commission's table, but it can be said, nevertheless, that some grains of salt are being added by members of the commission as they digest the statements made to them. It is believed that the commission is of the opinion that there is nothing startling in the effort of the United Mine Workers to unionize all mines. Every labor union seeks as many members as it can get. Unless a union gather into its membership a large proportion of the workers in a particular line of endeavor, collective bargaining would be impracticable. On the other hand, the commission is not surprised and regards as only natural, it is believed, that the non-union operators should resist determinedly all efforts to bring their men within the organization. It is thought that the commission recognizes that the real objection of the non-union operators to the union is not the various reasons usually cited but is the surrender of great market advantages that come with the ability to vary the wage scale in such a way as to take full advantage of the commercial situation.

Governor Marshall already has emphasized the fact that one illegal act does not justify another. It is safe to predict that, with the operators' point of view, the mine workers' point of view and the public's equity well understood and championed by members of the commission, a new code of ethics will be prescribed for the coal industry, with the probabilities favoring a scathing denunciation of various practices which have grown up in the employer-employee relationship at the coal mines. From the information that has become available as to the appearance of Mr. Stimson, some persons judge that the commission is in accord with the operators' contention that strikes constitute the real cause of the recurring shortages of bituminous coal. These shortages may have been prolonged and intensified by other contributing causes, but the operators seem to have established their contentions in that connection.

F. R. Wadleigh, Federal Fuel Distributor, appeared before the commission on April 6, at which time plans were perfected for co-ordination of the studies being made by the two agencies. It also was agreed that the commission would co-operate with the Bureau of Mines and the Federal Fuel Distributor in a study of anthracite standardization and preparation.

The statistical and technical compilations being made by the commission are progressing rapidly. During the first week of April ninety-six persons were added to the commission's staff, bringing the total personnel to 356.

It is probable that the retailers will make certain compilations of their own from duplicate returns on the questionnaires involved in that branch of the business.

C. A. Allen, Field Investigator, Dies

Carl A. Allen, in charge of field investigation of waste in the mining of coal for the U. S. Coal Commission, died of pneumonia Monday, April 9, in the Emergency Hospital, Washington, D. C. He had been ill ten days. The body will be taken to Denver for burial.

Mr. Allen was born in Colorado Springs and was educated at the Colorado School of Mines. Following his graduation he worked for four years as a mining superintendent and as a mining engineer in gold and copper properties, later engaging in consulting work, including problems of coal-mine engineering.

From 1911 to 1913 Mr. Allen was assistant professor of mining at the Colorado School of Mines, where he established a coal-mining course. In 1916 he joined the staff of the U. S. Bureau of Mines and spent a year and a half in charge of one of its mine-rescue cars, operating in the Montana and Wyoming district. In 1918 he was sent to Utah to direct the Bureau investigations in Utah, Wyoming and Idaho. An arrangement was made whereby he was engaged on a part-time basis to serve as the chief mine inspector for the State of Utah and as a member of the State Industrial Commission. His work with the Coal Commission was being done under a leave of absence from his regular duties. When he was taken ill Mr. Allen was engaged in field work in West Virginia for the Coal Commission.



Here's a Mule He Can't Ride

(From the United Mine Workers Journal)

"Not Guilty" Is Second Herrin Verdict; State Drops Remaining Cases

"Not guilty" was the verdict returned at Marion, Ill., in "bloody Williamson" County, April 6, closing the second murder trial growing out of the Herrin massacre of June 22, 1922. Thus a second time the State of Illinois was balked in its attempt to punish members of a mob which besieged a non-union strip mine, accepted the surrender of the 48 men within, and then shot and cut 21 of them to death with a brutality which made the massacre notorious the world over.

There remains a long list of names on the list indicted last autumn by a grand jury. The state, however, has thrown up its hands. All the charges of murder and conspiracy to murder have been *nolle prossed* on motion of Delos Duty, state's attorney, because the state feels that it is impossible to get a conviction before a Williamson County jury, no matter how direct the evidence against the defendants. Only the cases of larceny will be tried. Thus the whole effort of the state halts.

"I am not going to try any more," said Mr. Duty. "I have done my duty to the best of my ability. I have my personal opinion as to who committed those crimes and did all I could to convince two juries. It is a hopeless proposition." Attorney General Brundage, who gave a good deal of his own time to the prosecution, had little to say in Chicago, where he went at the end of the trial. He merely commented that the state couldn't get justice.

Under the law the case must be tried in the county where the crime was committed, so there is no further move to be made by the State of Illinois unless new evidence be found. The United States Department of Justice, which aided in working up the case against the long list of indicted men—most of them members of the United Mine Workers—has made no move to attempt federal prosecution. Acting Attorney General Seymour and Assistant Attorney General Crim, the latter in charge of criminal prosecutions, said in Washington April 7 that the decision of the Supreme Court in the Coronado case appeared to prohibit the government from intervening. In the Coronado decision coal mining was held to be in no sense interstate commerce. It is believed at Washington that there can be no federal action in the Herrin case unless it can be shown that there was a direct effect upon interstate commerce.

In Illinois the state's attorney, in a statement following the trial, said that two juries in the two Herrin cases had returned verdicts of acquittal "regardless of evidence" and that "intimidation, prejudice or downright dishonesty actuated them."

Assistant Attorney General Middlekauff said further: "Under rulings of the trial court, when jurymen were being examined, any man who admitted he had an opinion as to whether the massacre of the disarmed and helpless strip miners was lawful was disqualified for jury service. In my opinion, this is not the law in Illinois. Every man in Williamson County has repeatedly heard or read the details of this horrible and revolting tragedy. If he has no opinion whether such killings were lawful or unlawful he is, in my judgment, wholly unfit for jury service. At this time it seems that further trials would be farcical."

The six men who were defendants in this trial were Hugh Willis, a district official of the United Mine Workers; James Fontanetta, Oscar Howard, James Brown, Otis Clark and Bert Grace. They were charged with the murder of Antonio Mulkavich, one of the armed guards who defended the strip mine during the two-days' siege preceding the slaughter. The jury was out six hours and fifty-five minutes. The jury was made up of seven farmers, one student, one union painter, one merchant and two union miners.

Pennsylvania Coal & Coke Corporation Buys Two Cambria County Mines

Stockholders of the Pennsylvania Coal & Coke Corporation, at a meeting held in Philadelphia April 5, ratified the proposal of the Board of Directors to purchase from the Clearfield Bituminous Coal Corporation the West Branch Colliery, located near Barnsboro, Cambria County, Pa., and the Victor No. 12 mine of the Carrolltown Coal Co., located at St. Benedict, Cambria County, Pa. The purchase of the West Branch Colliery carries with it the equipment and railroad sidings, about 400 vein acres of coal lands owned in fee and about 30 vein acres held under leasehold. In purchasing the Victor No. 12 mine the new owners take over the sidings, about 400 vein acres of coal lands owned in fee and approximately 870 vein acres held under lease.

The report of the corporation for the year ended Dec. 31, 1922, shows net income of $496,929 after expenses, depreciation and federal taxes, etc. This is equivalent to $4.04 a share ($50 par) earned on the $6,169,500 stock outstanding at the close of the year, as compared with $668,330, or $5.43 a share, in 1921.

Productive Activity Higher in February

Further figures on February production in the United States, according to the Survey of Current Business, reprinted from *Commerce Reports*, show that the January high level was well maintained and even slightly bettered when account is taken of the difference in working days in the two months. On this basis additional new high records were made in wool consumption and copper production. Orders continue in large volume in most lines, and the unfilled orders on hand for many commodities, such as steel sheets, steel barrels and flooring, were the largest recorded in recent years.

Prices received by farmers for crops and live stock again increased, while the cost-of-living figure was unchanged from January. Retail distribution continued at high levels, while savings deposits increased throughout the country.

The index of mineral production for February was 106.5 compared with 1919 as 100, declining from 124.3 in January, owing to the decreased output of bituminous coal. The index of marketings of animal products declined from 113.4 in January to 95.3 in February, while the crop marketing index declined from 114.5 to 73.4. The index numbers for both minerals and animal products were higher than a year ago, but crop marketings were the lowest recorded for February in recent years, due to the small marketings of cotton and tobacco.

Fireproof Anthracite Reaches Wisconsin

Reports from the East about "fireproof anthracite" are not empty jests to Wisconsin. A car of culm shipped to Moede & Son of Manitowoc, Wis.—and for which payment in advance by wire was demanded and made—has been tested by John C. White, state power plant engineer. Ash content of 51.72 was enough to carry the case before F. R. Wadleigh, Federal Fuel Distributor. Mr. White's report contained this: "Moisture, 1.54; volatile matter, 5.10; fixed carbon, 41.64; ash, 51.72; sulphur, not determined. The dry ash was 52.51 and the heat value was 5,800 B.t.u."

Bituminous Operators' Special Committee Files Brief Blaming Union for Shortage and High Prices

In response to a request by the U. S. Coal Commission for specific charges and evidence of violation of the rights of American citizens in the coal industry, the Bituminous Operators' Special Committee, of which J. C. Brydon is chairman, filed with the commission April 5 a brief which brands the policy of the United Mine Workers as the chief deterrent to satisfactory supply and price of coal. The brief charges the union with destructive monopoly of labor and outlines a campaign of allegedly deliberate violence which the committee asserts that the union fosters to maintain and extend its rule.

Colonel Henry L. Stimson and Goldthwaite H. Dorr, of counsel for the Bituminous Operators' Committee, prepared the brief. A letter from counsel accompanies it, asking an opportunity to present proof of its allegations "at such times and places as the commission may set."

"The close of the war," the brief states, "found this nation with abundant coal reserves which had been accumulated under the war powers of the government. The periods of shortage and consequent abnormal price which have since occurred can be directly traced to the action of this organization and its allies in railroad labor. Even the deficiencies of railroad service such as are occurring today can be largely attributed to the effect which nation-wide strikes have had in preventing regular production and throwing upon the railroads unnecessary and abnormal peak loads.

"But for the expectancy and almost certainty of a tie-up of whole coal fields about every so often, most of the speculation would be taken from the coal business; mines unfit to compete under normal conditions would not open as they do whenever a strike or threatened strike puts an unnatural bulge into the price of coal; the railroads would not be called upon to haul two months' coal in one, or to dilute their service among twice as many mines as are needed for normal year-round operations."

Twelve Cases of Violence Cited

Colonel Stimson and Mr. Dorr outline twelve cases of violence on a large scale in bituminous fields since Jan. 1, 1919, including Willis Branch and Mingo in West Virginia and Herrin in Illinois. They maintain the cases show "such uniform characteristics as to necessarily postulate a common purpose and creed as well as a uniform system of tactics."

"Acts of intimidation and violence to extend and preserve this monopoly of the United Mine Workers are not sporadic, but systematic," the brief declares. "Whenever it is endeavoring to organize a district they flame up from the fundamental determination of this organization and its members in authority that no one shall be permitted to mine coal in an organized district, or one under attack by the organization, without its leave. Equally systematic is the resistance to the efforts of the state to bring to justice the agents of this supergovernment."

The brief points out that there is no excuse for a labor monopoly as a protection for workers in the bituminous industry. "Bituminous coal mining," it says, "is one of the most bitterly competitive industries in the United States. Bituminous coal is mined in thirty states of the Union and is hardly more susceptible of monopolization than the land itself underneath which it is found. Enormous reserves of such coal, still untapped, underlie vast areas of our country, awaiting future development."

The Bituminous Committee, through its attorneys, seeks opportunity to prove before the Coal Commission that the principal cost of coal is labor; that wages in coal mining are double those in other industries because of the arbitrary power of the United Mine Workers of America; that "for collective bargaining this monopoly has substituted collective bludgeoning"; that the policy of the mine workers' organization "has laid the dead hand of monopoly on efficiency"; that the public pays the price for every unjust labor victory, and that further extension of the union would make government regulation hopeless.

In discussing the methods of the United Mine Workers the brief's first charge is:

"It supplants loyalty to the normal democratic machinery of government by loyalty to an irresponsible class-machine. (a) It creates a highly centralized organization in which a minority controls and overawes the majority by the weapons of incitement, abuse and intimidation. (b) It tends to crystallize and stratify the society of this republic into antagonistic classes. (c) It seeks to undermine the confidence of its members in the courts and other institutions of government."

In summing up their conclusions, Colonel Stimson and Mr. Dorr state: "We began our legal services in this matter in the hope that our work could be confined to the presentation of the results of economic investigation. The inquiry which we have thus far prosecuted has dispelled that hope. If an arrogant minority is challenging the American Republic by its attempt to fasten a monopoly of coal labor upon American industry and by its attempt to fasten an irresponsible class supergovernment upon American political institutions, purely economic questions sink into subordination.

"The effort to extort an artificial and economically unjustifiable wage scale by nation-wide strikes as the weapon is directed solely against the public. It is not organization against an employer; it is 'direct action' against the nation. It is the use of force for political ends.

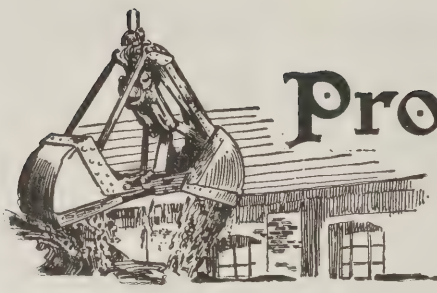
"The resort of such a monopoly to the weapon of calculated violence in carrying out its ultimate purpose is not accidental; it is inevitable. The use of the unlawful method is a necessary sequence of the conception of the unlawful purpose. The combination of such purpose and such methods is as abhorrent to the democratic institutions of a republic as would be the use of military force to establish a military dictatorship.

"We do not mean for an instant to be understood as attacking the rank and file of the United Mine Workers of America. They are men of much the same instincts and character as Americans the country over. Normally the chronic acts of violence, a few of which we have recited, would be as abhorrent to them as to us or as to this Commission. The worst wrong worked by the leaders of this monopolistic conspiracy has been to substitute for normal American standards a false loyalty to organization and class which has so perverted the normal instincts of normal men that Straitsville, Cliftonville and Herrin follow as the natural and inevitable consequences. These consequences will continue to follow until this monopoly is curbed."

Operators' Charge Against Miners' Union Is "Fabrication of Lies," Says Murray

Officers of the United Mine Workers of America at International headquarters in Indianapolis have asserted that the bituminous operators' statement to the Coal Commission that the union carried on a campaign of violence to extend or preserve its hold on the mining industry is "untrue and unfounded." Union officials said they would seek an opportunity to disprove the operators' charges before the Coal Commission. Philip Murray, International vice president and acting head of the union while President John L. Lewis is absent in Europe, characterized the operators' statement as a "fabrication of lies," while William Green, International secretary-treasurer, merely said the allegations were untrue. The mine workers, he declared, do not have a monopoly on coal-mine labor in this country.

France handled the pick of the German army; it is much more difficult to handle the pick of the German miner. —*Woodstock* (Ont.) *Sentinel-Review.*



Production and the Market



Weekly Review

April is running true to form in the soft-coal market. Buying is very quiet and current output, which is holding up the late March figures, is being taken on current orders. With few exceptions large industrial buyers are not offering to contract, evidently waiting for prices to settle to the level at least of early 1922. The poorer grades of soft coal and steam sizes of anthracite are becoming increasingly difficult to move. Reports from Columbus are to the effect that some railroad contracts are being closed at from $2.25 to $2.50 for Ohio No. 8 mine-run. No-bills have been accumulating at small off-grade mines in central Pennsylvania for several weeks, and some of this coal has been and is being offered at $2, a figure below the cost of production. By comparison the better grades of steam coal are holding their own and some fair-sized blocks have been contracted above the current spot market.

Coal Age Index of spot prices of soft coal declined 19 points from last week and stood at 233 on April 9, the corresponding average price being $2.82, as compared with $3.05 the previous week. Prices on Indiana, southern Illinois, Pocahontas and western Kentucky coals held firm, but nearly all other coals on the list registered declines.

Production continued on an almost even rate with that of the past few weeks, approximating 10,500,000 tons. Preliminary estimates by the Geological Survey indicate that the total output of soft coal for the coal year ended March 31, 1923, was 419,710,000 net tons, a decrease of 3.5 per cent as compared with 434,754,000 net tons in the coal year ended March 31, 1922.

February Consumption Heavier than January

The government report of stocks of coal on hand on March 1 confirms earlier estimates that consumption in February was heavier than in January and that stocks declined in February. The report shows 36,000,000 tons of soft coal on hand, a decrease of 2,000,000 tons as compared with 38,000,000 tons on Feb. 1.

Illinois operators report market recovery from losses on account of no market, but in southern Ohio, Pittsburgh and central Pennsylvania car supply was not improved.

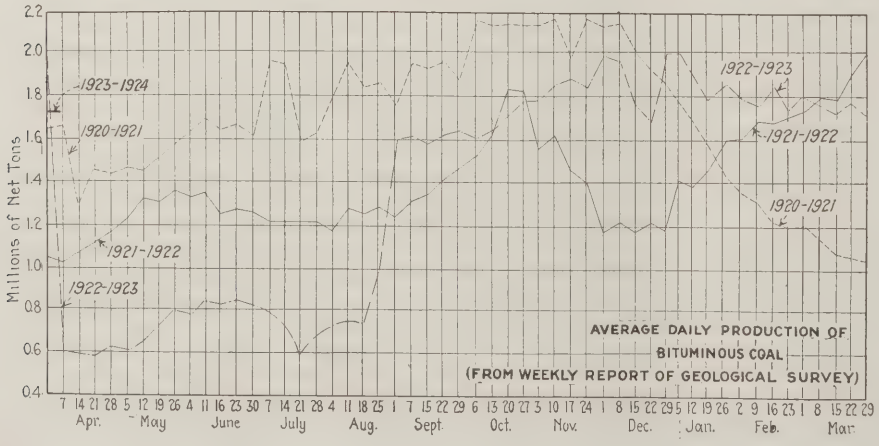
The short-lived strike in the British mines did not serve to increase the demand for coal for export. Inquiries were few and accumulations at Hampton Roads increased. Some exporters are optimistic, however, and look for heavier demand during the next few weeks. Dumpings at Hampton Roads for the week ended April 5 were 400,267 net tons, as compared with 370,823 net tons during the previous week.

Demand Good in Midwest

Considerable coal moved in the Midwest because of continued cool weather, demand around Chicago being heavy enough to absorb nearly all the coal produced, and there was some talk of car shortage not only in nearby fields but in the Eastern smokeless regions.

"The anticipated decrease in production on account of the pre-Easter holidays in the week ended March 31," says the Geological Survey, "did not occur and for the third successive week production was in the neighborhood of 10,400,000 tons. The present estimate of the total soft-coal output in the last week of March is 10,414,000 net tons, including coal shipped, mine fuel, local sales and coal coked, which is a decrease of only 10,000 tons from the revised estimate of the week preceding.

"Preliminary reports of cars loaded in the week April 2-7 showed 17,953 cars on Monday. Thus production on that day, which was a double holiday—Eight-Hour Day and Easter Monday—was equal to 45 per cent of the average for recent Mondays. Loadings on Tuesday were approximately 33,000 cars and did not show the usual recovery following holidays. The loadings during the



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
March 17	10,843,000	10,428,000
March 24 (*b*)	11,448,000	10,424,000
March 31 (*a*)	10,469,000	10,414,000
Daily average	1,745,000	1,736,000
Coal year to date	434,754,000	419,710,000
Daily average coal year	1,416,000	1,366,000
ANTHRACITE		
March 17	1,907,000	2,057,000
March 24	2,095,000	2,126,000
March 31	1,896,000	2,008,000
Coal year to date	88,909,000	56,486,000
COKE		
March 24 (*b*)	175,000	384,000
March 31 (*a*)	191,000	388,000
Calendar year	1,809,000	4,709,000

(*a*) Subject to revision. (*b*) Revised from last report.

first four days of the week were 14 per cent less than in the week before, and the total output for the week will be around 9,500,000 tons."

Domestic sizes of anthracite moved rapidly. Demand is strong and the companies as well as the larger independent producers are in some instances booked heavily ahead. Independent egg, stove and chestnut coals are commanding premiums as high as $1.50 above company schedule. The steam sizes move slowly.

Midwest Moves Much Coal

Operations throughout Illinois and Indiana continued to ship domestic sizes in considerable volume during the past week, due to persistent cool weather. On the whole there was no trouble filling orders. Steam buyers sat back and took what screenings were produced. The expected increase in the price of steam sizes did not occur. Southern Illinois screenings still hang close to $2 though lower grades sell under the market, as always. This means that some screenings from Franklin County went as low as $1.75.

Car supply was ample for a full three days' running time through the southern Illinois fields. Many mines used all they got. But a number of big producers have been shut down, so that the capacity of the field is considerably reduced. In the Duquoin and Jackson County fields there was some activity but railroad tonnage was comparatively light all week and no mine worked over three days. The Security mine in this region, which has been down for about three weeks because of flooding, is about ready to operate again.

The Mt. Olive district remains in an unhappy state because the operators there are so badly undersold by southern Illinois independents and by entire neighboring districts. Mt. Olive producers are trying to get $3.25 for 3-in. lump while Franklin County 6-in. lump can be had for as low as $3. Central Illinois 6-in. lump goes for $2.65@$2.75.

St. Louis Business Is Fair

Seasonable weather keeps domestic coal moving in small quantities in St. Louis and in good demand for the cheaper grades. The dealers are fortunate this year in being able to clean up all of their old stocks. The April retail prices which went into effect of $5.50 on Standard, $6.25@$6.50 on Mt. Olive and $7.50@$7.75 on Carterville have kept the dealers fairly active. Anthracite came down from $16.25 for all sizes to $15.75 for the large sizes and $16 for the

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

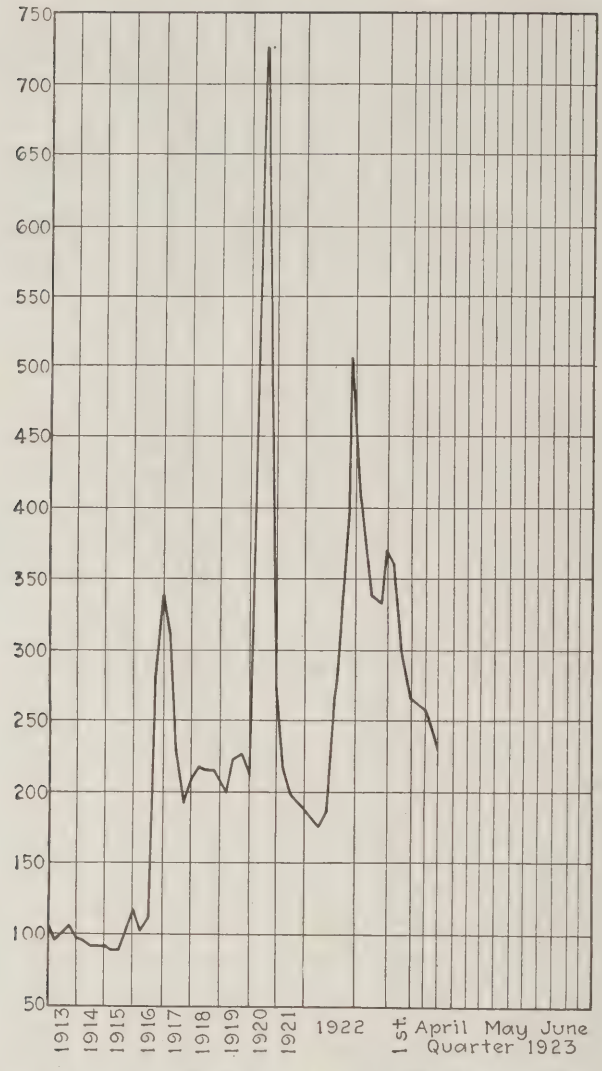
Low-Volatile, Eastern	Market Quoted	Apr. 10 1922	Mar. 26 1923	Apr. 2 1923	Apr. 9 1923†
Smokeless lump	Columbus	$2.85	$7.00	$6.85	*$6.00@$6.50*
Smokeless mine run	Columbus	2.15	4.50	4.25	4.00@ 4.50
Smokeless screenings	Columbus	1.35	4.50	4.25	*3.50@ 4.00*
Smokeless lump	Chicago	2.40	6.35	6.10	6.00@ 6.25
Smokeless mine run	Chicago	1.75	4.00	3.75	3.50@ 4.00
Smokeless lump	Cincinnati	2.50	6.75	6.25	*6.00*
Smokeless mine run	Cincinnati	1.90	4.60	4.00	*3.75@ 4.00*
Smokeless screenings	Cincinnati	1.65	4.50	3.85	3.75@ 4.00
*Smokeless mine run	Boston	4.60	6.50	6.10	**6.00@ 6.50**
Clearfield mine run	Boston	2.05	2.60	3.05	*2.35@ 3.50*
Cambria mine run	Boston	2.30	3.60	3.85	*3.25@ 4.25*
Somerset mine run	Boston	2.10	3.10	3.50	*3.00@ 3.75*
Pool 1 (Navy Standard)	New York	2.80	4.25	4.10	*3.50@ 4.50*
Pool 1 (Navy Standard)	Philadelphia	2.80	4.50	4.30	*3.90@ 4.30*
Pool 1 (Navy Standard)	Baltimore	2.70	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.40	3.50	3.50	*3.00@ 3.75*
Pool 9 (Super. Low Vol.)	Philadelphia	2.30	3.70	3.50	*3.00@ 3.65*
Pool 9 (Super. Low Vol.)	Baltimore	2.50	.....	3.50	*3.25*
Pool 10 (H.Gr.Low Vol.)	New York	1.95	3.00	2.90	*2.50@ 3.25*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.00	3.20	3.00	*2.60@ 3.00*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.25	.....	3.25	*2.90*
Pool 11 (Low Vol.)	New York	1.75	2.50	2.50	2.25@ 2.75
Pool 11 (Low Vol.)	Philadelphia	1.75	2.60	2.50	*2.20@ 2.60*
Pool 11 (Low Vol.)	Baltimore	2.15	.....	2.35	*2.25*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.70	2.35	2.40	*2.10@ 2.50*
Pool 54-64 (Gas and St.)	Philadelphia	1.55	2.35	2.30	.....
Pool 54-64 (Gas and St.)	Baltimore	1.70	.....	2.40	*2.25*
Pittsburgh sc'd gas	Pittsburgh	.....	3.60	3.35	*3.00*
Pittsburgh mine run (St.)	Pittsburgh	.....	2.35	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	2.50	2.25	*2.00*
Kanawha lump	Columbus	2.35	4.50	4.25	*3.75@ 4.25*
Kanawha mine run	Columbus	1.55	2.75	2.75	*2.25@ 2.75*
Kanawha screenings	Columbus	1.45	2.40	2.30	**2.15@ 2.60**
W. Va. lump	Cincinnati	2.00	3.60	3.50	**3.25@ 4.00**
W. Va. Gas mine run	Cincinnati	1.75	2.75	2.75	*2.50@ 2.75*
W. Va. Steam mine run	Cincinnati	1.55	2.75	2.50	*2.25@ 2.50*
W. Va. screenings	Cincinnati	1.40	2.35	2.10	**2.25@ 2.50**
Hocking lump	Columbus	.....	3.75	3.50	*2.75@ 3.25*
Hocking mine run	Columbus	.....	2.45	2.35	*2.00@ 2.25*
Hocking screenings	Columbus	.....	2.05	1.90	*1.65@ 1.85*
Pitts. No. 8 lump	Cleveland	2.60	3.10	2.90	2.50@ 3.35
Pitts. No. 8 mine run	Cleve'and	$1.80	$2.35	$2.25	*2.15@ 2.30*
Pitts. No. 8 screenings	Cleveland	1.85	2.10	2.00	*1.90@ 2.10*
Midwest					
Franklin, Ill. lump	Chicago	3.45	3.85	3.85	3.85
Franklin, Ill. mine run	Chicago	2.75	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	2.65	2.05	2.05	1.90@ 2.25
Central, Ill. lump	Chicago	2.60	3.10	3.10	*2.65@ 2.90*
Central, Ill. mine run	Chicago	2.60	2.60	2.60	*2.00@ 2.25*
Central, Ill. screenings	Chicago	1.85	1.60	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	3.15	3.60	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	2.45	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.00	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	2.60	3.10	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	2.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.20	1.60	1.55	1.50@ 1.60
Standard lump	St. Louis	2.65	2.60	2.60	*2.50*
Standard mine run	St. Louis	1.90	2.10	2.10	*1.75@ 2.00*
Standard screenings	St. Louis	1.70	.95	.95	**1.10**
West Ky. lump	Louisville	2.45	2.50	2.50	2.25@ 2.75
West Ky. mine run	Louisville	1.90	2.05	1.85	1.75@ 2.00
West Ky. screenings	Louisville	1.90	1.70	1.75	1.60@ 1.90
West Ky. lump	Chicago	.....	2.85	2.85	2.75@ 3.00
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.50	2.50	2.50
Big Seam mine run	Birmingham	1.70	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	3.75	3.85	3.75@ 4.00
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.25	4.00	4.25	*3.75@ 4.25*
S. E. Ky. mine run	Louisville	1.70	2.85	2.85	*2.40@ 3.25*
S. E. Ky. screenings	Louisville	1.50	2.25	2.40	**2.25@ 2.75**
S. E. Ky. lump	Cincinnati	1.90	3.50	3.75	*3.00@ 4.00*
S. E. Ky. mine run	Cincinnati	1.60	2.50	2.60	*2.25@ 2.75*
S. E. Ky. screenings	Cincinnati	1.45	2.25	2.10	**2.25@ 2.50**
Kansas lump	Kansas City	4.25	4.50	4.50	*3.25@ 4.50*
Kansas mine run	Kansas City	4.00	3.50	3.50	*3.00@ 3.50*
Kansas screenings	Kansas City	2.50	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	April 2, 1923 Independent	April 2, 1923 Company	April 9, 1923† Independent	April 9, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	8.25@10.00	8.00@ 8.35	8.25@10.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	*9.25@ 9.50*	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.25@10.00	8.00@ 8.35	8.25@10.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	*9.25@ 9.50*	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.25@10.00	8.00@ 8.35	8.25@10.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	*9.25@ 9.50*	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 8.50	6.00@ 6.30	*6.30@ 7.50*	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	*7.00@ 7.25*	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	3.00@ 4.00	3.50@ 4.15	*2.50@ 3.25*	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	4.00@ 5.00	4.00	*3.50*	*3.50*
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 2.75	2.50	*2.00@ 2.50*	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	3.75@ 3.00	2.75@ 3.00	*2.50*	*2.50*
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.75	1.50	*1.25@ 1.50*	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.40@ 2.00	2.00	*1.50*	*1.50*
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 233, Week of April 9, 1923. Average spot price for same period $2.82. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the war Industries Board.

small sizes, while byproduct coke is $11 and gas-house $10.50, with smokeless egg and lump at $12.50.

Strike Concentrates Kentucky Business

The strike in the southern section of western Kentucky, which affects about one-third of the field is resulting in better demand and car supply for the balance of the field. It is reported that the operating sections of the field got 100 per cent car supply during the week. The strike has not forced prices higher. Demand hasn't been sufficient for that. Mines have not been able to run much better than two to three days a week in spite of the plenitude of cars.

Prices as a whole are quite steady. There is a firmer market on screenings, and this market is likely to show advance. Lack of prepared-coal orders is resulting in much slower running on screened coal, with the result that screenings are getting scarcer and prices firmer. While some screenings have been sold as low as $1.50 a ton in past weeks, with the general market at from $1.60 to $1.75 or $1.85, it is reported that most of the screenings last week were quoted at around $1.85@$1.90 on actual sales.

Louisville feels that the general outlook for coal business during the summer is fair in spite of the fact that high ocean rates and combinations among Easterners to boost prices have driven a good deal of foreign trade away and stopped the flow of coal that had started toward the Atlantic piers. Lake trade is expected to be slow in opening but industrial demand generally is counted on to assume large proportions. Country-wide stocking on a bigger scale than usual is expected.

Northwest Expects Lake Trade to Lag

Up around the Head-of-the-Lakes it is generally agreed now that the Lake season will not open on April 20, as prophesied. The date is now set forward to about May 1 because a good deal of heavy ice still locks the harbors and passages and the weather is still distinctly cold.

There is no anthracite at Duluth and Superior. Householders with magazine stoves which will burn only hard coal and whose coal bins are empty are so thoroughly up against it that the Mayor of Superior asked those in the city who had coal to divide it.

In spite of this scramble for hard coal and in spite of the fact that there remain but 400,000 tons of free bituminous on the docks to last until coal arrives by vessel, there is little market for the bituminous.

Milwaukee is little worried just now. Enough hard coal is in hand for the demand and bituminous is arriving steadily. The only real difficulty is a congestion of terminals which is expected to be cleared soon. Given a spell of fair weather, the car ferries are counted on to move a good deal of coal across the lake from Ludington, Mich. Some consignments from Toledo are still undelivered though they have been three weeks on the way. Rail anthracite has been arriving through Chicago.

Western Trade Softens

April 1 in the Kansas City region brought the usual scramble to unload domestic sizes on hand at once. In such a time quotations show wide spreads, coal bringing what it will. Kansas lump and nut sell all the way from $4.50 down to $3.25.

Domestic coal in Colorado is moving fairly well, with mines running an average of 64 per cent of the time, but steam sizes drag. The state produced 1,909,000 tons of coal during January and February and is now running better than 100,000 tons a week.

In Utah most mines are getting only two days a week. Soft weather and an anticipated drop in price have held the market flat. Carbon County lump sells for $4.50@$5; egg, $3.50@$4, and slack, $1.25. Contracting is dull. Metals are on the upgrade however, improving the market for coke. The Utah Fuel Co. made 21,000 tons in March selling for $8.50 at the ovens. Car supply is ample and there are no labor disturbances in the state.

Lull in the Cincinnati Market

Buyers and sellers in the Cincinnati market are marking time. Lake buyers are out bargain hunting and although the Coal & Ore Exchange permits will not be issued until April 15 at the earliest, they have been picking up what spot tonnage they can around $3.25@$3.50, figuring to pay demurrage and still get coal at a lower price than the $4 which most shippers are holding out for. The shut down of the Kanawha mines that refused to accept the wage scale of the Miners' union had but little effect on this market.

Softness is developing in the Columbus market and it is believed it will continue until the lake season is well under way.

The Cleveland market was quiet. Not much contracting is being done because operators are not disposed to sell ahead at current quotations.

The Pittsburgh market turned still softer during the week. There was some buying of lake coal, but only in odd lots.

No improvement was noted in the Buffalo market. Buying was slow, and it looked as if consumers were determined to hold off for some time to come.

Dullness Pervades New England Market

There are few bright spots in the current market in New England. There are only scattering purchases and those mostly on the part of small users. Many of the larger buyers are postponing action until prices are more nearly on last year's level. There seems no anxiety whatever over the future and the agencies find it difficult to place tonnage

more than a few weeks in advance. Practically all quotations are at a lower point than a fortnight ago, and with many operators it is a question whether they would not be better off to close mines for the present, especially in high-cost sections in central Pennsylvania. The prospect is for continuing dullness through April and May, and only by constant effort will shippers be able to place any considerable output.

Accumulations at Hampton Roads have mounted steadily since March 15. Upward of 300,000 tons was on cars early the past week at Norfolk and Newport News, the larger proportion of it being navy standard coal. New England industries are only mildly interested in contract quotas, and there is a general slackness that used to be considered characteristic of July and August.

Quotations on cars at Boston, Providence and Portland are at least 50c. off from a week ago. Pocahontas and New River that were then selling at $9.25 per gross ton are now an easy buy at $8.75, a price that coincides with the April contract basis named by one of the large producers. While there still are delays in handling cargoes at this end the congestion is less evere, but there is still enough detention to make coal factors chary of sending cargoes forward unsold at their own risk.

Throughout the central Pennsylvania districts there is urgent need of orders. This territory is being thoroughly canvassed, but softening prices on the smokeless coals from Hampton Roads make the area open to the all-rail route more and more circumscribed. Ordinary Clearfields of moderate preparation have sold recently at prices well down to the $2.25 mark, although certain specialties of most approved grade have commanded $3.50@$3.75, and even $4.

New York Looks for Brisk Summer

Buyers in the New York market continue to mark time. There was practically no demand but there was a better feeling due to increased inquiries. A brisk summer is looked for beginning with the opening of the lake season. Buyers are taking coal in small quantities.

The Philadelphia market was slow. A survey shows that outside of the big utilities, stocks above ground are moderate and consumers show little inclination to add to them. The local tide business while a trifle better has not at any time recently been sufficient to stimulate domestic demand.

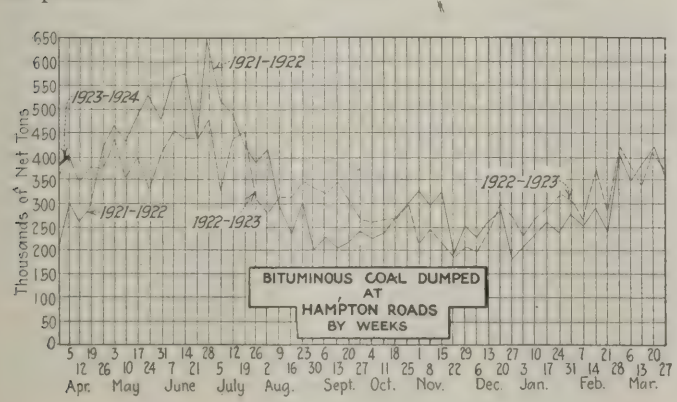
Export Market Growing at Baltimore

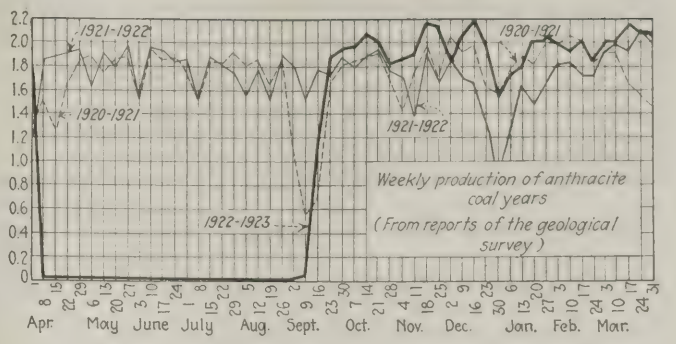
The continued growth of the export market is one of the outstanding features at Baltimore. Some congestion is already noted at terminals where supply is running in excess of demand. Revised figures show that for the first three months of this year 109,688 tons of cargo coal was shipped from Baltimore in 23 vessels. The total dumpings at Baltimore for the year 1922 were 107,735 tons.

Anthracite Output Holds Up Despite Holidays

Producers are having no trouble to move their domestic coals. The steam coals are accumulating however, and independent operators and shippers are disposed to sell below company quotations.

Retail dealers are ready to take all the larger coals they can obtain and are making deliveries to consumers as rapidly as possible.





"Contrary to expectations, production of anthracite in the week ended March 31," says the Geological Survey, "was not seriously curtailed by observance of Easter holidays. Daily reports of cars loaded, furnished by the American Railway Association, indicate that production on Good Friday amounted to 65 per cent of the output on other recent Fridays and production on Saturday compared favorably with preceding Saturdays. The total production for the week is estimated, on the basis of 38,397 cars loaded, at 2,008,000 net tons, including mine fuel, local sales and dredge and washery output.

"Early returns for the week April 2-7 indicate a general observance of Eight-Hour Day, April 2, as a holiday, and little if any anthracite was produced. Production was approximately 70 per cent of normal on Tuesday and further, but not full, recovery was made by Wednesday. In view of the uncertainty as to the rate of production maintained in the second half of the week it is impossible to fore-

Coke Production Increases Slightly

Production of coke during the week ended March 31, estimated by the Geological Survey from reports of cars loaded by the principal coke carriers and in part from reports of producers was 388,000 net tons, as compared with 384,000 tons during the previous week.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Mar. 24, 1923 Inclusive	Week Ended Mar. 24 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	27.4	22.5
Panhandle, W. Va.	51.3	57.3	55.4	58.2
Westmoreland	58.8	65.8	54.1	60.0
Virginia	59.9	55.7	54.2	61.5
Harlan	54.8	22.1	22.2	28.2
Hazard	58.4	16.4	20.1	28.6
Pocahontas	60.0	36.6	37.8	38.3
Tug River	63.7	28.8	34.2	35.2
Logan	61.1	26.2	30.8	30.8
Cumberland-Piedmont	50.6	31.7	46.3	51.5
Winding Gulf	64.3	30.4	33.7	36.4
Kenova-Thacker	54.3	42.4	32.1	45.0
N. E. Kentucky	47.7	28.4	28.2	(a)
New River	37.9	31.6	35.0	36.7
Oklahoma	59.6	59.1	43.7	58.1
Iowa	78.4	75.9	79.0	69.2
Ohio, Eastern	46.6	40.8	34.4	37.9
Missouri	66.8	76.3	77.4	88.3
Illinois	54.5	49.9	48.9	39.7
Kansas	54.9	55.9	46.9	48.3
Indiana	53.8	37.7	53.3	47.4
Pittsburgh†	39.8	41.2	32.8	35.3
Central Pennsylvania	50.2	53.4	45.7	54.9
Fairmont	44.0	35.5	36.1	33.0
Western Kentucky	37.7	32.4	32.8	26.1
Pittsburgh*	31.9	56.1	60.4	46.0
Kanawha	13.0	15.6	22.3	22.4
Ohio, Southern	24.3	38.1	32.7	30.7

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended March 24, 1923	917,036	185,062
Previous week	904,286	183,530
Same week in 1922	837,241	203,219

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
March 21, 1923	12,741	4,111	75,993	29,915
March 14, 1923	12,461	3,897	74,442	30,405
Same date in 1922	219,483	85,764	.....	.....

Foreign Market And Export News

Export Orders Swamp British Mine Owners; Rhonnda Miners Settle Trouble

British mines continued their heavy production during the week ended March 24, when 5,703,000 tons of coal were mined. This was but 18,000 tons below the previous week's record, which was the highest for any week of the present year, and but 39,000 tons less than the record for 1922, 5,742,000 tons having been the output for the week of Dec. 26.

It was reported that the strike of the miners in the Rhonnda coal fields had been settled and that the men would return to the mines on April 10.

Fully 100 vessels were said to be in the Welsh ports awaiting their turn to be loaded.

Chief pressure on the Welsh market comes from France, Italy and Germany. From these sources buyers appear anxious to cover themselves right up to the winter, and well over 250,000 tons has been sold to Germany.

In addition to the inquiries from France, Italy, Germany, and elsewhere, Russia is reported in the market for heavy quantities to be delivered over the coming Baltic season.

All mines are sold up to the end of March, and have little to offer for April, while buyers are anxious to purchase for at least six months ahead.

The French demand is easier, in some cases to the extent of withdrawing inquiries already in hand. Germany will need coal supplies for some time to come, but is at the moment awaiting developments. Belgium is less eager in her inquiries. American coal is offering freely, so that buyers feel fairly safe in holding off.

Orders Flood French Collieries

Collieries of the Nord and Pas-de-Calais are flooded with orders far exceeding their production, many from consumers who are trying to avoid paying the high prices quoted for British coals. Importation of Dutch coals is increasing, while Belgian coal imports show a tendency to decrease. In February, France imported 43,000 tons of raw coal from Holland.

A meeting was recently held in Paris between representatives of French and Belgian collieries with a view of coming to an agreement on prices to be charged for domestic coals supplied to the Paris market during the coming summer, but no agreement was reached at that time owing to French collieries quoting prices considered by the Belgians as too low.

Hampton Roads Export Demand Good

Business at Hampton Roads slackened slightly last week although the general trend was upward and coal movement continued on a par with March business, when records for twelve months were broken. Export business held up well, with further prospects of this business to stimulate the market.

Prices fell slightly, and whatever dullness was apparent was attributed to this. Coastwise business was down, somewhat, though bunkers held good. Prospect of shipments to England, in case labor difficulties there should prove serious, gave stimulus to the market.

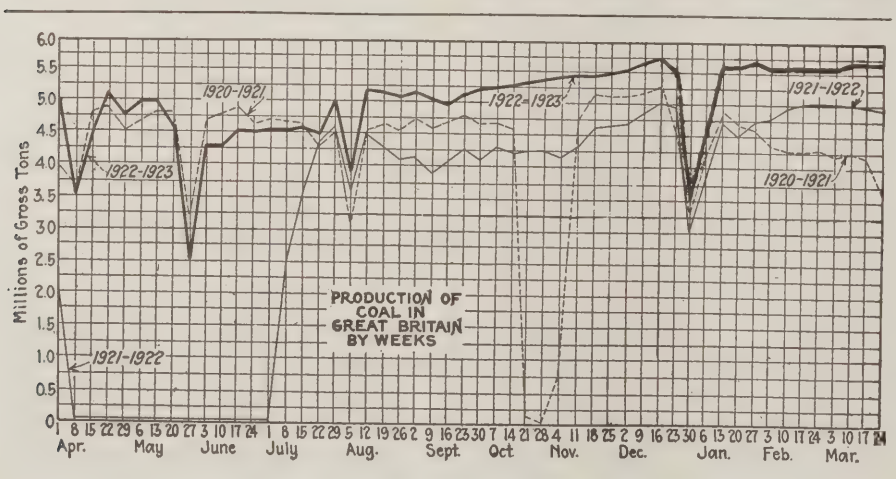
Unusually large supplies of coal were on hand at the piers, and the car situation showed further improvement. Domestic business fell in the wake of spring, and many retail dealers were preparing to devote their energies to the other side of their business, that of distributing ice.

Holland's Coal Production

Although the production of bituminous coal in the Province of Limburg, Holland, 1922 was nearly 600,000 tons greater than in 1921, Holland is still largely dependent upon foreign coals. In 1922 there were produced in the Province of Limburg 4,500,000 tons of bituminous coal, as compared with 3,920,000 tons in 1921 and 3,940,000 tons in 1920.

There were imported into Holland in 1922 6,220,000 tons of coal and 234,000 tons of coke, as compared with 4,890,000 tons of coal and 200,400 tons of coke in 1921. Of the coal imported in 1922 4,530,000 tons came from Great Britain and 1,190,000 tons from Germany. In the previous year 1,770,000 tons came from Great Britain and 1,280,000 tons from Germany.

In 1922 there were exported 2,260,000 tons of coal and 350,000 tons of coke, as compared with 1,930,000 tons of coal and 120,400 tons of coke in the previous year. Of the exports in 1922 Germany received 354,000 tons, Belgium 549,000 tons and France 249,600 tons.



Export Clearances, Week Ended March 31, 1923

FROM HAMPTON ROADS

	Tons
For Africa:	
Br. SS General Church, for Algeria	9,019
For Brazil:	
Br. SS Norman Monarch, for Rio de Janeiro	6,579
For Cuba:	
Nor. SS Karmoy, for Havana	3,660
Du. SS Trompenberg, for Havana	2,727
Nor. SS Gunnar Heiberg, for Havana	3,800
For Germany:	
Du. SS Maasburg, for Emden	10,042
For Greece:	
Ital. SS Timavo, for Piraeus	9,189
For West Indies:	
Nor. SS Sorland, for Guayabal	1,478

FROM PHILADELPHIA

For France:	
Br. SS Tafna, for Dunkirk	....
Jap. SS. Tne Maru, for Dunkirk	....

United States December Coal Imports

(In Gross Tons)

	Dec., 1921	Dec., 1922
Coal and coke:		
Anthracite	183	26,070
Bituminous	87,506	201,936
Imported from:		
United Kingdom	17,031	188,355
Canada	66,520	154,569
Japan	600	....
Australia	2,614	13,466
Other countries	741	112
Coke	3,165	9,125

Hampton Roads Pier Situation

	Mar. 29	April 5
N. & W. piers, Lamberts Pt.:		
Cars on hand	2,060	2,074
Tons on hand	124,951	133,348
Tons dumped for week	112,369	123,401
Tonnage waiting	9,000	18,150
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,614	1,145
Tons on hand	90,880	63,367
Tons dumped for week	134,836	153,255
Tonnage waiting	12,000	1,261
C. & O. piers, Newport News:		
Cars on hand	2,220	2,915
Tons on hand	118,465	152,735
Tons dumped for week	83,887	80,726
Tonnage waiting	3,900	1,605

Pier and Bunker Prices, Gross Tons

PIERS

	March 31	April 7†
Pool 9, New York	$6.50@$7.00	*$6.20@$6.75*
Pool 10, New York	5.60@ 6.15	*5.50@ 6.00*
Pool 11, New York	4.75@ 5.25	**4.75@ 5.50**
Pool 9, Philadelphia	6.70@ 7.00	*6.45@ 6.90*
Pool 10, Philadelphia	5.70@ 6.30	*5.55@ 6.00*
Pool 11, Philadelphia	4.60@ 5.40	*4.60@ 5.00*
Pool 1, Hamp. Roads	6.40@ 6.50	*6.25*
Pools 5-6-7 Hamp. Rds.	5.75	*5.70*
Pool 2, Hamp. Roads	6.40@ 6.50	*6.25*

BUNKERS

Pool 9, New York	6.80@ 7.30	*6.50@ 7.05*
Pool 10, New York	5.90@ 6.45	*5.80@ 6.30*
Pool 11, New York	5.05@ 5.55	**5.05@ 5.80**
Pool 9, Philadelphia	6.90@ 7.20	*6.75@ 7.00*
Pool 10, Philadelphia	6.00@ 6.50	*5.80@ 6.35*
Pool 11, Philadelphia	4.90@ 5.75	*4.85@ 5.30*
Pool 1, Hamp. Roads	6.50	*6.35*
Pool 2, Hamp. Roads	6.50	*6.35*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	March 31	April 7†
Admiralty, large	37s.6d.@40s.	37s.6d.@40s.
Steam, smalls	28s.@30s.	**30s.**
Newcastle:		
Best steams	34s.6d.@35s.	**35s.**
Best gas	34s.@35s.	**35s.**
Best bunkers	32s.6d.@35s.	**32s.@36s.**

† Advances over previous week shown in **heavy** type; declines in *italics*.

News Items From Field and Trade

ILLINOIS

The recent **refusal of the Interstate Commerce Commission to grant permission for the construction of the Jefferson & Southwestern R.R.**, has somewhat upset the plans for the new mine at the new townsite of Nason by the Illinois Coal Corporation. The road was to be used for the heavy haulage of material, etc., during the developing and construction of the mine. An appeal has been taken on the decision and if the outcome is still unsuccessful, the next step may be to build an extension spur from the nearest point of the Chicago & Eastern Illinois R.R. near Ina, or from the Chicago, Burlington & Quincy R.R. at Waltonville, to the mine site.

A. H. Vogt assumed office on April 2 as treasurer of the Illinois Coal Corporation, to which he was elected recently. For six years Mr. Vogt was comptroller of accounts of the Federal Reserve Bank of Chicago, in which capacity he devised a system of accounting for the United States Government fiscal agency operations of the bank which was adopted by several other Federal Reserve banks. Mr. Vogt also has been a member of the Federal Reserve committee on economy and efficiency for some time.

Proposals for furnishing fuel for the use of army stations in miscellaneous amounts between April 20, 1923, and March 31, 1924, will be opened April 12 by the Quartermaster Supply Officer, Chicago General Intermediate Depot.

The M. & B. Coal Co., Danville, has been incorporated with a capital of $25,000, incorporators, L. T. Mauck, Wm. Mauck, Louis Bock, Louis F. Bock, Paul F. Bock. Correspondent, Louis Clement, 1102 First National Bank Building, Danville.

C. W. Smith, of Chicago, chief engineer of the **Illinois Coal Corporation,** has arrived at Mt. Vernon, Jefferson County, to take active charge of the sinking of the company's new mine near there. The company also plans to **establish the town of Nason,** near the mine site, the town being named after A. J. Nason, head of the coal company. Engineer Smith has stated that all preliminary work and details are complete and that **actual sinking will be started soon.** It also is estimated that six months will be required to sink the two shafts to the coal.

The Free Belle Mining Co., Freeburg; capital, $50,000; has been incorporated by H. F. Driemeyer, O. E. Altrogge and S. J. Fowler. The company will mine and deal in coal, coal products and minerals. Correspondents, Pope & Driemeyer, 24 N. Main Street, East St. Louis.

The Valley View Mine, at Coal Valley, **has been closed for a few months.** The mine is owned by Sachville & Wynn. The shaft will be closed the greater portion of the spring and summer months and during that time, improvements of various nature will be made in and around the plant.

Mine No. 2, better known as the **Hart-Williams mine,** at Benton and owned by the **Chicago, Wilmington & Franklin Coal Co., has suspended** operations for six weeks or longer. This is the first colliery of that company to be closed this spring, and the fourth large mine in Franklin County to shut down. The Hart-Williams mine employed over 500 men.

J. C. Micheals, president of the Chest Creek Coal Co., of Chicago, has been found guilty in federal District Court of trying to defraud several railroads by claiming losses in shipment which did not occur. He has not yet been sentenced but the maximum penalty for the offence is 20 years in prison or $50,000 fine or both. The Chest Creek Coal Co. has been heavily involved in Chicago graft scandals, charged with shortweighing the school department.

A. K. Mordue has left the C. M. Moderwell organization in Chicago and joins the **Southern Coal, Coke & Mining Co.,** whose Chicago office has been moved into the Peoples' Gas Building. **W. K. Kavanaugh,** president of this company, has returned to St Louis from a long trip through the West Indies and Central America.

The Glenn Coal Co., Astoria, has been chartered with a capital of $12,000 to mine and deal in coal. Incorporators: E. G. Bader, M. W. Hughes, David E. Thomas.

The Utilities Coal Co., 332 South Michigan Avenue, Chicago, has been incorporated with a capital stock of $200,000. Incorporators are Cyrus H. Adams, Jr., Ben H. Matthews, Edward M. Bullard. The company will mine and deal in fuel.

INDIANA

The Clinton Coal Co., of Clinton, has contracted with the Roberts & Schaefer Co. for the complete installation of a new steel tipple at Clinton. This tipple is to replace the present wood structure and will be equipped with combination installation of Marcus screens and bar screens and "RandS" loading booms.

The Bertelsen Coal Co., Evansville, has been organized with a capital of $10,000, to deal in coal mines; directors, Jeppe Bertelsen, Katharine Bertelsen and Lowry Bertelsen.

J. R. Wasson, Oakland City, has purchased for $10,000 at a receiver's sale the property of the defunct Muren Mining Co. The property consists of three mines along the Southern Ry., with a daily output of 550 tons. Two of the mines are small slope mines with an output of eighty tons each, but the largest mine is equipped with a tipple and has a production of 400 tons daily.

The General Fuel Corporation, Terre Haute, has increased its capital from $2,000,000 to $2,400,000; $200,000 of the increase is in preferred stock.

The Howe-Coulter Coal Co., anticipating a heavy fall business in coal, has started driving entries in its No. 1 mine at Petersburg. A double shift of 60 men each is employed at the mine, and the work is being divided among the 450 employees of the company. **Many big mines in Pike County, except the strippers,** are operating only one or two days a week. Owing to the cut of $1 a ton on coal, some operators in Pike County say they cannot operate their mines at a profit, but will improve their properties. The stripping mines can handle coal at much less expense than the deep mines, and are operating full time.

The Fort Wayne Board of Works has authorized the city light department **to advertise for bids on 40,000 tons of coal—** the most the city ever contracted for. The city wants shipments to be made every week from May 1, 1923, to April 30, 1924.

At the seventeenth annual meeting and dinner of the Indianapolis branch of the National Metal Trades Association, held April 6, at the Claypool Hotel, Indianapolis, **E. L. Greever,** general counsel for the non-union coal operators' associations of West Virginia, **delivered an address on the open-shop struggle in the coal fields.**

KENTUCKY

The Liberty Coal & Coke Co., Louisville, recently chartered with a capital of $50,000, to operate mines in the Pineville territory, has opened sales offices in the Inyer Southern Building, Louisville. M. S. Barker, A. R. Anderson and R. R. Atkins, of Pineville, are incorporators. The company has production at Bell County mines.

The Young & Morgan Coal Co., Providence, Webster County, capital $12,000, has been incorporated by E. M. Young, J. E. Morgan and Anna B. Young, all of Providence, western Kentucky.

The Howard Elkhorn Coal Co., of Johnson County, capital $36,000, has been incorporated by Paintsville men, including E. G. Howard, of Sublett; L. C. Davidson, of Huntington, W. Va., and H. B. Stanbaugh, of Paintsville.

The Frozen Creek Coal Co., Jackson; capital, $12,000 has been incorporated by S. B. Williams, Elihu Reynolds and M. F. Reynolds.

The Denver Coal Co., Johnson County, capital $50,000, has been chartered by Paris Pelphrey, Alsia Pelphrey and W. L. Pelphrey, all of Denver, Ky.

Thomas C. Fuller, of Lexington, **filed suit for an injunction and accounting** at Frankfort, April 3, in the federal court, claiming **a one-tenth interest in the 120,000 acres of mountain land** sold recently by the F. S. Peabody syndicate, of Chicago, **to the Fordson Coal Co.,** a Henry Ford corporation. The defendants include Harry Payne Whitney, New York; Stuyvesant Peabody, Chicago, trustee of the F. S. Peabody syndicate; Samuel Insull, Chicago; William Wrigley, Jr.; Williams & Peters, Syracuse, N. Y.; the Peabody-Houghteling Co., Chicago; Marks Manufacturing Co., George F. Getz and the Semet-Solvay Co., Chicago; John P. Hopkins, Evanston, Ill., and the Fordson Coal Co.

The I. X. L. Coal & Mining Co., Bell, capital $25,000, has been incorporated by M. D. Bell, F. R. Martin and J. E. Bill, all of Pineville.

The American By-Products Coal Corporation, Bell; capital, $150,000, has been incorporated by M. J. Moss, Pineville; S. M. Loomis and Adolph Levy, Cincinnati.

The White Elkhorn Mining Co., Letcher; capital $25,000; has been incorporated by Thomas Fugate and J. W. Craft, Hazard, and H. A. Price, Detroit, Mich.

The **Tug River Coal Corporation,** capital $5,000, has been incorporated by Hubbard R. Petty, W. E. Caldwell, James Willey and R. H. Lucas.

Coal operators of Perry County, after a long conference with the State Tax Commission **failed to convince the Commission that the assessment of coal lands and mining equipment in Perry County was placed too high.** Members of the commission stated at the close of the conference that the matter had been taken under advisement but indicated that they were not wavering from their stand for the original assessment. Perry County lands, rich in minerals, were assessed at approximately $19,000,000 this year. This represented an increase of approximately $5,600,000 over the previous assessment. Representatives from Pike County appeared before the commission in the interest of a reduction on the assessment for their county but no agreement was reached. Pike County's assessment of approximately $19,000,000 was raised to $28,000,000.

Development of large areas of virgin coal lands in Butler County is visualized as the result of **the construction of a railroad from Greenville to Rochester,** under a charter granted the Greenville Eastern R.R. Contracts for the construction of 14 miles of the road already have been let. This will be the first railroad in Butler County. The incorporators of the road are J. W. Thompson, of St. Louis; H. E. Barber, of Marion, Ill.; W. J. Lester, of Cleveland; J. L. Rogers and Hubert Meredith, of Greenville.

George R. Dempster of Knoxville, Tenn., president of the Dempster Construction Co., which has obtained the contract to strip and mine coal deposits in Hopkins County, reports that this is **one of the biggest projects in the South** and he estimates that it will take several years to complete the job. The company will work on more than 2,000 acres and will develop the project with steam shovels. Dempster estimates that the company in its operations will remove 100,000,000 cu. yd. of earth and stone and that the tract will yield an estimated output of 16,000,000 tons of coal.

John Hoffman, Judge S. S. Helburn and State Auditor John Craig, all connected with the Hignite Coal Mining Co., were in Louisville recently and called upon President Mapother of the Louisville & Nashville, who **promised them rail connection** with that carrier.

The Rogers Bros. Coal Co., of Ashland, is making preparations to develop its holdings on Turkey Creek, Pike County. The plans of the company will entail the expenditure of more than a million dollars.

K. U. Meguire, of the Harlan Coal Co. interests, Louisville, has arranged to enter the western Kentucky field with **a big stripping operation four miles north of Dawson Springs,** on a new branch of the Illinois Central R.R. from Central City to Madisonville, Ky. Work on this branch line has just started, and development of the mine hardly will start until the railroad reaches the property, and makes it possible to get in steam shovels and equipment by rail. A tipple will be erected with a capacity of 50 to 75 cars per day.

MAINE

The State Fuel Administration was abolished as of April 1, F. R. Wadleigh announces.

MARYLAND

The Black & Decker Mfg. Co., Towson, manufacturer of portable electric tools, announces that **the regular quarterly dividend has been declared on preferred stock,** and that the payment of **dividends on common stock has been resumed,** after having been discontinued for about a year following the recent depression.

MASSACHUSETTS

The State Fuel Administration was abolished on April 1, F. R. Wadleigh states.

The House Committee on Rules voted March 29 **to report with amendments an order** passed by the Senate **for the appointment of a special joint committee to investigate the coal situation.** Changes made centered largely on the question of expense. Under the amended order a committee consisting of three members of the Senate and six members of the House would "investigate the emergency relative to the production, transportation and distribution of coal, with a view to the adoption of such measures as may aid in preventing a recurrence and in securing a continuous and adequate supply of anthracite coal of good quality at reasonable cost and an equitable distribution thereof."

MICHIGAN

To further insure ample coal supply for manufacturing requirements, and to obviate coal shortage delays, etc., **the Ford Motor Co. has purchased 1,000 coal cars** of 55-ton capacity each, to transport coal over the Ford Railways.

MINNESOTA

Federal fuel commissioners are working upon a survey of fuel conditions in the Twin Cities, in order that coal shortages may be averted and prices kept stable in the future. From statements made, it appears that they are likely to recommend warehouses in which to store coal against a shortage. Their investigation will follow the course of coal from the mine to the lower Lake port, thence to the dock, and by rail to the point of consumption. If they are correctly quoted, the warehouses would be established by private capital. It is pointed out in the coal trade that if the plan were economically feasible, private capital, which has already invested millions in docks for the trade of this region, would hardly have refrained from spending a little more, to guard its business.

MISSOURI

The Hannibal Coal Co., of Hannibal, pulled off a new stunt recently when it **shipped more than a ton and a half of coal by parcel post.** The coal was put in white muslin sacks and wrapped in paper, 25 lb. to the sack. The shipment consisted of 147 sacks. The coal shipped was sample fuel and was sent to blacksmiths in Illinois and Missouri. The cost of shipping the coal was $36.03.

The Star Coal Co., of Bevier, **has just signed a contract with the Burlington R.R.** Delivery will start at once. The company recently installed a screen.

MONTANA

A new commercial coal mine is being opened up in the Bird Tail area on the old ranch of J. J. Farrell, Sr., near Fort Shaw. The coal veins, which are of Eagle formation, yield semi-bituminous coal.

NEBRASKA

The Nebraska State Legislature has tendered an **official invitation to Henry Ford to scan that state's water-power possibilities** and to develop the 360,000 horsepower which the government says Nebraska rivers will produce. Harnessing the water-power resources of the state would save 4,000,000 tons of coal annually, and the development of white coal to supplant the chocolate lumps which the state must now import would attract a large population.

NEW YORK

F. R. Wadleigh, Federal Fuel Distributor, is to be the speaker at the luncheon to be held at the Waldorf-Astoria, New York City, on April 12 by the Smokeless Coal Operators' Association.

Coal purchased by the U. S. Shipping Board in New York for its steamship lines **will be inspected and sampled by the U. S. Bureau of Mines.** The work will include sampling of foreign coal remaining in bunker upon the arrival of these ships in New York as well as sampling the coal while it is being loaded on these vessels in the New York port.

Assembly Print No. 2,025, by Assemblyman O'Connor, adds a new section, 2147-a, to the penal law, **prohibiting the sale of ice, coal and wood on Sundays.**

Senate Print No. 1,724, by Senator Fearon, amends Section 225 of the Farms and Markets Law so as **to fix the size of sacks and bags used in the sale of coke, charcoal or kindling wood.**

Burns Brothers announced April 3 that the meeting of stockholders set for April 9, to act upon a proposed readjustment of the capital stock of the company, has been postponed to a date to be fixed later.

C. Tracy Ryan, formerly deputy commissioner of the Tidewater Coal Exchange at New York and recently associated with Dexter & Carpenter at their New York and Boston offices, **is now affiliated with the New York office of the Iron Trade Products Co.**

J. G. Bradley, president Elk River Coal & Lumber Co., Dundon, W. Va.; **George H. Cushing** and **J. D. A. Morrow,** of the Morrow-Callahan Coal Co., Cincinnati, Ohio, **are to make addresses at the annual meeting of the United States Chamber of Commerce,** in New York City, May 8-10. The talks will be before the Chamber's Natural Resources Production group, which will hold a session devoted to discussion of coal problems at the Waldorf-Astoria on the afternoon of May 9. Mr. Bradley's topic will be **"Labor and Its Relation to the Cost of Industrial Coal"**; Mr. Cushing will speak on **"Economic vs. Legislative Method of Settling the Coal Problem,"** and Mr. Morrow's talk will be on **"Some Problems of Coal Distribution."**

NORTH DAKOTA

Vigorous propaganda is being instituted on behalf of the lignite industry of North Dakota, with frequent publicity in which that fuel is credited with possibilities for an industrial development of the Northwest the like of which Pittsburgh never dreamed. Visions are portrayed of the removal of the steel center to the Twin Cities; of developing immense power plants at the scene of the mines, and transmitting power electrically to the Twin Cities, and of briquetting lignite to undercut the price of hard coal with consequent capture of a big domestic market for this fuel.

OHIO

When the Board of Purchase of Columbus opened bids April 4 for 13,000 tons of coal for various city departments for the coming 90 days it was found that Hatton, Brown & Co., Inc., was low on the municipal light plant for 7,200 tons of Hocking nut, pea and slack at $1.60 at the mines. William Harman, a wholesaler, was low on 3,300 tons for the water works department and 200 tons for the garbage reduction plant at $1.43. **It is doubtful if the contracts will be awarded,** as some of the Board of Purchase favor the policy of buying on the open market.

The Steam & Heat Coal Co., Bridgeport, has been chartered with a capital of $100,000 to mine and sell coal in the Pittsburgh No. 8 district. Incorporators are W. E. Thomas, J. C. Heinlein, Jacob Meister, George Meister and Fred Meister.

The Stannard Coal Co., Cleveland, has been incorporated with an authorized capital of $10,000 to mine and sell coal both at wholesale and retail. Incorporators are Max P. Goodman, Mollie Friedman, Meyer Gordon, Charles Auerback and Benjamin F. Sacharow.

The Cincinnati Coal Exchange has voted to invite the Michigan, Ohio and Indiana Retail Coal Dealers' Association to meet in Cincinnati this year. It may be that the meeting will be held at the same time as that of the American Wholesale Coal Association in June.

Papers have been filed chartering the **No. 6 Hocking Coal Mining Co.,** Cannelville, with a capital of 500 shares of no par value, designated by Harold H. Burton and others.

The W. T. & K. Coal Mining Co., Akron, has been incorporated with a capital of $10,000 to mine and sell coal by Murray S. Parker, Orella M. Parker, Teresa Wenst, Alice B. Kraus and J. L. Edwards.

The East Cadiz Coal Co., of Cadiz, has been chartered with a capital of $100,000 to mine coal and deal in coal and coke by John M. Wheeler, Agnes W. Vance, Harry W. Vance, S. B. Hedges and J. W. Reed.

The Margretta Collieries Co., of New Philadelphia, has been incorporated with a capital of $115,000 to operate coal mines, and to buy, sell and deal in coal at retail. Incorporators are H. C. Schneider, Roscoe Oberlin, John C. Thomas, J. W. Edwards and John T. Maurer.

The J. C. Rosso Coal Mining Co., chartered with an authorized capital of $100,000, has been organized by the election as president and manager of J. C. Rosso, a well-known coal mining man from Pittsburgh. An option has been taken on a large tract in the eastern Ohio field, which will be developed. Incorporators are J. C. Rosso, R. H. O'Brien, E. G. Bowerman, H. G. Kates and R. E. Bothwell.

Shipments by river on an unusually large scale are planned by the Cleveland & Western Coal Co. in connection with the opening of a new mine at Powhatan, Ohio, which will rank as one of the largest in the country. With a view to having the most modern facilities for such river shipment, the company has awarded to the General Contracting Corporation of Pittsburgh, Pa., a contract for the construction of a huge tipple, extending out over the river. The company also is arranging for a harbor with capacity for the largest boats and barges.

PENNSYLVANIA

For the part she played in bringing relief to Reilly No. 1 mine at Spangler, Cambria County, on Nov. 8, 1922, when 78 lives were lost and about 35 men were rescued alive through prompt arrival of relief forces, **Miss Mary Agnes McCarthy,** operator for the Bell Telephone Co. at Barnesboro, **has been awarded one of the eight Theodore N. Vail bronze medals** issued in the Pennsylvania-New Jersey division of the Bell company "for conspicuous acts of public service in the telephone industry during 1922." Miss McCarthy's brother-in-law, Martin McAvoy, was killed in the disaster. She went on duty at 8 o'clock in the morning, not knowing of the explosion. She remained on duty throughout the day, directing the messages to and from the mines and called physicians and sent emergency calls to all sections.

A decision by J. W. Brown, a deputy Attorney General, to Joseph J. Walsh, chief of the Department of Mines, holds that it is the duty of a mine operator to keep a headman and footman at their proper places during the entire time any persons are underground and is not permitted to withdraw them after miners are hoisted if any persons are still in the mine.

A series of five bills relating to the mine acts of the state has been introduced in the House by Representative Charles F. Beidelspacher, Lycoming County. One of these amends an act of 1903, creating the State Department of Mines, by providing for fees for examination and qualification of mine foremen and assistants in the anthracite mines. A second bill amends an act of 1901 by providing that it is the duty of the mine inspector to prosecute for violations of the mining law. The third measure provides for the appointment of boards of examiners to examine applicants for certificates of qualification as mine foreman, assistant mine foremen and firebosses in the bituminous coal mines of Pennsylvania and prescribes the qualifications, defining the powers and duties and fixing the compensation of the examiners. Another of the series is a bill amending laws governing the safety of persons employed in the bituminous coal mines. The fifth of this series of bills requires bituminous operators to pay the state the actual cost of foremen's reports and record books which are now furnished by the state.

Eight bills bearing on coal and mining made their appearance during the eleventh hour of the last day for the introduction of measures in the House. It is still possible to introduce legislation in the Senate. Among the bills introduced is one by Representative Richard D. Burns, which would **regulate the sale of anthracite,** fix a standard of clean coal and provide for inspection. **Coal taken from rivers would be taxed** for state purposes **at the rate of 20 per cent of the value** when recovered and dredgers would have to pay a license fee of $25 to the commonwealth under the terms of a bill introduced by Representative J. Ross Horne, Cambria County. Richard Aston, a Luzerne member of the House, sponsored a **bill providing that 50 per cent of the anthracite tax be dedicated to the state,** which now retains all it collects, **and that the other half go to the cities, boroughs and townships where anthracite is mined.**

Auditor General Samuel S. Lewis has announced that because there was a reduction of more than $1,000,000 in the expected revenue from the anthracite coal tax for 1922 and of more than $2,000,000 from the indicated annual yield under normal conditions **a revision of the 1922 reports made to his department by the anthracite producers will be made.** The reduction is indicated by a compilation of the anthracite coal reports for last year for which accounts are now being settled.

The Pinchot administrative code, which reorganizes the state government, **places the State Department of Mines in the Department of Labor and Industry,** making it the mining branch of that department. The code was introduced in the Senate recently. Section 1712 of the code gives the mining branch the same powers the Mining Department now has under existing laws. The examining boards of the Mining Department are placed under the Department of Public Instruction. Section 1309 creates a State Mine Inspectors' Examining Board, which takes over the duties of the Anthracite Mine Inspectors' Examining Board and the Mine Inspection Examining Board.

The House Judiciary General Committee has **reported out affirmatively the Burns bill which would make all coal companies public utilities** and therefore subject to the control of the Public Service Commission. The vote in favor of reporting the bill was 11 to 6. Representative Burns, Philadelphia, sponsor of the measure, appeared before the committee, which held a continued hearing on the bill. He said that coal prices should be regulated just as are those for gas, electric, water and steam service. Opponents of the measure a week prior had contended that coal is not a monopoly like the services the bill's sponsor referred to and that it could not be regulated in the same way.

State Senator P. F. Joyce, Luzerne County, has introduced in the Legislature **a bill modeled along the lines of the Kohler mine-cave law,** which was declared unconstitutional last year. It is designed to protect the lives and safety of persons residing over anthracite mines in cities, boroughs and first-class townships. The measure places in the hands of the chief of the Department of Mines the power to decide whether or not mining shall be carried on in the municipalities covered by the provisions of the bill. Violators of the act would be subject to a fine of $5,000 or imprisonment for a year, or both.

The Pennsylvania Fuel Commission has **rescinded its order of last September controlling deliveries of anthracite** for domestic consumption.

A four weeks' course in coal mining will be given at Carnegie Institute of Technology, according to an announcement from the institution, beginning June 25 and ending July 20. The object of the course is to prepare miners for the examinations of the State Department of Mines for positions as firebosses and mine foreman. At the completion of the work the miners will be awarded certificates by Carnegie Tech, and mine-rescue and first-aid certificates by the U. S. Bureau of Mines. At morning sessions the following subjects will be taught at Carnegie Institute of Technology: Mine laws and regulations, mine ventilation, mine gases, safety lamps, methods of working, mine explosives, timbering and haulage. On afternoons, at the Pittsburgh Experimental Station of the Bureau of Mines, the students will be instructed in mine rescue and first-aid training, coal-dust explosion demonstration at the experimental mine, permissible explosives demonstrations at the experimental mine, lectures on mine safety, etc.

TEXAS

The Texas & Pacific Coal & Oil Co. reports gross earnings of $7,316,287 in 1922, against $9,227,910 in the previous year. After payment of all expenses and reserves for depreciation there was left a balance of $2,077,736 available for the 8,448,048 shares of capital stock of $10 a share par value outstanding, or the equivalent of $2.45 a share. In 1921 the company reported net income of $2,077,519 after the same deductions, equal to $2.46 a share.

UTAH

The Columbia Steel Corp. has acquired title to 312 acres of coal land in Carbon County by a cash settlement of approximately $740,000 on the purchase contract. The property involved adjoins the Sunnyside coking deposits of the Utah Fuel Co. on the north and has been pronounced by experts to be good coking coal.

WASHINGTON

To promote greater co-operation among retail dealers and that they may understand the processes involved in the production of briquets, the **Pacific Coast Coal Co. was host to 150 outside dealers** March 22 on a sightseeing trip through its plants in the vicinity of Seattle. The trip concluded with a banquet at the Frye Hotel in the evening. Dealers from every section of the state were members of the party.

WEST VIRGINIA

Eight houses, the store and the mine office of the Soper-Mitchell Coal Co., operating at Scott's Run, in the Monongahela field, **were destroyed by fire** on March 24, and the tipple partly damaged, though not sufficiently to halt operations at the mine. The fire was started by an overheated stove in a dwelling occupied as bachelor quarters by six miners. A house belonging to the Diamond Fuel Co. also was destroyed. Only heroic work upon the part of the miners employed at the Soper-Mitchell plant saved the tipple from destruction.

A freight wreck at Eggleson Tunnel on the Virginian Ry. late in March caused **a total suspension of the movement of coal freight** for several days. Eighteen carloads of coal piled up in the tunnel and it was necessary to detour passenger trains over the Norfolk & Western, no attempt being made to move any freight.

Complete figures covering every phase of mining in West Virginia for the fiscal year ending June 30, 1922, though not so far printed, have been compiled by the West Virginia Department of Mines, the following table affording a summary of such mining activities in the state, for the period given (figures for coal representing gross tons and for coke net tons):

Counties in which coal is mined on a commercial scale	35
Firms operating on a commercial scale	888
Openings of all kinds subject to the mining law	1,381
Coal pick mined from commercial mines, tons	15,565,016
Coal machine mined from commercial mines, tons	54,623,187
Total tons of coal from commercial mines	70,188,203
Estimated tons of coal from small mines	700,000
Total tons of coal from all mines	70,888,203
Coal converted into coke, tons	296,151
Coke manufactured, tons	175,156
Total value of coal at the mines	$180,764,917.65
Total value of coke manufactured	$1,026.414.16
Value of a ton of coal at the mines	$2.55
Value of a ton of coke at the ovens	$5.86
Number of mining machines in use	3,434
Average number of coke ovens in use	750
Days mines were in operation	131
Days ovens were in operation	146
Pick miners employed in commercial mines	14,161
Machine operators and miners employed in commercial mines	44,070
Underground laborers in commercial mines	30,700
Outside employees connected with commercial mines	18,517
Coke employees	261
Persons employed at commercial mines and coke ovens	107,709
Persons killed	330
Persons injured non-fatally	542
Persons employed for each man killed	326
Persons employed for each man injured	199
Tons of coal mined in commercial mines for each fatality	214,813
Tons of coal mined in commercial mines for each non-fatality	127,100
Number of wives left widows	182
Number of children left fatherless	450
Acres of coal worked out	8,795
Tons of coal produced in commercial mines, per miner, pick and machine miners included	1,205
Average earnings of each pick miner, per year	$1,099.10
Average earnings of each pick miner per month	$91.59
Average price per ton of mining run-of-mine coal	$0.95

WISCONSIN

B. M. Ainesworth has been elected president of the **newly formed Valley Coal & Dock Co.,** 273 Broadway, Milwaukee. Other officers named were R. L. Clements, general manager; F. F. Klegel, treasurer; J. F. Sweeney and F. H. Baker, directors. The new company, which has absorbed the old Valley Coal Co., began operations under the new organization on March 31 with a capital of $250,000.

The Industrial Coal & Dock Co., Milwaukee, 1,000 shares common stock without par, has been incorporated by J. Gilbert Hickox, Leo Mann and Walter C. Ferris.

WASHINGTON, D. C.

Those in attendance at the recent **annual meeting of the Joseph T. Holmes Safety Association,** held in Washington, were Dr. H. Foster Bain, Director U. S. Bureau of Mines and president ex officio; Edgar Wallace, American Federation of Labor; Dr. David T. Day, American Mining Congress; E. H. Denny, J. O'Leary, United Mine Workers of America; Dr. George K. Burgess, American Society for Testing Materials; Major M. J. Shields, American Red Cross; Dr. David White, National Academy of Sciences; John H. Finney, American Institute of Electrical Engineers; Gen. W. H. Bixby, American Society of Mechanical Engineers; George S. Rice, American Institute of Mining and Metallurgical Engineers; J. W. Paul, Mine Inspectors' Institute; Dr. J. J. Rutledge, Geological Society of America; Dr. Andrew Stewart, American Chemical Society; F. J. Bailey and Dr. R. B. Sayers, U. S. Bureau of Mines.

The U. S. Navy will open bids April 18 at noon for the following quantities of **bituminous or semi-bituminous coal** for ships: 12,000 gross tons at New York, delivery from May 1, 1923, to June 30, 1924; 3,000 gross tons at Philadelphia, delivery from July 1, 1923, to June 30, 1924; 425,000 gross tons at Hampton Roads, delivery from July 1, 1923, to June 30, 1924; 50,000 gross tons at Baltimore, delivery from July 1, 1923, to June 30, 1924; 200,000 gross tons at Sewalls Point, Va., 50,000 tons to be delivered prior to July 1, 1923, and remaining 150,000 tons prior to Nov. 1, 1923.

CANADA

Harvard Stutchbury, trade commissioner for Alberta, is in Toronto on a mission for the opening up of a market for Alberta coal in Ontario. The Ontario government has appointed a committee to receive and distribute shipments of Alberta coal during the coming season and **a demonstration of its burning and treating qualities will be given** as early as possible under the direction of G. R. Pratt, fuel engineer for the Alberta government.

A plan for the exportation of coal from Mexico to Canada which would be beneficial to both countries has been submitted to the Fuel Commissioner at Ottawa by L. F. Bustamente, Mexican commercial agent in Canada.

Recent Patents

Mining and Loading Machine. N. D. Levins, Columbus, Ohio, assignor to the Jeffrey Mfg. Co., Columbus, Ohio, 1,437,526. Dec. 5, 1922. Original application filed Jan. 13, 1917; serial No. 142,324. Divided and this application filed Jan. 20, 1919, serial No. 272, 115; renewed March 2, 1922, serial No. 540,572.

Coal Screening and Washing Machine. Wm. F. Martin, Wormleysburg, Pa.; 1,437,669. Dec. 5, 1922. Filed May 18, 1922; serial No. 561,978.

Coal Screening and Washing Machine. Wm. F. Martin, Harrisburg, Pa.; 1,438,125. Dec. 5, 1922. Filed May 18, 1922; serial No. 561,979.

Obituary

C. S. Williamson, formerly of the Meade-Morrison Manufacturing Co., who had a great deal to do with the designing and installation of modern coal machinery at Milwaukee and other leading upper lake ports, died in Chicago on Saturday, March 31, 1923.

Albert H. Tracy, 83 years old and active in the city coal trade of Buffalo, died on April 3, after a short illness. He was long in the trade, being superintendent of the Delaware & Hudson water-shipping trestle several years, till the company went out of business at Buffalo. He was well known, an active worker in church and in general benevolent enterprises. He leaves a wife and three daughters. His son and namesake, manager of the Tracy Coal & Wood Co., died several years ago.

Traffic News

On account of accumulation **an embargo was placed April 6 by the New York Central R.R.** against the acceptance of all carload and less carload freight from connections at 60th Street or 68th Street, New York City, Weehawken, National Junction, or Harsimus Cove, for points on or via the Boston & Albany R.R., except livestock, perishable freight, flour, deeds for livestock, anthracite coal, fertilizer or fertilizer materials including agricultural lime, pulverized lime, limestone, phosphate rock, field and garden seeds when in packages, sacks or bags, spraying materials, spraying machinery, agricultural implements required for planting purposes, Boston & Albany Railroad fuel, material and supplies, freight consigned to offices of the U. S. Government and shipments covered by permits issued by C. J. Brister, assistant vice president, New York Central Lines, Chicago, Ill., or G. C. Woodruff, general freight agent, New York Central R.R., New York City,

On account of an accumulation **an embargo** was placed March 31 by the **Philadelphia & Reading Ry. against all carload freight** destined to 22nd and Allegheny Ave. Station, Philadelphia, Pa., consigned to John J. Davies & Co., R. D. Letterle, F. R. Philip and Edward Morris.

According to well-authenticated reports, **the Virginian Ry. will extend its line** from Elmore, W. Va., down the Guyan River to or near Pineville, in Wyoming County, W. Va. In fact **both the Virginian and the Chesapeake & Ohio have made surveys of proposed routes** along the river and both have obtained rights of way that conflict at some points for some distance below Pineville. A survey of the proposed route and an application to construct the railway have been filed with the Public Service Commission at Charleston, and it is understood that the Virginian will soon invite bids for the construction of the proposed extension. There also is the possibility that the company will extend its line beyond Pineville and traverse Wyoming and Logan counties to a terminal near Huntington.

Heavy coal movement last year was a primary factor in Norfolk & Western Railway Co., **gross revenues of $90,352,887, the largest in the road's history**, according to the report for 1922. In 1921 gross amounted to $80,718,802, while operating expenses rose from $64,346,857 to $68,052,304 last year. Balance available for dividends, after deductions for rentals, interest and miscellaneous charges totaled $14,554,989, equal after preferred dividends to $10.66 a share on the $127,826,900 outstanding common stock. In 1921 net was $10,043,181, or $7.50 a share on the $121,519,700.

The Norfolk & Western R.R. has ordered 25 Mallet locomotives for use in all divisions of its lines, principally in hauling coal. These engines, weighing 536,000 lb. and having a pulling capacity of 7,000 tons, will aid in taking care of the lake trade this season.

The Interstate Commerce Commission has set June 14 as the date on which **to hear oral arguments in the following coal cases**: Illinois Coal Traffic Bureau vs. Chicago & Northwestern R.R.; Northwestern Coal Dock Operators' Association vs. Chicago & Alton R.R.; C. Reiss Coal Co. vs. Ahnapee & Western R.R.; Traffic Bureau of the Sioux City Chamber of Commerce vs. the Baltimore & Ohio R.R.

The following embargoes have been cancelled: Coal via New York Central for United Hudson Electric R.R. Co., Catskill, N. Y.; Bituminous coal via New York Central for Superior Fuel Co., at all New York City stations; all freight via Boston & Maine for Cunningham Grain Co., Oak Grove, Mass.; all freight via New York Central for Staten Island Rapid Transit Railway.

On account of accumulation and to prevent congestion due to inability of the N. Y., N. H. & H. R.R. to take from B. & A. R.R. currently cars for delivery in their Boston switching limits **an embargo was placed April 3 by the Boston & Albany R.R.** against all carload freight from connecting lines at Albany, West Albany Transfer and Rensselaer, N. Y., intended for public deliveries or private sidings on the N. Y., N. H. & H. R.R. at Boston, Mass., Army Supply Base, Bird Street, Commonwealth Pier No. 5, Dudley St., Harvard St., South Boston Terminals Boylston St., Forest Hills, Harrison Square, Roxbury, Mass., when routed via Framingham or Boston, Mass. No exceptions and all outstanding J. O. Halliday permits covering cars for those destinations will not be honored.

On account of line being discontinued **an embargo was placed April 3 by the Bangor & Aroostook R.R.** on all shipments, carload and less carload, destined from Works, North Brownsville and Gould Siding, Maine.

On account of advices received from the Central New York Southern R.R. dated April 2, 1923, as to possible supension of operation effective at once, **The New York Central R.R. embargoes** all carload or less carload freight consigned to points on the Central New York Southern R.R., except shipments tendered by shipper and accepted by the railroad on the basis of "at shipper's risk on account of failure of connecting carrier at Auburn to accept and transport beyond New York Central R.R."

The Alexandria Paper Co., of Alexandria, Ind., has **attacked the rate on bituminous coal from Springfield, Ill., to Alexandria.**

Batchelor & Barlow, of Sharpesville, Ind., have filed **complaint against the rate from Springfield to Sharpesville.** Similar complaints have been filed against the rate from Springfield to various Indiana points.

The Consumers' Fuel & Ice Co., of Watertown, S. D., has **complained against the rate on coal from Herrin, Ill., to Watertown.**

Joseph Bancroft & Sons, of Wilmington, Del., has filed a **complaint based on rates from certain producing points in Pennsylvania to Wilmington.**

Stockholders of the **Hocking Valley R.R.**, meeting at Columbus, Ohio, April 3, **elected the following directors:** O. P. and M. J. Van Sweringen, C. L. Bradley, J. J. Bernet, W. A. Colston, Otto Miller, J. R. Nutt, J. B. Zerbe, all of Cleveland; F. R. Hunting, Columbus; Jeremiah Milbank, New York City; Thomas J. Davis, Cincinnati, and W. J. Harahan, Richmond, Va.

On account of accumulation **an embargo was placed March 29 by the New York Central R.R.** against all freight consigned, reconsigned or intended for the Rogers Milk Corporation, Boonville, N. Y.

An embargo placed by the **Susquehanna & New York R.R.** against freight destined to points on the Hillsgrove Tram R.R. **was entirely cancelled** March 29.

Certain shipments of coal from Higginsville and Macon, Mo., and Cornell, Kan., to Argentine, Kan., **are found to have been overcharged** in a tentative report made to the Interstate Commerce Commission by its examiner. The overcharge was found to have been 40c. per net ton.

A report by examiner Carter of the I. C. C. finds that the **Cambria Steel Co.**, of Johnstown, Pa., **was charged an unreasonable rate on the movement of 61 cars of coal** from Pennsylvania points to Johnstown. The rates were found unreasonable to the extent that they exceeded commodity rates subsequently established.

The Interstate Railroad Co., now completing a new line running from Norton, Va., to a connection with the Carolina, Clinchfield & Ohio system, has asked for authority **to issue $1,057,756 in new capital stock**, which it purposes to sell at par, the funds to be used to complete its building project, to pay off existing indebtedness, and to reimburse the road's treasury for expenditures made upon it.

The Kanawha & West Virginia R.R. and the New York Central have applied to the Interstate Commerce Commission for authority **to construct an extension** of the line of the former road from its present terminus at Swiss, eastwardly up the Gauley River to the mouth of Meadow River, a distance of twenty miles, thence southwesterly up Meadow River to a connection with the Sewel Valley R.R., near Nallen, a distance of nine miles. It also is proposed to build a branch line at a point eight miles above Swiss to extend northwestwardly up Peters Creek to Line Creek, a distance of four miles.

Association Activities

Hazard Coal Operators Association

The Executive Committee of the Hazard Coal Operators Association met at the Gibson Hotel in Cincinnati on April 3 and went over many items that were of an association nature—among which was car allotments that would be expected from the Louisville & Nashville and traffic conditions and betterments that had been promised by that line. Informal discussions were made after the meeting by members concerning the pooling of coal from Hazard for handling over the docks at the Head-of-the-Lakes. Intimation was given that it might be possible to lease dock space or forward coal to dock concerns for handling on a straight unloading cost plus a selling commission.

Cincinnati Coal Exchange

At the regular monthly meeting and luncheon of the Cincinnati Coal Exchange, April 5, Thomas L. Lewis, secretary of the New River Operators' Association, was the speaker. Mr. Lewis declared that "politicians were the curse of this country" and that their meddling with business caused distress to the consumers. He lit into the Interstate Commerce Commission and said that its members were only human. Lewis said that he feared that the **findings of the President's Coal Commission would result in the formation of a permanent coal commission** modeled along the line of the Interstate Commerce Commission "And then God help this country."

Coming Meetings

National Association of Purchasing Agents will hold its eighth annual convention and Informashow at Cleveland, Ohio, May 15-18. Convention headquarters, room 219, Hotel Winton, Cleveland.

The National Association of Manufacturers will hold its 27th annual convention at the Waldorf-Astoria, New York City, May 14-16.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey. The registration fee of $15 will include all meals except breakfast, transportation to and from the mines which will be visited, and the banquets. The only other expenses to be incurred will be hotel room and transportation to and from Scranton. Executive secretary, J. E. O'Toole, Philadelphia, Pa.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The Virginia Coal Operators' Association will hold its annual meeting on April 21 at Norton, Va. Secretary, G. D. Kilgore, Norton, Va.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24. Secretary-treasurer, J. G. Crawford, Chicago, Ill.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Indiana Retail Coal Merchants' Association will hold its annual meeting April 25 and 26 at the Claypool Hotel, Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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A Battle of Publicity

ABANDONING for the time their usual forceful tactics for promoting the extension of their organization, the organized mine workers have turned the guns of publicity on the non-union coal operators. Beginning some months ago with the demand that all coal fields be unionized, they have lost no opportunity to assert that it is the fact that some operators have managed to stay without their fold that has been responsible for the ills of the coal industry. This summer it is to a battle of words rather than of bullets.

Colonel Stimson's arraignment, on behalf of the Special Committee of Bituminous Coal Operators, of the policy, purpose and methods of the United Mine Workers so far has brought forth nothing further in reply than an attempt to make light of the charges because they were prepared by two lawyers. Now there may be a deal of difference between a statement prepared for the operators by lawyers and one prepared for the miners' union by a newspaperman, and the difference may be due to the fact, as particularly stressed by the union's "release" of April 12, that the lawyers are highly paid. That fact seems to distress many.

At any rate, there has been nothing since the war that has served to solidify the ranks of the soft-coal operators as has this challenge of the union. Changing from a policy of defense to one of aggressive offensive, the operators' association has taken on new life. Union as well as non-union operators have rallied to the support of the Special Committee, of which John C. Brydon is chairman, for the committee is bent on taking the fight into the enemy's camp, via the same route selected by the union, that of publicity.

Causes of General Goethals' Troubles

GENERAL GOETHALS, in his official report to Governor Smith at the close of his service as Fuel Administrator for New York State, succinctly summarizes the situation that faced him. The New York law under which he functioned gave him all the authority and funds that could have been bestowed by a state legislature. General Goethals found, however, that the State of New York could grant him no power over coal mines in another state or over coal moving in interstate commerce, which meant all the coal that came into his jurisdiction. His control over prices was confined to retail dealers' margins, since he could in no wise influence the mine price or the freight rate. His function with respect to distribution was entirely that of seeing that after the coal reached the dealers' yards it was equitably apportioned among the household customers.

Because the production of coal is not interstate commerce and because shipments across state lines are, a State Fuel Administrator dependent on outside sources cannot increase his share of the total by depriving others of coal going to them. General Goethals found that he lacked authority to divert shipments within his state, that he could not speed up the movement of his own coal, could not fix prices to dealers, or control the quality of coal shipped to him. He complains that the Federal Fuel Distributor had no authority, which is entirely true, and that the Interstate Commerce Commission, which presumably had some authority under the federal law, was a "quasi-judicial body, not accustomed to executive action." He might have added that, with respect to his own situation, the Interstate Commerce Commission did not always exercise what measure of authority it had in accordance with the recommendations of the Federal Distributor, as suggested by the act of Congress.

What the General has to say with respect to the lack of authority conferred on the federal officials is quite true, but he might have accompanied it by the acknowledgment that in the act creating the Federal Fuel Distributor Congress gave him all the power, authority and jurisdiction it could under the limits imposed by the Constitution. It is particularly significant that after reciting the steps taken to insure the necessary use of substitutes for anthracite, he admits that such trouble as was experienced in New York State was occasioned by non-compliance with his orders. He says: "Difficulty was experienced in securing full compliance [with orders that substitutes be used], and in most communities where shortages were reported or crises threatened, investigation disclosed that such conditions were due to non-compliance with this order."

Which brings us to the heart of the matter. All of General Goethals' troubles and those of Mr. Woodin before him, as well as those of fuel administrators in other states, were due to shortage of anthracite. Had there been sufficient hard coal there would have been no fuel administrators, no high prices, no impure coal and rock delivered to consumers. But the country was short some thirty to forty million tons of production and had to face the winter with but 60 per cent of requirements for consumption. No amount of price fixing and regulation of distribution could, or ever can, make more tons of coal. There was non-union soft coal to substitute for union soft coal not produced last summer, but there was no non-union hard coal. And after the strike was settled there was soft coal of all kinds to make up the deficiency in anthracite, but people did not take kindly to its use, therefore the most of the trouble.

Plainly enough if this country can find no way to curb the power of the United Mine Workers and continues to submit to such unwarranted suspensions of mining as characterized the hard-coal strike of 1922, then, but not until then, is it time to discuss the technique of governmental regulation of price and distribution. Complete elimination of the comparatively small quantity of "fireproof" coal distributed, repression of the 5 per

cent of "higher price" tonnage reported by General Goethals and theoretically perfect distribution of available coal would not have relieved the shortage or obviated the use of substitutes. All these things, irritating as they were, were as nothing compared to the fact that because the United Mine Workers chose to exert their full "economic strength" they called a strike in the anthracite field and thus deprived householders of millions of tons of hard coal.

Reservoir Sump Systems an Operating Economy

BIG power bills are bringing operators to a recognition of the importance of having large sumps. A big underground reservoir is an assurance against the drowning out of the shaft in case of accident to the pumps or pipes, power failure or an excessive inflow of water. It is a cheap substitute for the large and expensive machinery that the power station, public or private, must introduce to take care of peak loads. Cheaper by far as a rule would be a few million gallons of storage than a few hundred kilowatt-hours of capacity. To avoid paying the latter the power company penalizes the operator, who, not having storage capacity, is obliged to add pumping to his other loads during the busy hours of the day.

In this issue of *Coal Age* an article describes the reservoir or sump system in the Isabella mine of the Hecla Coal & Coke Co. It is only one of many large sumps. Its interest lies in the utilization of airways for water storage and the problems thereby confronted and solved. Another large sump system is that in Eureka No. 25 mine of the Berwind-White Coal Mining Co., at Windber, Pa., where the reservoir lies in the major axis of the Wilmore basin and has an area of eight to ten acres. Water flows to it from mines Nos. 35, 36, 37, 40 and 42.

This company pumped 111,000,000 gallons of water in December of 1921, about 3,600,000 gallons per day. As the sump fills in two days, the capacity is twice that of the daily accumulation, or 7,200,000 gallons. The pump-room is equipped with three 4,000-gallon centrifugal pumps which lift against a 330-ft. head in an 18-in. main and are driven by 500-hp. induction motors. Only two of these units are operated on any one night and consequently it takes from eight to nine hours to empty the sump.

In the early days of steam as a direct agent of power at the mine the men behind the shovels in the boiler room were the instruments by which the consumption of power was measured. If the steam failed to do what was required of it, the firemen were supposed to be flagging on the job or stoking badly. Sometimes the firemen by a burst of energy could carry the load over its peaks, but often the pumping load was so heavy that the other loads had to be reduced to permit the pumps to run.

Now, the load is more accurately ascertained. When men begin to measure and record, then comes regulation. As soon as a co-operating factor like the power station comes into the business, an attempt to place responsibility results in better performance, and both parties endeavor to arrange that mutual accommodation shall be rewarded by mutual advantage. Thus arises the lowered rate for off-peak service, which is a concession of the power corporation of which the frugal operator should take full advantage.

Strange to say, many operators for many long years perseveringly pumped water during busy hours because they lacked storage capacity that would enable them to do otherwise. They did not realize the loss because they had no figures to show them what they were losing. Now that power is purchased the doubt as to the loss is gone. The facts can be no longer hidden and the change is almost automatic.

With continuous pumping the pumps need continuous superintendence. When all the work is done in a short portion of the day the wage charge is reduced from one-third to one-half. Furthermore, where the water flowing to the sump contains suspended matter the large sump provides a chance for the silt to settle, thus saving the impeller and the case of centrifugal pumps from wear and possible clogging and the cylinders and plungers of reciprocating pumps from abrasion. Moreover, with clear water the valves of these pumps will function without interruption.

FREQUENT AND WIDESPREAD REPORTS of wage increases in industry have marked the past three months. These increases have come mainly in the textile, clothing and steel industries. When considering these upward changes in wage rates it is well to have in mind that they are taking place in industries in which wages were deflated in 1921 and that the wage levels after these present increases are even yet generally below the peak of war and post-war scales. The recent advance of 12½ per cent by the Amoskeag Mills, for instance, leaves wages 2 per cent below the war peak, it is stated.

In the coal industry, on the other hand, union wages have not receded from the post-war peak, which is well above the war-time levels. In other words, wages that were lowered during the slump of 1921 are now coming back as industry gains in activity. A shortage of labor is reported more or less generally over the country, save in the soft-coal industry. There is, in consequence, a distinct trend toward the further development of mechanical aids to production to offset high labor costs and labor shortage. This is true also in coal mining, where there is now under way intensive development of mechanical loading machinery and of other devices for increasing output per man and for lowering the labor cost in producing coal.

SOUTH AFRICA'S COAL IS MORE VALUABLE THAN ITS DIAMONDS judging by the report of the government mining engineer for the first eleven months of 1922. The output of the Union of South Africa for that period was 8,907,576 tons valued at £3,196,037, whereas the diamond output for the same period brought only £1,995,513. Now that coal shipments are starting from South Africa for a long haul across the equator to Germany, the coal production of the tip end of the black continent attains a little worldwide attention. At the twenty-second geological conference held in Canada it was estimated that the South African coal deposits totaled about fifty billion tons.

THE CHIEF TROUBLE with the country just as present seems to be too many authorities and not enough authority. —*Baltimore Sun.*

FRANCE CONTROLS THE PITHEADS. It remains to be seen whether she can control the square heads.—*Norfolk Virginian-Pilot.*

Large Sump and Night Pumping Lower Peak Load When Electric Power Displaces Steam at Isabella

Reservoir Holds More Than a Million Gallons—Sump Near Shaft Sealed with Gunite—Stoppings, Dams and Buried Pipe Mains Keep Water from Tracks —High-Voltage Dangers Underground Reduced by Suitable Construction

By Alphonse F. Brosky*
Pittsburgh, Pa.

DURING the shutdown of 1922 the Hecla Coal & Coke Co., a subsidiary of the Hillman Coal & Coke Co., made many improvements to the Isabella mine, at Isabella, Pa. This mine has two hoisting shafts both of which are located a short distance from the bank of the Monongahela River. Among the improvements that should be mentioned were the substitution for steam-driven machinery, of electrical equipment operated by purchased power. At the same time a large underground sump was constructed under unusual difficulties near these two shafts. This was done mainly for the purpose of permitting the pumping of water during the night and thus reducing the peak load to a level which would not draw a penalty.

In order to familiarize himself with the location, elevations and other details of the sump the reader should study Fig. 1, which shows a section of the mine layout. From No. 2 shaft, up which the water is pumped, the sump system runs northeastward in a return airway, known as No. 2 aircourse, for a distance of about 725 ft. it then crosses the main entries to the west by a passageway driven expressly for that purpose, and occupies a portion of No. 1 return airway and the first two sets of the butt headings driven to the west. All the sumpage is in roadways or airways, except where connecting waterways have been constructed. No rooms are available for the storage of water.

Sump Will Take Water from Two Mines

For the purpose of hauling coal from Tower Hill Mine No. 2 to the river for shipment by water that operation which is owned by another subsidiary of the Hillman Coal & Coke Co., is connected underground with the Isabella Mine. In order to provide for this additional tonnage whenever it is decided to raise it in the manner indicated the mine is furnished with two hoisting shafts. The water already is handled from the one mine, consequently the sump must be large enough to hold the water from both mines, that from the Tower Hill No. 2 Mine being pumped to the sump.

Though it is estimated to hold at least 1,000,000 gallons the exact capacity of the sump has not been determined. It is so large, however, that it is expected that it will hold all the water likely to accumulate over a period of not less than 72 hours. The superintendent tells me, however, that from his knowledge of this mine he doubts whether the stage will rise above 654 ft., which is 2 ft. below the flood stage for which provision has been made.

Because the elevations of the bottom in the vicinity of the shafts are such as to facilitate the construction of a sump with a minimum of excavation, a new pumproom was built at *A*, in a breakthrough driven from No. 2 aircourse to No. 1 shaft. As the distance to No. 2 shaft is short, the water readily could be discharged through the upcast compartment of that shaft, and as this compartment is an upcast all danger of freezing was removed. Consequently no borehole had to be drilled to the surface. But to drain all the water in the sump to a suction well at the pumproom, the underclay had to be lifted on No. 2 aircourse, as reference to the elevations of the bottom will make apparent. The bottom of the aircourse before excavation was at an elevation of 660 ft. near No. 2 shaft and only 654 ft. at the breakthrough where the system crosses to the west.

Again referring to the elevation of the bottom in the vicinity of this crossover point, it will be noted that a natural shallow basin lay there, and it was to this basin,

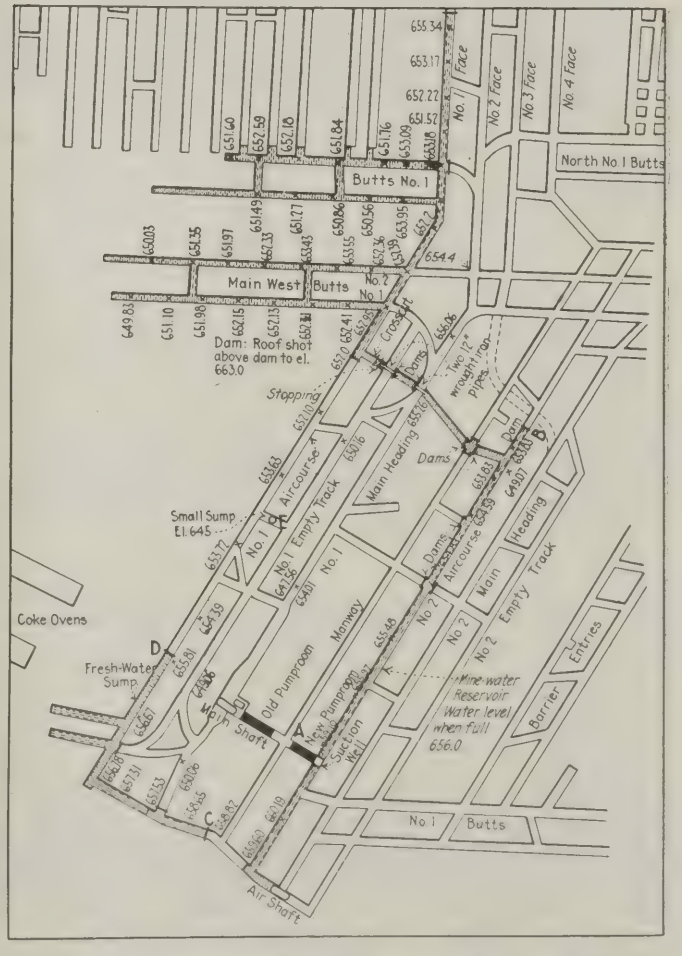


FIG. 1—EXTENSIVE SUMP AT ISABELLA SHAFT

In order to get space for the storage of water without weakening the pillars around the shaft an excavation was made along No. 2 air course and provision was made to store water on roadways a long way from the shaft. The sump had to cross a manway and two haulways. In order to protect the shaft further the excavation was gunited.

*Assistant editor, *Coal Age*.

before the present sump was constructed, that the suction line extended, coming from the old pumproom adjoining No. 1 shaft which housed the steam-driven pumps. This basin was so small that only by keeping these units in continuous operation could the main bottoms be kept free of water. In order that the space may be utilized as a waiting room the steam equipment will be removed from the old pumproom.

By taking up bottom to an elevation of 651 ft. in No. 2 aircourse, the management calculated that, what with the storage afforded by the butt headings to the west, the sump system would be adequately large. Accordingly the bottom was lifted beginning at *B*. After excavating to an elevation of 651 ft. a soft bed of clay was encountered which dipped slightly toward No. 2 shaft, greatly facilitating the work. The cut increased from a depth of 3 ft. at *B* to a depth of 10 ft. near No. 2 shaft, where the bottom level of the ditch is about 650 ft. Thus the bottom of the sump sloped gently southward toward the shaft.

Holes for blasting were drilled horizontally by an electric drill in the soft bed of clay, giving a more effective lift to the shots. Above this soft material were shale and hard clay which could not be penetrated as readily by holes drilled in a vertical plane. The saving in drilling and blasting and the added storage space warranted the additional mucking caused by reason of a larger cut.

Fear was entertained that the clay might cut under the coal and so weaken the pillars on which No. 2 shaft and its bottom relied for protection. It was feared also that the shaft might settle as a result of the softening of the clay by water. Consequently gunite was placed on the exposed surfaces below the coal, thus sealing the water in the sump from all the clay surfaces along the entire main sump heading. Altogether 1,944 sq.yd. of gunite was applied to a thickness of 1 to 1½ in. and at a cost of $1.03 per square yard. Only in a few spots was it necessary to use a wire mesh for reinforcement. Where the main sump heading is deepest ¾-in. weep pipes were used to let in from behind the gunite facing whatever water could not be conveniently shut out.

So far the work has shown no signs of failing in the year that has elapsed since its completion. It might well have been feared that squeezes, no matter how inoffensive, would result either from the swelling of the clay or the squeezing of the strata consequent on mining and that these might displace the gunite, but appar-

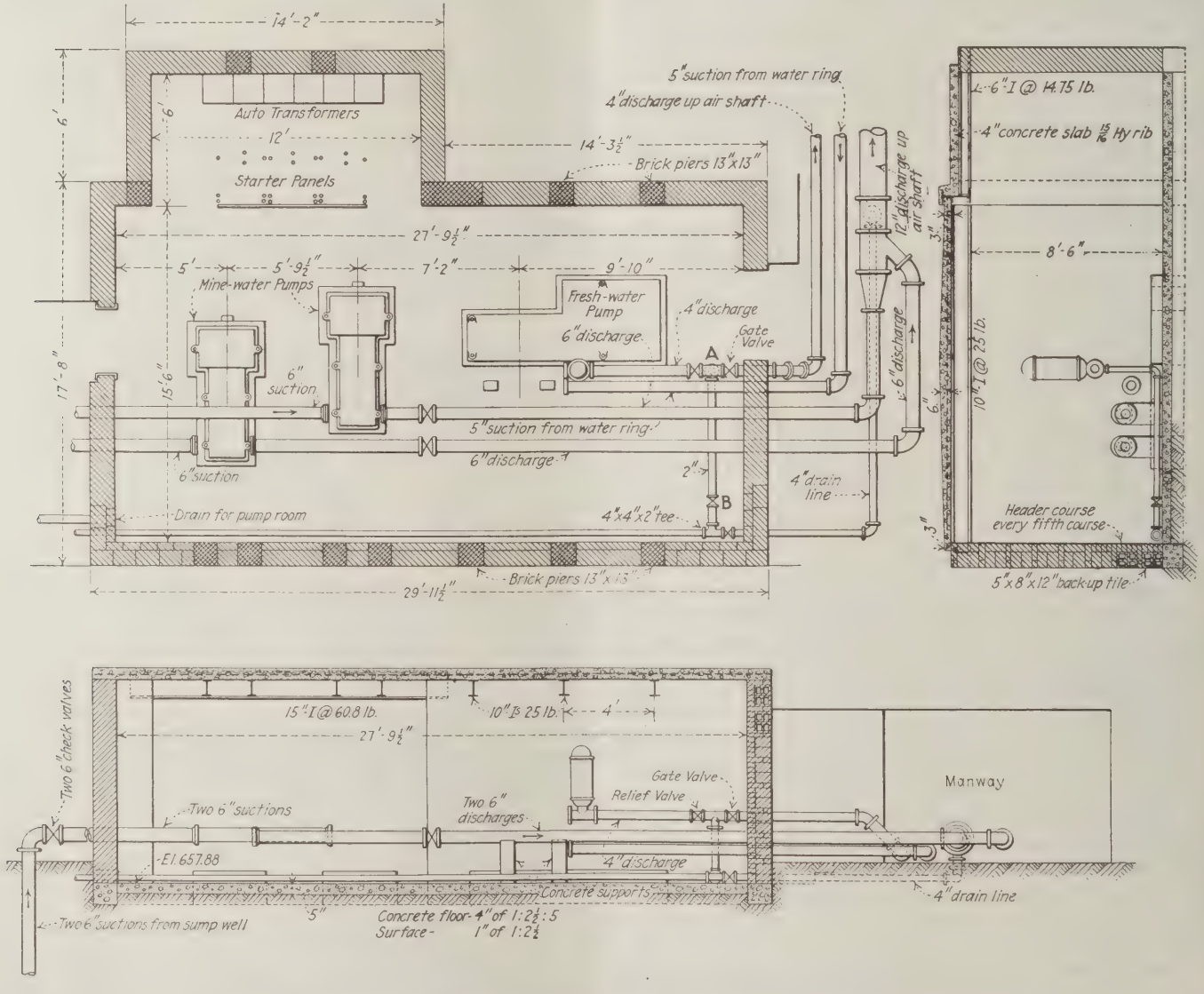


FIG. 2—PUMPROOM AND PUMP CONNECTIONS WITH PROVISIONS FOR PRIMING

In laying the foundations excavations were made to rock that might be expected to remain unaffected by the softening action of water and air. Underground, the foundation material may not have been subjected to such weathering actions and the present condition of a foundation bed may be not a correct index to its future condition as is the case with surface materials. The floor in this pumproom has been made part of the foundations. From this pumproom is discharged both dirty mine water and clean water, from the water ring, that water being stored in a separate sump located not far from the foot of the shaft.

ently the swelling action was wholly eliminated by the way the water was sealed off from the clay. As for the imperceptible squeezes resulting from the weight of the strata the panels of gunite possess sufficient flexibility as cantilevers to withstand the thrusts normal to them; or, if that is necessary, they can be given greater strength by the use of a reinforcing mesh. The success achieved on this job moved the Snowdon Coke Co. to gunite a sump in a near-by mine which holds 500,000 gallons of water.

To carry the sump system, which lies in the path of the return air, across the haulageways and fresh-air entries it was necessary to erect many brick stoppings and concrete dams. These dams rise to an elevation of 656 ft., or 1 ft. above the maximum water stage. Water which collects in the sump headings to the west is carried across the manway on the No. 2 side and across the two haulageways on the No. 1 side by sets of two 12-in. wrought-iron pipes which are buried beneath the entries they cross and beneath the stoppings that were erected to prevent the air from wandering from its determined course. These pipes are buried several feet below the entries, which provision, together with the tight stoppings, prevents the air in one entry from short-circuiting into another in which the air is traveling in the opposite direction.

No. 1 aircourse and the butt headings turned west, which form part of the sump system, required little conditioning. Dams had to be erected, however, and the roof had to be shot where these dams were located, so as not to restrict the airway. The bottom, also, had to be given a general cleaning. The bottom was taken up at a few points to establish the mean elevation at about 652 ft. Thus this area will hold a runoff to a depth of about 3 ft. whenever a maximum stage is reached, and consequently more than two-thirds of the entire storage capacity is developed here.

Fresh-Water Sump Holds Water for Town

As might be expected, the strata near the river discharge into the rings of the No. 2 shaft a moderate quantity of water, so pure indeed as to be suitable for town use. This water is piped to a fresh-water sump lying between dams *C* and *D* (see Fig. 1). The overflow from this fresh-water sump falls from the dam at *C* into the mine-water sump, which lies at a lower level.

Some people might look askance at supplying water from an underground source for town use, but under conditions such as exist here there is little to fear. Inasmuch as the fresh-water sump seals off that which might be strictly termed mine water and as the undesirable acids and salts in the wetted sides of the sump have long been removed by solution, the fresh water coming from the shaft rings and stored in this sump is the equal of any spring water in the region. As an added precaution it occasionally is treated with lime.

Thus is care taken of practically all the water in the Isabella and the Tower Hill No. 2 mines, though, of course, small pumps have to be used for gathering. Mine water from the main bottom in the vicinity of No. 2 shaft drains directly to the big sump. Water which gathers in the sump of No. 1 shaft, that which finds its way to a small sump at *E* and that which collects in a swag on No. 1 empty track are pumped to the big sump by a 6x8-in. piston pump which is driven by a direct-current motor. This unit is housed in the old pumproom adjoining No. 1 shaft.

The walls of the new pumproom are 13 in. thick and consist of brick and back-up tile. However, where the wall has to support crossbeams, solid brick pillars 13 in. square are erected in the walls. These crossbeams are 10 in. high and of I cross-section where they span the main building but only 6 in. where they cover a side extension of the pumproom. To support the 10- and 6-in. beams where the extension breaks the continuity of the wall, a 15-in. beam is laid across the pillars. The solid brick piers have been introduced into the body of the wall so as to give adequate support to this roof system.

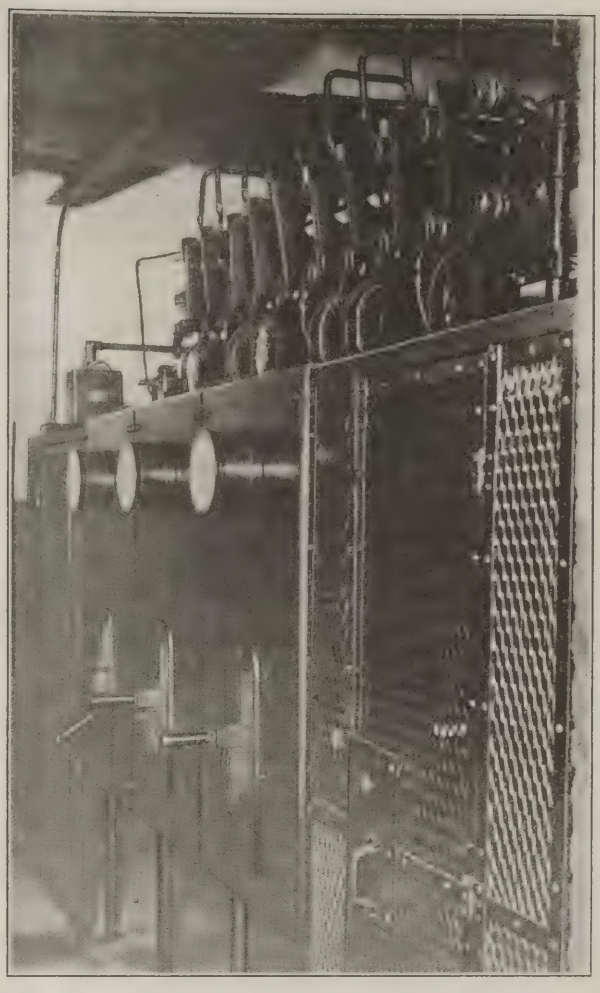


FIG. 3—STARTER PANEL FOR MINE PUMPS

A cable carrying a 2,300-volt current is brought through the wall behind the board to disconnecting switches and thence through oil starting switches to the motors. Nothing over 110 volts makes direct connection with the switchboard, the frame of which is grounded so as to afford the operative a further safeguard against shock.

The details of the design can be seen in Fig. 2. Entrance is gained to the interior through a door made of $\frac{3}{16}$-in. steel plate reinforced by riveted angles and channels. The pump foundations are carried to a solid footing by concrete piers and the floor is made part of these foundations.

The roof slab is of concrete reinforced with expanded metal and varies in thickness from 3 to 6 in. The upper flange of the 15-in. beam already mentioned, which otherwise would be subject to corrosion because of its inaccessibility for painting, is enveloped in concrete. This practice should be adopted in all work where steel and concrete are employed in the manner described. All other steel beams lie below the roof slab where they are accessible for painting and sheltered from roof water.

Mine water is pumped from the big sump up No. 2

airshaft against a head of 138 ft. by two 750-gallon single-stage centrifugal pumps driven by 60-hp. squirrel-cage motors. The 6-in. discharge lines from these two units connect by means of a Y to a 12-in. line which is located in the shaft. The 6-in. suction lines from the centrifugal pumps are provided with check valves as indicated in Fig. 2 and lead to a 10x12-ft. concrete suction well 8 ft. deep in the main sump heading adjoining the new pumproom.

Water for town use coming from the fresh-water sump is pumped up the same shaft against a head of 403 ft. to a reservoir tank on a hill by a 150-gallon plunger-type triplex pump which is driven by a 50-hp. squirrel-cage motor. This pump has a 5-in. suction which taps the little sump through the dam at *C*, and a 4-in. discharge which is carried to the reservoir. To supply the needs of the town it must be kept in operation about 16 hours per day.

Only Pump During Off-Peak Hours of Night

The pumping of mine water is done during the off-peak hours of the night. At the present time from 300,000 to 400,000 gallons of water accumulates in the big sump each day. This quantity can be pumped by one of the two units in a single shift. The two centrifugal pumps are put in operation on alternate nights. Consequently the sump capacity is three times that of the daily accumulation of water, which in turn is one-half the 8-hour capacity of the two centrifugal pumps. Thus ample provision has been made for any increase in the quantity of water that may have to be pumped at any time.

Auxiliary tap lines have been provided whereby the 4-in. discharge column from the triplex pump or the 12-in. discharge column from the centrifugal pumps may be drained back to the big sump. Through the same drain line by a manipulation of valves the centrifugal pumps may be primed from the triplex pump.

A 4-in. drain line connects the 12-in. discharge of the centrifugal pumps with the big sump. A 2-in. line connects this drain line with the discharge of the triplex pump as shown in Fig. 2. Thus by opening the proper valves either water column in the airshaft may be drained.

As before mentioned, the water head on the triplex pump is 403 ft., and against this the pump cannot start. By opening a check valve *B* on the 2-in. line it is enabled to pick up water against practically no head. Then a gate valve at *A* is opened, after which the check valve is closed, thus allowing the triplex pump to take up its load gradually against the large head.

Safeguarding the High-Voltage Lines

Alternating current at a potential of 2,300 volts is conducted from the substation on the surface to the underground pumproom by a No. 1 3-conductor lead-armored cable which is strung down the No. 1 shaft in fresh air, and leads to the rear of the switchboard. The incoming line at 2,300 volts passes through disconnecting switches and oil switches for starting and thence leads to the motors. Direct connections are made from the oil switches behind the main panel to the motors by wires carried in conduits under the floor.

By bringing the control panel flush with the sidewall of the pumproom, locating all control apparatus in an offset, keeping the high voltage behind the starting panel and under the floor in conduits, the dangers involved in handling heavy voltages in close quarters are eliminated. The starting panel is equipped with three hand-operated starters and three voltmeters which latter are tied in with the high-voltage equipment by a current stepped down to 110 volts. These features are to be recommended for all underground pumprooms where alternating current is used.

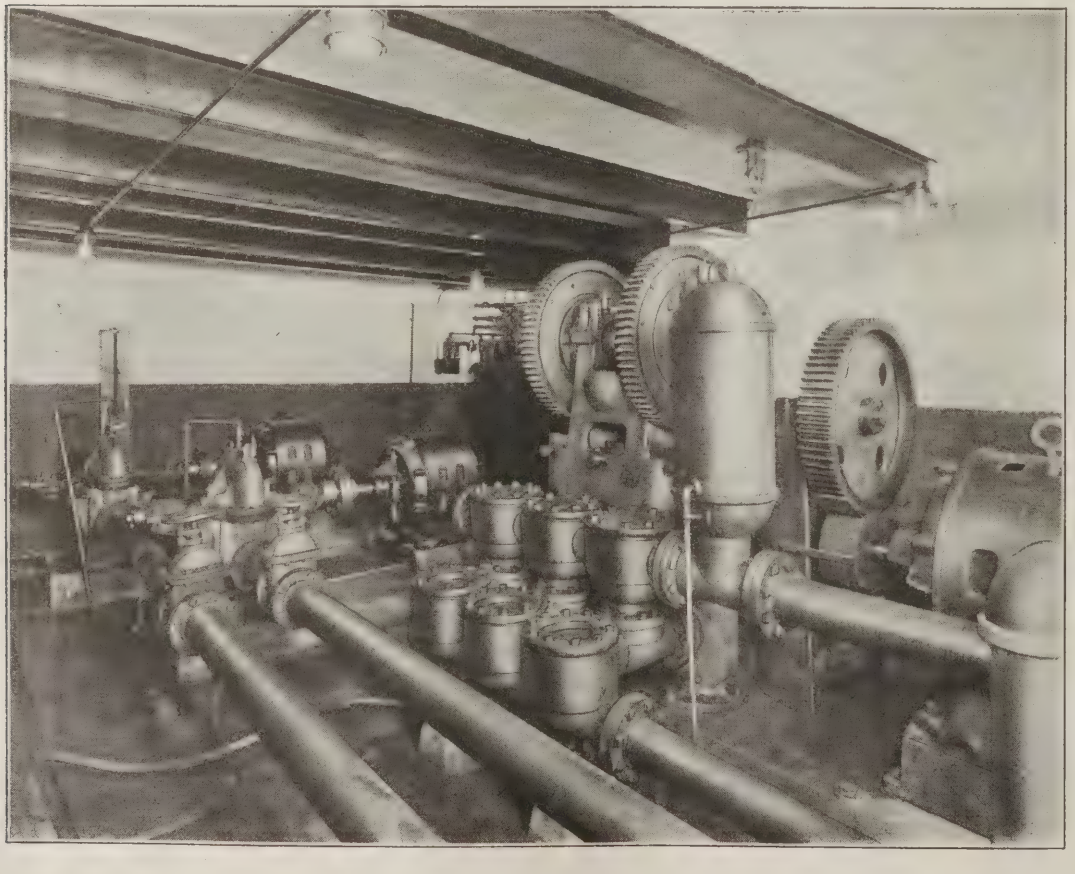


FIG. 4

Pumproom, Isabella Mine

Mine water is pumped by one of the two 750-gal. single stage centrifugal pumps driven by 60-hp. squirrel-cage motors which can be seen in the rear and on the left. The large pump on the right is a 150-gal. plunger type triplex pump for pumping fresh water. This is driven by a 50-hp. squirrel-cage motor, the lift being 403 ft. as against 138 ft. which is the lift of the other pumps. The starter panel can be seen to the left and behind the triplex pumps.

Gathering Without Animals, Locomotives or Conveyors

Longwall Retreating by Panels with Cars Placed Continuously Before Face by Portable Electric Hoists and Assembled in the Same Manner When Loaded—Every Locomotive Hauls Full Trips Exclusively

By F. C. Cornet*
New York City

THE mining method shown in the illustration accompanying this article and explained hereinafter applies to seams of such thickness that cars can be loaded at the working face without excavation in either the top or the floor.

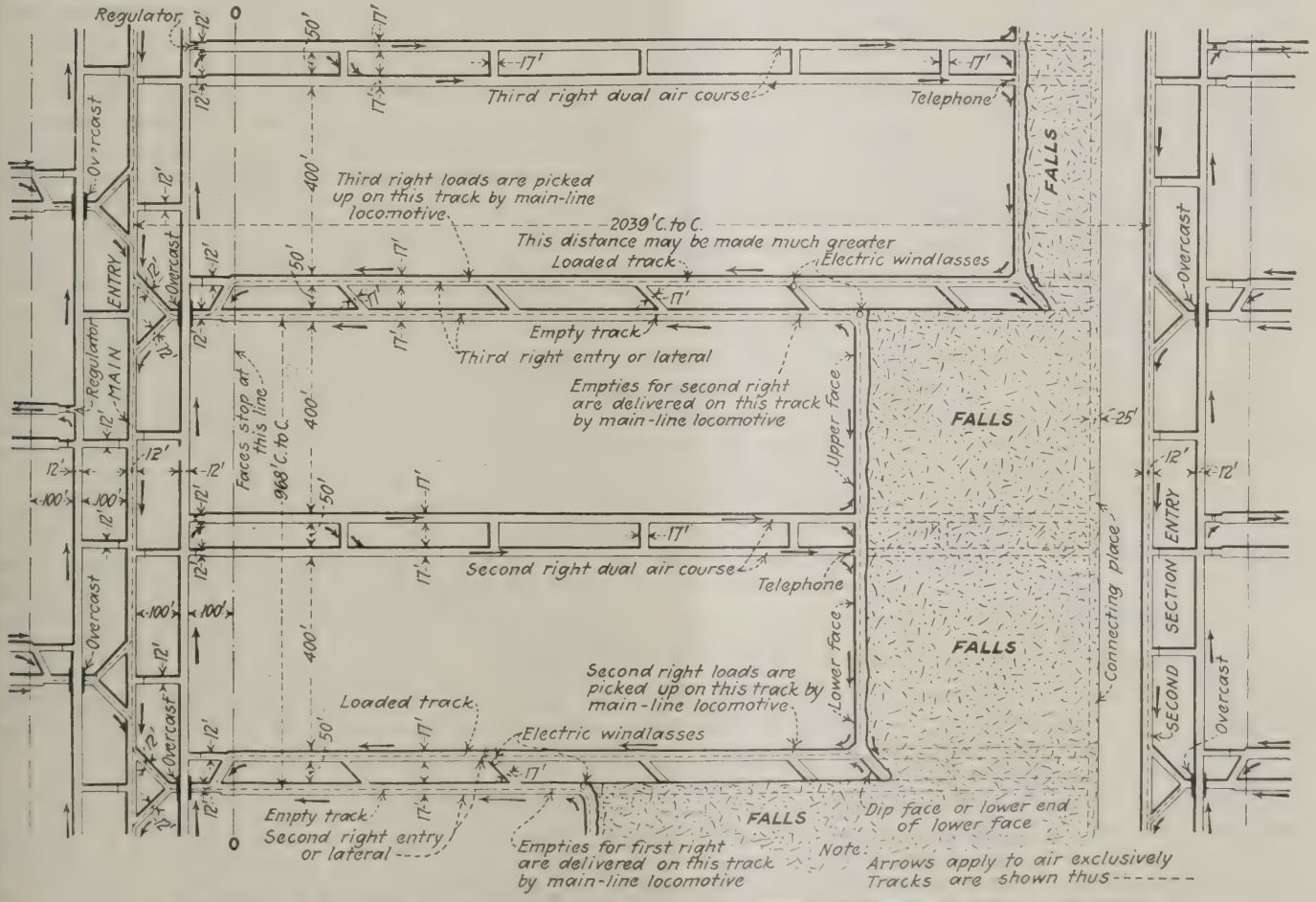
The main-entry system shown to the left of the illustration, which consists of a haulageway flanked on either side by a so-called main aircourse, is driven on the full pitch of the coal, which, it is assumed, does not exceed 4 per cent. At intervals of nearly 1,000 ft. center to center, lateral headings (hereinafter called "laterals" for brevity's sake) are driven two abreast at right angles with the main entry, that is, on the strike of the seam. For brevity also the lower member of a lateral will hereafter be called the "empty track" and the upper member will be designated as the "loaded track."

Halfway between two successive laterals a so-called "dual aircourse" is driven parallel with the laterals. Between any dual aircourse and the nearest lateral, above and below, a solid 400-ft. pillar is left to be mined retreating after at least two successive laterals and the intervening dual aircourse have been driven to their assigned limit.

The fact that these solid 400-ft. pillars constitute for the laterals and the dual aircourse an effective protection that will last as long as these places are used makes it permissible to drive them of such a width that they can be extended without payment for yardage. I have assumed that a width of 17 ft., as shown on the drawing, would put these places out of the yardage-paying class, leaving in the narrow class, subject to yardage, only the main-entries and the short necks by which the main haulageway and the aircourses are connected with the laterals and dual aircourses respectively.

When two successive laterals and the intervening

*Consulting engineer.



METHOD OF MINING ELIMINATING USE OF LOCOMOTIVE EXCEPT FOR FULL-CAR TRIPS

The locomotives in the scheme planned keep continuously traveling, loaded always to their capacity except when driving what the author calls the laterals and the air courses. The air currents cannot leak from intake to return, as a 400-ft. pillar unbroken by crosscuts separates them during the real operating stages. The cars, drawn to the highest point of the face by an electric windlass, can be lowered to any point at the face desired. Electric windlasses assemble the cars and the locomotives pull them out. The cutters have straight cutting without traveling from face to face. Absolutely nothing spoils this picture except the requirement of an even, favorable grade, which in many places can be conceded, and the need for a suitable roof or height of cover. As hand loading is provided the area to be supported back of the face is a minimum.

dual aircourse have reached the limit assigned to them, their ends are connected up, as shown, by a wide place simultaneously driven from the dual aircourse toward both laterals and from each of the latter toward the dual aircourse. The outby rib of this connecting place forms a longwall face intended to be driven toward the main entry until it reaches the line *OO* drawn parallel with the main entry sufficiently far from the near main aircourse to protect the latter by an adequate barrier pillar that will not be mined until the time when the main-entry pillars are themselves drawn.

A look at the drawing shows that when a newly formed longwall face starts driving, it is perfectly straight from end to end, including that lowermost part of it marked "dip face" on the drawing. As the longwall face drives on, however, the direction of the dip face is gradually changed to a slant, as shown. The reason for this will appear below.

As to the main part of the face, it will be maintained straight on the full rise of the seam, as shown. This part of the face I have divided arbitrarily into two sections, marked "upper face" and "lower face" on the drawing, the supposed dividing line between the two being opposite the lower member of the dual aircourse, near the telephone. The reason for my making this imaginary division will appear later.

No Bonding Needed Along Longwall Face

The illustration plainly shows in broken lines the great simplicity of the whole track system. If trolley locomotives are used, all the tracks will be bonded and equipped with trolley wires, except along the longwall faces. As will appear later, no gathering locomotives and no animals will be used.

The main-line locomotive, coming up the main heading with a full trip of empties, keeps on its way past the lateral for which it is bound, until the last car of the trip has cleared the point of the upper switch giving access to the lateral. The whole trip is then dropped into the empty track of that roadway, which, as may be seen, is straight. The empties thus dropped are intended for the longwall face below the empty track.

When dropping a trip of empties into a lateral, advantage is taken of the momentum gained by the cars while running downhill on the main entry. This will make it unnecessary for the locomotive to begin pushing the trip until such time as every car is on the straight track and beyond the overcast. On this long track tangent the cars, even if pushed, will not be likely to leave the rails unless the former are in bad condition and the track is shaky.

Provision for Turning the Locomotive

The locomotive, having placed the empties on the straight track as far as required, will run back the way it came to the main heading, to re-enter the lateral immediately by way of the lower switch leading to the same lateral. This maneuver is necessary in order to have the locomotive, when going out, turned the same way as when coming in. If storage-battery locomotives are used, it will not be necessary to run the locomotive around in the manner described. After re-entering the lateral, the locomotive will switch to the loaded track, where a full trip of loads is standing already made up, waiting to be hauled away. These are the cars that have been loaded at the longwall face above the loaded track.

At some convenient point along each empty track an electric windlass is placed, the steel rope from which reaches outward as far as the outby end of the trips of empties delivered by the locomotive. Although I have shown this windlass placed where the empty car curves toward the face, another location along the empty track might equally well answer the purpose, which is to move the empties from the point where the locomotive has left them to a point at or near the head of the longwall face where they can be allowed to run by gravity down the loading track along the face until stopped by their brakes at the point where they are needed. The cars thus will be brought to loading positions, not one or two at a time but in groups of fifteen or twenty-five, or even more units, as the face foreman may think best. The grade being in favor of the movement of the cars it is easy to spot them at any point desired.

At some appropriate point along each loaded track, not necessarily where shown on the drawing, is also placed an electric windlass, the steel rope of which reaches as far inward as the foot of the dip face. It is by means of this windlass and rope that the cars, dropped by gravity from the main face after loading, as well as the loads drawn away from the dip face, will be made into full trips all coupled up, ready to be hauled away by the locomotive, as previously explained.. Although windlasses answering perfectly the comparatively limited requirements of these operations are machines that may be rapidly and inexpensively moved from one location to another, it will be best so to place them that they will have to be moved only at long intervals, say 200 or 300 ft. at a time.

Locomotive Invariably Handles A Full Trip

The grades, where grades there are, being in favor of the loads, the number of empties that the locomotives can conservatively haul up the controlling grade will determine the number of cars constituting what I have repeatedly designated above as a full trip. Fifteen-ton locomotives will haul with comparative ease forty-five ordinary empty 2-ton cars up a 4-per cent incline, which is the maximum grade assumed at the beginning of this article. The face lengths and other measurements appearing on the drawing permit the placing of forty-five empties and the formation of trains of forty-five loads in the laterals at all stages of the operations down to the time when the longwall faces get to the line *OO* when the laterals, being worked out, are abandoned.

All conditions required to minimize the cost of main haulage are met by this system: First, single destination on every trip made; second, full trains hauled at all times; third, no shifting to be done by the motors in the laterals; fourth, no reduction in the length of trains at any stage of the operations, no matter how nearly the territory saved may be worked out. The gathering is done at much lower cost by the combined windlass and gravity method than it could be by animals or gathering locomotives under the most favorable circumstances.

In ordinary mine layouts, the lateral headings generally are short, seldom exceeding 1,500 ft., due to the fact that gathering by either locomotives or animals rapidly becomes too expensive when the laterals are made longer. This drawback is entirely eliminated when the work is done in the manner just explained. The cost of gathering remains at the same low figure no matter how long the laterals may be. Longer laterals mean less section headings of the kind shown at the right of the drawing. They also mean less trackage and fewer

overcasts, as well as more efficient supervision and increased safety.

I realize that some engineers will object to long laterals, on the ground that, in the system I am describing, intensive, paying production is delayed until two consecutive laterals have been driven to their limit and connected up at their ends. Of course, the execution of such preliminary work will absorb more time than certain operators can, or are willing to, afford before getting tangible returns from the money spent in development work.

I freely admit that this new mining method is designed only for those operators who have at their disposal capital that will permit them to wait reasonably long for returns, provided that by so doing the dividends earned will be larger than they could possibly be through any other method. The large coal area tributary to a lateral is in itself a factor that will amply repay the operator for the time spent in driving these long roadways.

Assuming the layout to accord with the figures appearing in the illustration, ninety men could, without interfering with one another, work together along the 900-ft. face. When pressed for coal, 120 men could work there without appreciable decrease of individual output. Supposing, as already seen above, the imaginary dividing line between the upper and lower faces to be at the lower member of the dual air course, as many men could work above as below said imaginary dividing line—that is, sixty on each side of it. The mining law of West Virginia, which I had in mind when designing this method, limits to sixty the number of men who may be employed on a single split of air, no matter how far apart consecutive laterals may be. That is why the aircourse is placed between the laterals. By placing it exactly halfway between the two, the permissible maximum number of miners may be employed on either side without crowding them more on one side than on the other.

Ventilation Simply Arranged and Effective

The ventilation system requires only one regulator. It makes no difference in which member the regulator is built, provided the other member is blinded, as shown, by a stopping in order to confine regulation to one point only. This stopping is the only one necessary in connection with the dual aircourse, both members of which, combined, offer an easy passage for the air. None of this ventilating current can possibly be lost, as it has no way to reach the returns except through the workings to be ventilated. In no other system is all waste of air thus made impossible in working headings.

Another objection that may be raised against long laterals is that the maintenance of such arteries grows more expensive as they get older. Of course, the longer a lateral, the longer it will have to be kept in service and maintained in more or less perfect condition. The above objection is justified in ordinary practice where the driving of contiguous rooms to one side (and sometimes to both sides) of the lateral generally so weakens the overlying strata that maintenance of said lateral becomes expensive. This, however, is not likely to happen where the overlying strata remain supported to the last by solid 400-ft. pillars, as is the case with the layout represented by the drawing.

Let us assume that the seam worked has an average thickness of 54 in. of merchantable coal and ninety loaders are employed. which would allow each man 10 lin.ft. of face. A cut 10 ft. deep will throw 16 gross tons of coal per 10-ft. section. This is just what the average loading capacity would be among so many men working together shoveling coal into 2-ton cars standing 32 in. high above the rail.

We have seen that the locomotives would deliver the empties near the top of the workings in 45-car trips. The forty-five cars, dropped together or in two or three sections rapidly following each other, would allow every two loaders one car from each trip. Each pair of men would require sixteen cars and the ninety men 720 cars daily, which makes it necessary for the locomotives to make sixteen trips to and from each lateral in the course of an 8-hour shift. Assuming there are twice as many cars, empty and loaded, on the roads going and coming, or standing at the tipple and on storage tracks as there are at the different faces, every car in actual service will make 5.33 trips every working day, a performance unheard of in room-and-pillar mines, but just fairly satisfactory in well-planned longwall mines where the tracks are good, the ventilation abundant and the locomotives not lacking.

Chain machines of the ordinary room-and-pillar type, cutting 10 ft. deep, could be applied easily to such work as I am describing. With the difference that there is no sumping to be done, these machines would work just as they do in rooms, cutting across a 900-ft. face instead of one of 25 or 35 ft. Using two cutters simultaneously, both traveling downhill, for example, the upper machine starting at the empty track, the lower one at the lower member of the dual aircourse, the cutters could be depended upon to travel at the rate of a foot a minute, taking into account the time necessary to change all the bits of each machine twice. Thus the cutting of the whole face would be done easily in the course of an 8-hour shift or, to be exact, in 7½ hr. This performance of 450 lin.ft. a day, while not extraordinary in longwall practice, is 100 per cent better than in room-and-pillar work, where a chain machine is considered to be doing very well if it cuts ten 22-ft. places daily.

The chain cutter, perhaps the most remarkable instrument of production that the mechanical genius of this country has put at the disposal of coal operators, also is the one to which our mining methods have been slowest in adapting themselves.

What I said in my article in *Coal Age* of Jan. 25, 1923, concerning timbering and conveyor shifting applies in a general way to the method described above, the only exception being that in this case there is a track to be shifted instead of a conveyor. One job is about the same as the other.

Wagon Mine Operated by ¾-Yard Shovel Is an Alabama Innovation

ONLY a quarter mile from the Pocahontas station of the St. Louis & San Francisco R.R., the Pocahontas Coal & Mining Co., of Carbon Hill, Walker County, Ala., is nevertheless temporarily running a stripping as a wagon mine. Excavation just now is being made in the shallower stripping, which averages about 14 ft., and the work is done by a Bucyrus extra-high-lift shovel with a ¾-yd. dipper, a 22-ft. 6-in. boom and a 17-ft. dipper handle, the shovel being mounted on caterpillars. The coal is 28 in. thick and is covered by a 4-ft. bed of blue slate which can be removed without blasting. The shovel makes a 25-ft. cut, casting the overburden over into the previous excavation. The stripping is all done at night, and the shovel during the day loads coal into wagons along the bank.

Storing and Reclaiming Coal by Portable Conveyors Under Difficult Conditions

By D. A. Thomas*
Birmingham, Ala.

A LONG-TERM contract for convict labor made it necessary for the Montevallo Mining Co. to keep on mining coal when there was practically no demand for it. This made it necessary to store about 10,000 tons of small-size coal, and it was soon apparent that this coal could not be handled without machinery. Consequently three portable belt conveyors manufactured by the Barber-Greene Co., of Aurora, Ill., were installed in September, 1921, one being 60 ft. long and the other two 30 ft. Two were equipped with 5-hp. motors and one with a motor of 3 hp. All the belts were 16 in. wide.

Before the conveyors were installed some of the coal was unloaded from the cars to piles by shovels. After the conveyors were installed a section was cut underneath the track and a sheet-steel hopper built. Two men push the coal from the cars into the hopper, from which it is carried by the conveyors to the storage pile, which sometimes reaches a height of 27 ft. At times all three conveyors are used in series, sometimes only one and sometimes two. When piles 27 ft. high are made the 60-ft. conveyor is used on the far end of the line of three conveyors. With all three in series 50 tons of coal could be handled per hour, using seven men, but our average speed for all work was near 25 tons per hour. Approximately 150 tons could be unloaded per day and about 300 tons could be loaded back into the cars.

In less than four months 5,000 tons was loaded and 4,500 unloaded. The work was rendered particularly difficult by the contour of the ground, the railroad being 15 ft. above the storage yard. With three conveyors in series it was possible to pile the coal so far from the track that a large quantity of it could be stored and to do it in piles containing three different sizes: domestic nut, chestnut and slack. The work is, of course, irregular.

Three Conveyors Shift Coal Around Corners

In figuring operating costs the three conveyors are considered as a unit, because their chief use is in series. It is estimated that they are good for at least ten years of life and that repairs and maintenance should not exceed $120 a year. The labor for loading 5,000 tons is figured at 8c. a ton and for unloading 4,500 tons at 5c. a ton. The total operating cost for the four months is $858.80, or 9.04c. per ton.

If this work had been done by hand it would have cost at least 25c. a ton on account of the difficulties arising from the unfavorable contour of the ground. This would make a total cost of $2,375; so the machines saved $1,516.20 in four months. This, which is at the rate of $4,528.60 a year, is equivalent to a return of 152 per cent on the investment. The saving per ton is 15.96c. A summary of these costs is given in the table herewith.

A further saving is effected because there is less breakage of the domestic-nut size when handled by the conveyors than when shoveled by hand. About

*Formerly vice-president, Montevallo Mining Co.



Loading Out Coal

In foreground 60-ft. portable conveyor which is fed by a 30-ft. conveyor which is itself fed by another 30-ft. conveyor passing under the trestle. Note also in the foreground the handy method of suspension and transportation of the conveyor.



As Seen from Another Angle

The slats on the conveyor belt by which the railroad car is being loaded are plainly visible. Few conditions for a storage yard are as unfavorable as at this mine, the coal having to be lifted from the ground to the top of a car that is perched on a 15-ft. trestle.

3,500 tons of this size was stored in the four months, and I should estimate that the reduction in breakage was 3 per cent, or 105 tons. Breakage reduces the value of the coal from $3.50 a ton to $2, which is equivalent to a saving of $157.40 in the four months, or $500 a year. This would make the approximate saving in the operation of the plant over hand labor about $5,000.

COST OF OPERATION OF THREE PORTABLE CONVEYORS AT MONTEVALLO MINES

Depreciation on $3,000; estimated life 10 years	$300.00
Average interest @ 6 per cent— $11/10 \times \frac{\$3,000}{2} \times .06$	99.00
Repairs and maintenance	120.00
Total annual fixed charges	$519.00
Fixed charges prorated for four months	$173.00
Power—3,040 kw.-hr. @ 2c. per kw.-hr.	60.80
Labor loading, 5,000 tons @ 8c. per ton	400.00
Labor unloading, 4,500 tons @ 5c. per ton	225.00
Total operating cost for four months	$858.80

Total tonnage handled (5,000 + 4,500) = 9,500.
Cost per ton, $858.80 ÷ 9,500 = 9.04c.

How to Calculate Washed Coal and Refuse From Ash and Sulphur Determinations

By Kenneth D. Dodds*
Pittsburgh, Pa.

In order to know the extent to which a coal washery is separating raw coal into washed coal and refuse, the proportion of each product in relation to the original material must be determined. If each lot of raw coal, washed coal and refuse were weighed, the percentage of the mine production delivered by the washery as cleaned coal and as refuse could be ascertained by means of a simple calculation, using the weights involved; that is,

$$\text{Percentage of washed coal} = \frac{\text{Weight of washed coal}}{\text{Weight of raw coal}} \times 100,$$

$$\text{and Percentage of refuse} = \frac{\text{Weight of refuse}}{\text{Weight of raw coal}} \times 100.$$

The accuracy of the results obtained by such a method would be limited only by the accuracy of the scales on which the weighings were made and the carefulness of the operator, but the method would nevertheless be impractical because of the labor involved and the necessity of running the washery intermittently.

A simpler procedure, involving elementary analytical chemistry and mathematics, while avoiding the inherent difficulties of direct weighing, nevertheless yields satisfactory results. The principle of this method may be stated in this manner: The magnitude of any property of a mixture of substances is equal to the sum of the values of the same property in each constituent multiplied by the percentage of each constituent in the mixture. This axiom is the so-called "Law of Mixtures." In mathematical terms,

$$Z = Az + Bz + Cz + \ldots\ldots\ldots\ldots N_z;$$

where Z is the value of some property (specific gravity, ash, sulphur, etc.) of the mixture, z is the value of the same property in each of the components which are present in the percentages A, B, C, etc.

If raw coal is regarded as a mixture of washed coal and refuse, the application of the above general equation is readily understood. To illustrate by an actual case, let us consider a coal and its products which on being analyzed for sulphur and ash gave results as shown in Table I.

*Instructor in metallurgy, School of Mines, University of Pittsburgh.

TABLE I—ASH AND SULPHUR IN COAL AND WASHED PRODUCTS†

	Per Cent Ash	Per Cent Sulphur
Raw coal	16.9	2.59
Washed coal	6.1	0.90
Refuse	55.9	8.48

† Fraser & Yancey, Transactions American Institute of Mining and Metallurgical Engineers; preprint with Mining and Metallurgy.

If X represents the percentage of washed coal, then $1 = X$ will, of course, be refuse. Substituting the percentages of ash from Table I in the formula, we get

$$16.9 = 6.1X + 55.9(1 - X)$$

from which $49.8X = 39.0$

and $X = 78.3$ per cent (washed coal)

$1 - X = 100 - 78.3$

$= 21.7$ per cent (refuse)

Thus if a few simple analyses are made, valuable information can be obtained easily and quickly.

One might reasonably expect, on first thought, that the result obtained by using sulphur percentages would be the same as that from ash. For some coals this is true or nearly true, but for others, as will be shown later, there is a considerable difference between the two. With the coal already discussed the calculation on the basis of sulphur is

$$2.59 = 0.90X + 8.48(1 - X)$$

$$7.58X = 5.89$$

$X = 77.7$ per cent (washed coal)

$1 - X = 22.3$ per cent (refuse)

For this coal, then, either ash or sulphur may be used as the basis for the computation, with a fair agreement in the final figures. This does not hold true, however, for all coals. As an example of one which does not give the same result in the two instances, consider the data in Table II.

TABLE II—ASH AND SULPHUR IN ANOTHER COAL AND WASHED PRODUCT‡

	Per Cent Ash	Per Cent Sulphur
Raw coal	17.62	3.54
Washed coal	6.65	2.44
Refuse	53.15	9.09

‡ H. C. Ray, *Coal Industry*, December, 1919.

When the figures for ash are taken, we find

$$17.62 = 6.65X + 53.15(1 - X)$$

$X = 76.4$ per cent (washed coal)

$1 - X = 23.6$ per cent (refuse)

Similarly for sulphur,

$$3.54 = 2.44X + 9.09(1 - X)$$

$X = 83.5$ per cent (washed coal)

$1 - X = 16.5$ per cent (refuse)

The difference between these two values is, of course, much too great to be considered as even an approximate check, and the question, therefore, arises as to which of the two values correctly represents the conditions. When we recall that ash and sulphur are not present in the materials as one single compound but are independent of each other we suspect that any removal of one does not necessarily involve the elimination of a corresponding quantity of the other. Consequently, if it can be demonstrated that these two impurities are not interdependent, it will follow that both of the foregoing results are true—83.5 per cent if only sulphur is taken into account and 76.4 per cent when ash alone is considered. If ash and sulphur are not equally removed, then the ratio of each of these to the total impurities (i.e., the sum of ash and sulphur) will be different for the raw coal, washed coal and refuse, while if the contrary condition obtains, these ratios will be the same in each case. The ratio of ash to total impurities

in the raw coal is $\frac{17.62}{17.62 + 3.54}$ or 83.3 per cent, and likewise for the two products as in Table III.

TABLE III—RATIO ASH AND SULPHUR TO TOTAL IMPURITIES IN COAL AND WASHED PRODUCT

	Ash Total Impurities Per Cent	Sulphur Total Impurities Per Cent
Raw coal	83.3	16.7
Washed coal	73.2	26.8
Refuse	85.4	14.6

These figures show at once that the washing process does not eliminate ash and sulphur in the same proportion, but that instead sulphur is concentrated in the washed coal and ash in the refuse. This segregation of impurities accounts for the difference in percentages of washed coal observed when calculations are based on each impurity. If instead of segregating, sulphur and ash left the raw coal in equal proportions, ratios such as those in Table III would be identical for raw coal, washed coal and refuse. This means that the relative quantities of each impurity would be the same for the three materials, and would differ only in amount. Hence in this case 83.3 per cent of the total impurities in both the washed coal and the refuse would be ash, the same as in the raw coal. If this state of affairs existed, the analyses would be as shown in Table IV.

TABLE IV—ASSUMING PERCENTAGE OF ANY IMPURITY TO TOTAL IMPURITY IS SAME IN WASHED COAL AND REFUSE AS IN RAW COAL

	Per Cent Ash	Per Cent Sulphur
Raw coal	17.62	3.54
Washed coal ([6.65 + 2.44] x 0.833) ([6.65 + 2.44] x 0.167)	7.57	1.52
Refuse ([53.15 + 9.09] x 0.833) ([53.15 + 9.09] x 0.167)	51.85	10.40

On substituting the above derived percentages in the formula, it is found that the same result is obtained on each basis:

Based on ash: $17.62 = 7.57\,X + 51.85\,(1 - X)$
$X = 77.3$ per cent

Based on sulphur: $3.54 = 1.52\,X + 10.40\,(1 - X)$
$X = 77.3$ per cent

The examples cited show that washery calculations cannot safely be based on ash or sulphur indiscriminately, unless it is known that these are eliminated in the same, or substantially the same, ratio.

All coals on being washed behave in one of three ways: sulphur and ash are either removed in the same ratio, in widely different ratios, or as an average between these extremes. The importance of knowing upon which impurity to base calculations is, therefore, self-evident. A little study will convince one that if total impurities are considered in preference to any single impurity, any differences in ratios of elimination will be automatically adjusted, and regardless to which of the three above classes the coal may belong, the percentage of washed coal as indicated on this basis will be the same as if sulphur and ash were indeed eliminated equally. This is proved by adding the analyses shown in Table II and rearranging as in Table V:

TABLE V—TOTAL IMPURITIES IN RAW COAL, WASHED COAL AND REFUSE

	Per Cent Ash + Sulphur
Raw coal	21.16
Washed coal	9.09
Refuse	62.24

Substitution of these figures in the formula gives the following equation,

$$0.2116 = 0.0909\,X + 0.6224\,(1 - X)$$
$X = 77.3$ per cent (washed coal)

This result, unlike those obtained by calculating on sulphur and ash separately, is correct for both.

As the purpose of washing coal is to remove both undesirable substances to as great an extent as possible, it seems that total impurities should be adopted as the fundamental basis of washery calculations, rather than any single impurity.

NOTE—The author is indebted to Dean H. B. Meller and Prof. E. G. Hill, of the University of Pittsburgh School of Mines, for helpful suggestions in the preparation of this article.

An Anthracite Mine Car Discovered Dating Back, at Least, to the Year 1845

NOT often do mining relics of the past come down to us in such an excellent state of preservation as the mine car that was found in the old workings of the Hillman Bed at the No. 14 Colliery of the Pennsylvania Coal Co., between Pittston and Wilkes-Barre.

This mine car was found in some old workings that had been opened by a tunnel. From the records in the possession of the Pennsylvania Coal Co. it was found that no work had been done in this section of the mine since 1845. So there is no doubt that the mine car dates back at least to that year. It is therefore more



A MANIFEST PROGENITOR OF TODAY'S HARD-COAL CAR

Even today the anthracite car usually is a box on a track without any flare over the top of the wheels. The narrowness of the roadways prohibits the use of the wide cars of the bituminous-coal regions. In the soft-coal districts one is led to wonder which is the more remarkable, the width of the gage or the side overhang of the car body.

than 78 years old—how much older is problematical.

The Hillman Bed, in which it was used, is 8 ft. thick. The car contains 18.5 cu.ft. level full and with a 6-in. topping it would contain 6.5 cu.ft. more, or a total capacity of 25 cu.ft. It is 2 ft. 2 in. wide at the top and 1 ft. 8 in. wide at the bottom. It is 6 ft. 1 in. long and the height of the inside of the car is 1 ft. 7 in. The wheels are of a diameter of 16 in. and the gage is 24 in.

When the car was found the running gear, bottom sills and two of the uprights of the body were practically intact. From these uprights the rest of the body was built.

MECHANISM OF BOILER-SCALE FORMATION.—At the Pittsburgh experiment station of the U. S. Bureau of Mines the mechanism of scale formation in steam boilers is being studied, including the effect of temperature, pressure, character of surfaces and concentration of the water. A continuous test is being conducted on a commercial boiler in actual operation, in which a part of the suspended matter is continuously removed by an external filter through which the boiler water is circulated. The influence of added constituents is being noted.

Setting Diamonds in Drill Bits*

By George J. Young†
San Francisco, Calif.

SETTING a diamond in a diamond bit is somewhat similar in principle to setting a filling in a tooth, and the diamond setter develops a skill which is comparable to that shown by a good dentist. Seldom have the tools of the diamond setter been described, and this probably is because each diamond setter has his own kit. The work of diamond setting is a necessary accessory to diamond drilling and usually is done on the job. On the thoroughness of the setting depends not only the success of the drilling but also economical use of diamonds and reasonable costs.

A good diamond setter should have excellent mechanical training and familiarity with the tools of the craft as well as a good eye and innate aptitude for the task. Diamond setting is a fussy job, but it cannot be done in a fussy manner. To begin with a good light is necessary. Next, a solid bench about 6 ft. long with a low edge board to prevent tools from rolling off is essential. It should be equipped also with a good vise. The top of the table should be smooth and free from cracks.

The only other fixture necessary is a vertical stand which can be extemporized from pipe, pipe fittings, and a floor flange as shown in Fig. 1. This stand is used to support a breast drill, and downward pressure can be obtained by pulling down upon the end of the horizontal rod.

To hold the bit rigidly in position in the vise, a bit holder made as shown in Fig. 4 is used. The bit screws into the upper end as shown. It can be placed horizontally or vertically, as required. The necessary tools fall into several classes—measuring, cutting and drilling, calking, swaging, and miscellaneous.

*From *Engineering and Mining Journal-Press.*
†Associate editor, *Engineering and Mining Journal-Press.*

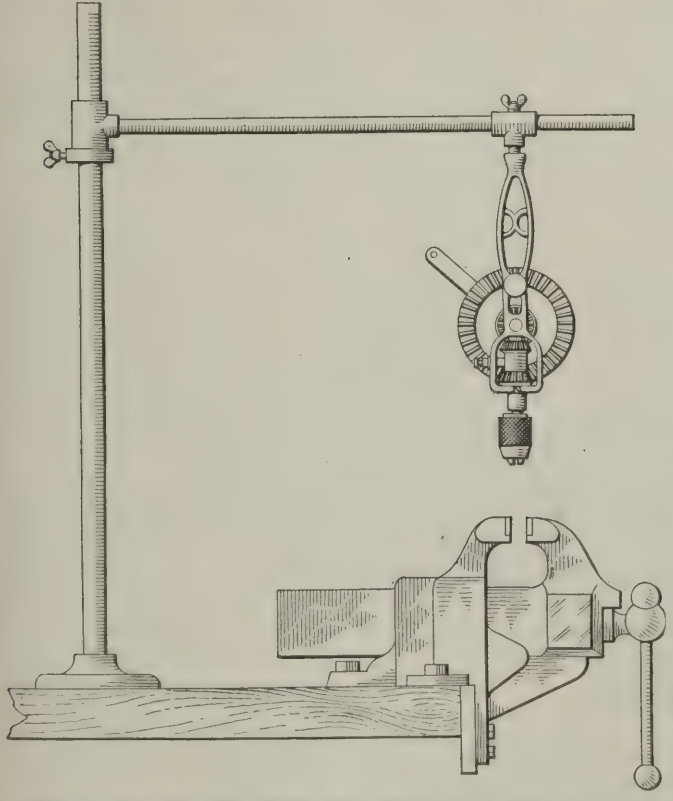


FIG. 1—STAND AND VISE FOR DRILLING BIT HOLDER

A simple pipe stand is used to support the hand drill. This is adjustable in two directions. Pressure on the horizontal pipe holds the drill to its work.

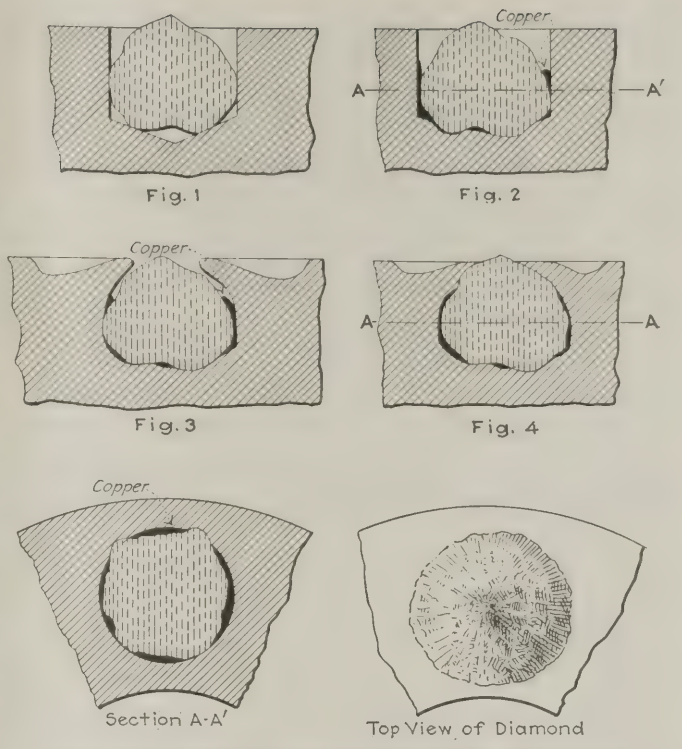


FIG. 2—SUCCESSIVE STEPS IN SETTING DIAMONDS

The hole is drilled of an accurate depth and width so that the diamond will project 1/100 in. and so that the hole will be well suited after chiseling to receive the diamond. The diameter is then set in as in Fig. 1. Copper strips are cut with a chisel and wedged in around the diamond as shown in Fig. 2, holding the sides and giving bearing to the bottom. Then the steel of the bit is swaged all around from a sufficient distance back from the diamond so that the diamond is buried in the bit without bringing sufficient pressure on that precious piece of abrasive to cause it to split. See Figs. 3 and 4.

The tool kit comprises the following: For measuring, two pairs of inside and outside calipers and a caliper square with inside-outside jaws; for cutting, a diamond point, a cape chisel, and small cold chisels of various sizes; for drilling, twist drills from $\frac{3}{16}$ and $\frac{1}{4}$ in. diminishing by $\frac{1}{32}$ in. successive sizes and both wire gage and regular sizes; off-set, round-nose, and square and round-end calking tools; swages, center punches, and sets; miscellaneous, three sizes of ball-pein hammers, 4, 8, 12 oz.; a "pick," copper set, snips, 10-in. Stillson wrench, pincettes, gage rings, magnifying glass, and portable balance with carat weights.

Stone Is Carefully Bedded in the Steel

The tools used in setting the stones are shown in Fig. 4. In setting a diamond the bit is marked by means of a center punch at the positions of the principal stones. The stones are carefully selected, larger stones for the important cutting positions and smaller stones, used stones, or fragments for the clearance positions. It is worthy of note that the diamonds as purchased are chosen from a stock first selected by the dealer.

Having selected a stone, it is carefully studied and decision made as to the cutting position to which it is best adapted. Its maximum diameter is measured, as well as its maximum height. The cutting surface of the stone is so placed that it will be $\frac{1}{100}$ in. above the bit. The proper diameter of bit is then selected and a hole of the right depth bored. By means of the chisels the hole is trimmed and cut to take the diamond. Copper strips are cut with the cold chisel and wedged in around the diamond until it is securely held at all points.

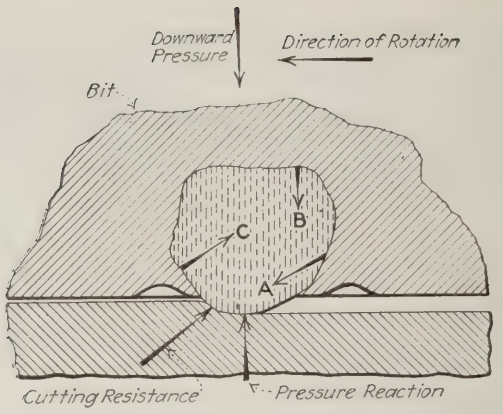


FIG. 3—FORCES ACTING ON DIAMOND WHEN CUTTING

This figure shows the couples acting on the diamond both to displace it and to keep it in position. If the diamond does not get the right kind of support it is likely to turn and work loose. The recovery will be quite difficult and in cases it may be lost entirely.

These bits of copper seat the diamond on the bottom and sides.

The steel of the bit is then swaged all around from a sufficient distance back to afford enough metal to close in about the diamond. The "collar" of metal thus drawn around the upper part of the diamond is gradually swaged closer and closer, avoiding any pressure upon the diamond. It is finally drawn down upon the diamond, the setter closing it in from the bottom up until the diamond is almost completely buried in the steel.

The last operation consists of calking the fringe of metal about the stone until it bears evenly upon it at all points and leaves only the upper surface of the stone exposed. This operation is a delicate one, for the setter must hit just hard enough to draw the metal without allowing the stone to get any more than a light effect from the blow. There is danger of splitting the stone, especially in calking.

The diamond setter will find it to his advantage to study Fig. 3, in which are illustrated the forces to which a diamond in the bottom surface of the bit is subjected. The forces of outside application are due to the thrust or weight of the drill rods and the rotation of the bit. The tendency of these forces is to rotate the stone in its setting. The irregularities of the diamond, and the seat formed for them, resist the rotation. The arrows *A*, *B* and *C* in Fig. 3 indicate the direction of the forces acting on the diamond.

Determination of the best position in which to set a given stone does not admit of fixed rules, but is based upon experience and experienced judgment. Different diamond setters will agree that there is one position in which a given stone can be set and in which it will be safely held and will cut with minimum wear.

GERMANY THINKS IT A CRIME to seize her mines. She doesn't believe in anything more drastic than dynamiting and flooding.—*Muskogee Phoenix.*

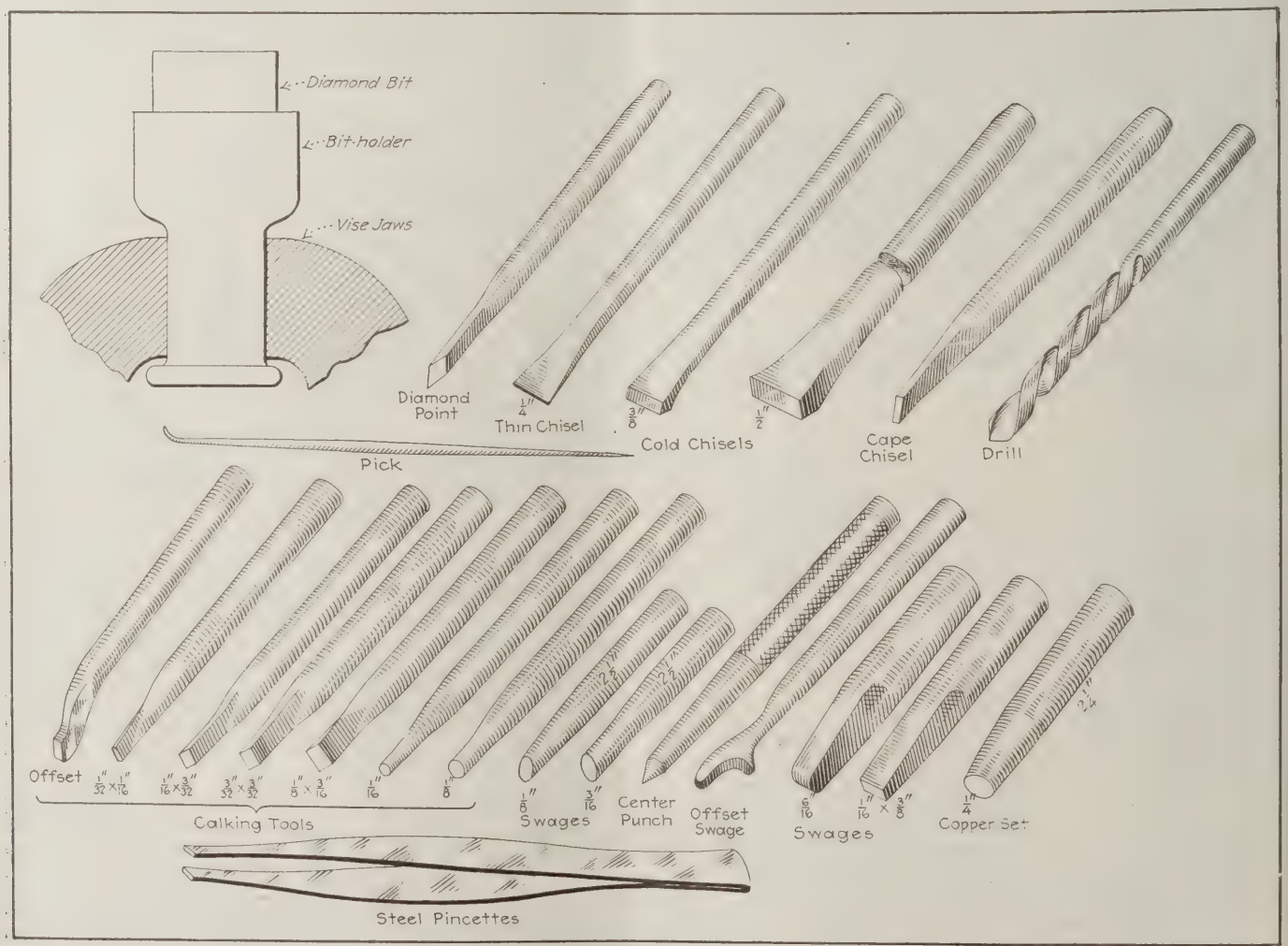


FIG. 4—TOOL KIT OF DIAMOND SETTER

In the upper left-hand corner are the jaws of the vise holding the bit holder so that the bit can be drilled. To the right are the chisels which condition the hole for the reception of the diamond. Below it are the calking tools which fit the copper round the diamond and the swages that push the steel so as to envelope both. At the base of the drawing are the steel pincettes which are used in the handling of the small copper chiselings for insertion between the diamond and the walls and bottom of the hole.

Biggest Asiatic Coal Producer and Thickest Coal Seam In the World at Fushun, South Manchuria

Will Extract Enough Material to Girdle Earth at Equator with Solid Wall 29 Ft. High and 10 Ft. Thick—Coal 430 Ft. Thick at One End of Field—In Places Only 30 Ft. Below Ground

By W. Laurie Seaman
Glen Cove, N. Y.

MANY observations of interest made during a trip to the Fushun colliery and some views of the mines obtained from the South Manchuria Railway Co. profitably may be added to the remarks and illustrations presented by N. Yamaoka in his excellent articles in *Coal Age*, May 19 and May 26, 1921. Only slowly can a mere article bring home to the reader this amazing coal property, its total content of 1,200,000,000 tons, the immense thickness of its single seam, which at the western end is 430 ft. thick, and its suitability in places for stripping, its cover in one place being only about 30 ft.

The Fushun coal field of Manchuria, with a daily output of 12,000 tons, is situated about 35 miles southeast of Mukden and covers barely 15 square miles. Forming a narrow rectangular area 10 miles long and running along the valley of the Hun River in an eastward direction, the main coal deposit consists of but one 50- to 180-ft. seam with an average thickness of about 150 ft. At the western end it grows even thicker, reaching 430 ft. and is found in one place but 30 ft. below the ground surface. Seldom is such an abundance of potential energy found in so small an area, especially in a single seam.

Electric Hoists Pull Wagons Out of Pit

That portion of this coal field which lies close to the surface is mined by the highly efficient open-cut process, which consists of stripping off the overlying materials and shoveling the coal into wagons which are drawn by electric hoists up inclined roadways to the edge of the strip pit. If the coal and overburden that has been excavated in the past and will be removed before the field is exhausted were piled around the earth at the equator it would make, so estimators have calculated, a solid wall 29 ft. high and 10 ft. thick. In other words, this gigantic undertaking will require 5.4 times as much excavation as was necessary for the digging of the Panama Canal.

The Koreans were the first to obtain coal from this region. That was some 600 years ago. It was used by them in baking their famous earthenware. After the occupation of Manchuria by the Chinese, which took place about 200 years ago, mining was entirely suspended, its continuance being prohibited by the Chinese Government because of a superstitious belief in the Fengshui, or Spirit of Nature. It appears that Fushun was situated too close to the mausoleum of Tai-Tsu, an emperor of the Manchu Dynasty, to meet with divine approval.

During the Russo-Japanese War the mines were worked on a small scale by the Russians, but not until 1907, when the South Manchuria Railway Co. acquired this property from the Japanese Government, was mining undertaken on an extensive scale. Shafts were sunk annually until there were eight in all, which in conjunction with the strip pit, are producing 3,500,000 tons yearly.

The visitor, after traveling over the level plains of Manchuria, on pulling into Fushun station is filled with awe to see the immense chasm that was filled with earth and coal but a few years ago. The steam shovels working in the vast pit look like mere toys and the hundreds of coal wagons and thousands of Chinese coolie miners are but moving specks within the depths of this artificial valley, which already has attained the size of the celebrated Culebra cut where the Panama Canal pierces the backbone of the Americas. After coal has been removed for a period of 70 years at a possible output of 10,000 tons (equal to a train of 250 cars) each working day only a romantic mind will be able to imagine its original appearance.

My train was nearly two hours late in reaching Fushun, allowing me only a hurried trip around the colliery. After a study of charts and maps and a "swell" lunch at the Colliery Club, we set out to see the sights before my predetermined return to Mukden on the afternoon train. As the Japanese are anxious to receive world comment, either favorable or adverse, on their activities in South Manchuria, I found them quite ready to furnish me with any information that I might desire.

The underground mines were first worked with shafts and the room-and-pillar system, but the mining engineers soon discovered that, if this plan of operation were persistently followed, 70 per cent of the coal must be left underground, to serve as roof and shaft supports and the like. Experiments proved that by replacing coal with sand, flushed in by a hydraulic stowage system, thus furnishing the necessary support for side walls and roof, 70 or even 80 per cent of the coal could be removed, thereby greatly increasing the efficiency and capacity of each shaft.

Fourteen Large Flushing Plants Fill Mines

Fourteen huge flushing plants were placed in operation by 1920. The Japanese engineers mix just enough water with the sand to form a flowable mass, which is forced under pressure of 10 atmospheres through pipe lines to chambers already barricaded and ready to be packed with sand. A minimum volume of water is used, as it must be pumped from the mine after serving its purpose of stowing the sand in the various subterranean passages.

In 1919 more than 7,800,000 pieces of mine timber were consumed in the Fushun Colliery. This number was materially lessened in the years that followed, the introduction of the hydraulic stowage system permitting much timber to be recovered as the sand flushing progressed.

The town of Fushun sprung up as the natural out-

Scenes at the Fushun Strip Pit, Shaft and Underground Mine Working

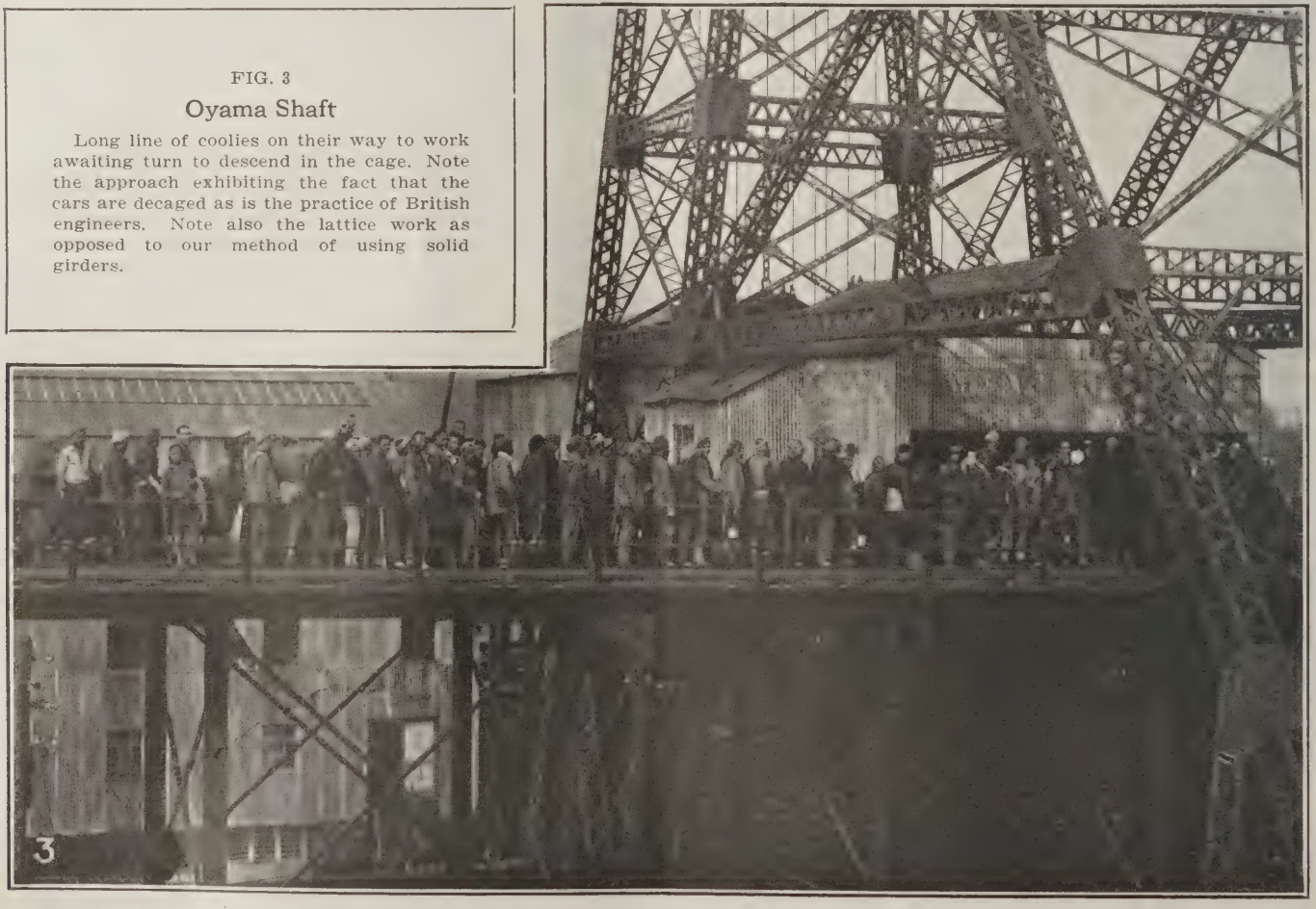


FIG. 1—OPEN PIT WITH INCLINED PLANE ON LEFT UP WHICH CARS ARE HAULED TO EDGE OF PIT

FIG. 3

Oyama Shaft

Long line of coolies on their way to work awaiting turn to descend in the cage. Note the approach exhibiting the fact that the cars are decaged as is the practice of British engineers. Note also the lattice work as opposed to our method of using solid girders.



n Manchuria, Where Coal Was Mined by Koreans Six Hundred Years Ago



FIG. 2—DEEPEST POINT IN OPEN PIT AS FAR AS IT HAD BEEN DEVELOPED WHEN PICTURE WAS TAKEN

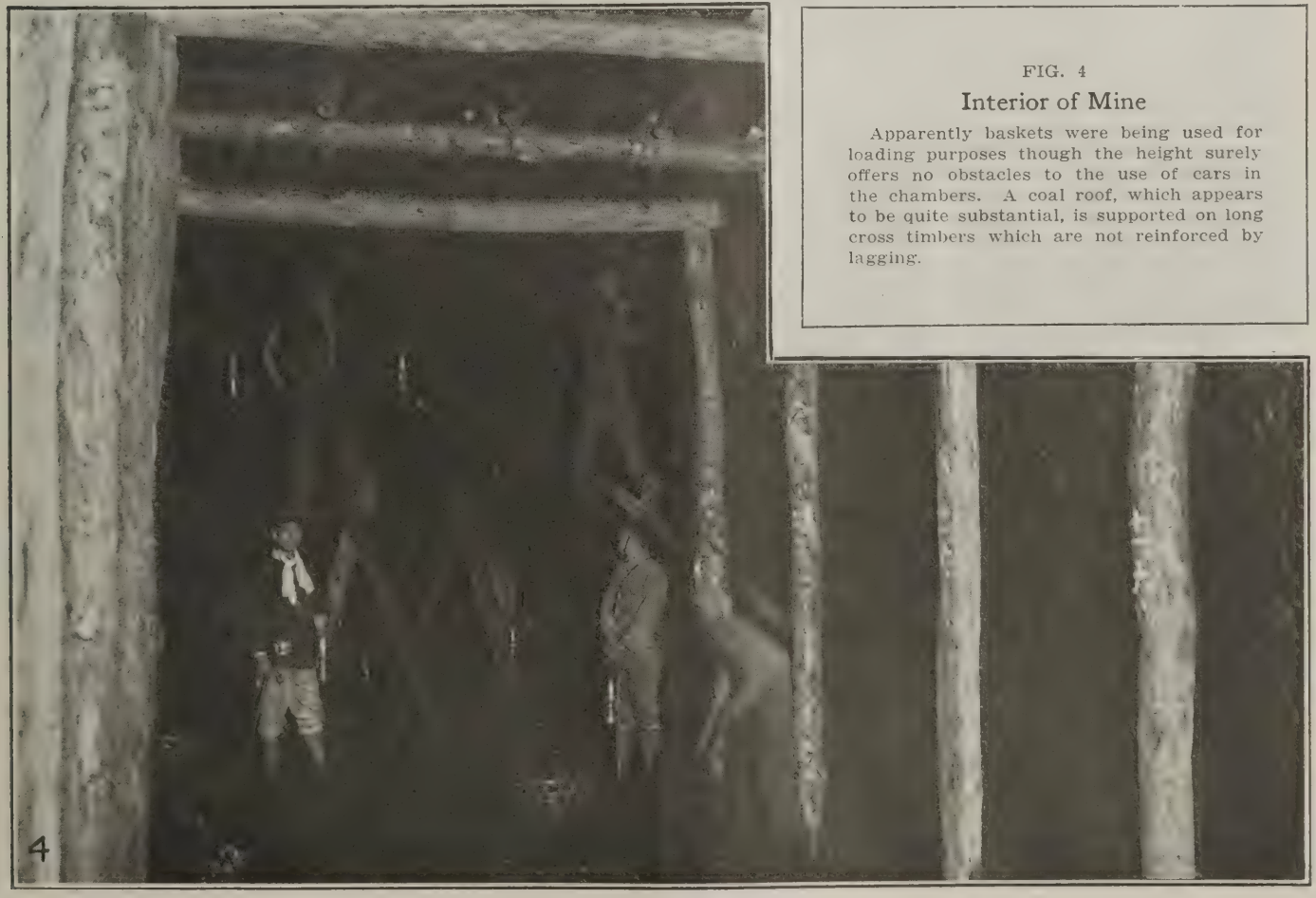
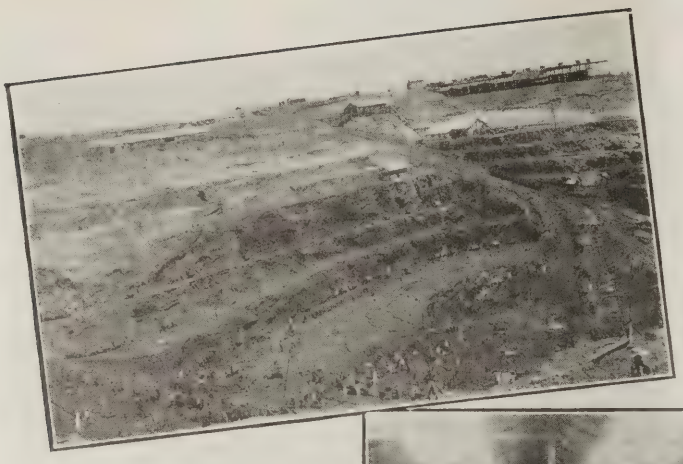


FIG. 4

Interior of Mine

Apparently baskets were being used for loading purposes though the height surely offers no obstacles to the use of cars in the chambers. A coal roof, which appears to be quite substantial, is supported on long cross timbers which are not reinforced by lagging.



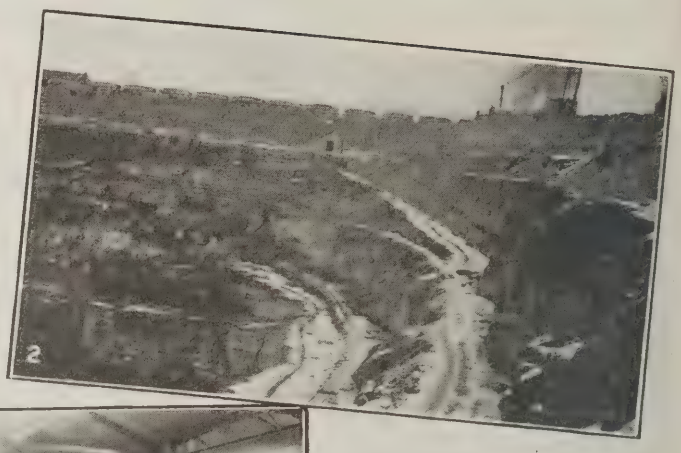








FIG. 1—ANOTHER VIEW OF AN OPEN PIT. FIG. 2—SOME OF THE LEVEL ROADWAYS IN STRIP PIT. FIG. 3 — PICKING TABLES AT THE TIPPLE OF THE OYAMA SHAFT. APPARENTLY THE REFUSE IS THROWN IN BASKETS FOR REMOVAL.



FIG. 4 — COOLIE MESS HALL. FIG. 5—QUARTERS FOR COOLIES, WHO APPARENTLY ARE A CHEERFUL LOT OF MEN. FIG. 6—COOLIE SECTION OF TOWN. NOTE THE LONG BARRACKS IN WHICH THEY LIVE. HEADFRAME OF LAOHUTAI SHAFT IN REARGROUND.

come of the mining activity and the operating company in consequence was compelled to construct hundreds of buildings, highways, water works and other conveniences.

Most of the mine workers, and 35,000 of them are employed, are Chinese from the Shantung and Chihli districts of north China. They receive free lodging and medical attention, three rationed meals at 14 sen (7c. U. S. currency) per day and are paid an average daily wage of 55 sen for nine hours work. Assuming a year as 250 working days, their annual earnings total nearly 140 yen ($70 in U. S. currency).

Fully 60 per cent of the Fushun coal is consumed by the railway in Manchuria, and the remainder is either sold to local industries or exported through the port of Dairen. Prominent foreign engineers and mining experts have gone away from Fushun marvelling at the equipment and layout which the South Manchuria Railway Co. has inaugurated during the fifteen years of its management.

Consumption Should Control and Determine Number and Ownership of Coal Cars

By L. S. Evans*
Richmond, Va.

BITUMINOUS coal is produced as the market demands it, save as transportation, or at intervals miners' strikes, interfere. Demand is measured by two elements, requirements for consumption plus or minus coal for or from storage. Transportation is the great factor in leveling off peaks of production and setting the brake on output. The soft-coal mines have developed capacity more than ample to meet consumption.

Since the potential supply is superabundant and the aggregate productive capacity of the mines exceeds consumption, it follows that transportation is the controlling and limiting factor in balancing production with consumption.

The only storage of coal at the mines is the natural supply within the earth. Coal loaded in mine cars underground is carried to the mine mouth and dumped into railroad cars. When no cars are supplied the mines stand idle. With transportation the dominant factor there is no advantage in storing coal, even where possible, above ground at the mines. The place to store coal is at the point of consumption.

Railroads reaching the mines are expected to own coal cars in numbers sufficient to supply the country's needs, hence the coal roads must bear the financial burden of such ownership and upon them falls responsibility for transporting the country's coal supply. These coal originating roads buy and maintain equipment either in anticipation of the annually constant increase in consumption or after the increase has occurred. For financial reasons, equipment purchases commonly are made after the need has arisen and car shortage has appeared.

Here is a remedial suggestion: let consumption control and determine the number of cars and their ownership. Consumption comes first; it sets the need for production. Every railroad should own that number of coal cars required to protect the consumers it serves. The number of cars owned by each should depend mainly upon the tonnage consumed on its line. In practice, empty cars would move to coal roads counterbalanced by loaded cars from the coal roads. Car shortages would seldom occur, and only on the underequipped roads. Many roads, instead of a few, would own the cars, and this distribution of the financial burden would make it easier to maintain equipment at the point of adequacy.

Box cars carry the widest range of commodities and are used everywhere, therefore all roads own box cars. Whether or not consumption or production governs the ownership of box cars is not the point: the fact that all roads own them means that there is a constant interchange of cars of the same kind. This condition tends to balance car movements and to prevent national shortages by localizing them.

Coal cars are not generally useful and they are not generally owned. Coal-originating roads are almost the exclusive owners of coal-carrying equipment. Some roads own coal cars to protect the fuel supply for their locomotives, but apparently none has considered such ownership for the protection of its industries and other consumers along its lines.

The coal roads send out loaded cars to various destinations on connecting lines, there to be unloaded and returned empty to the parent lines for reloading. They are in effect interchanging their own equipment, which means that they must own sufficient cars to supply the consumers on all lines plus their own.

Under existing conditions how can there be a balanced movement of coal cars even approximating the interchange of box cars?

*Eastern Coal & Export Corporation.

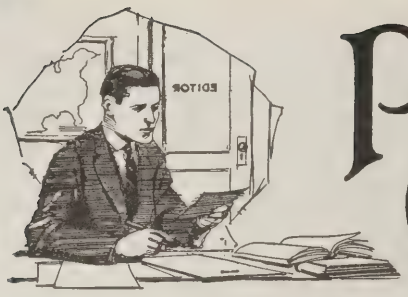
Engineers Stress Advantage of Storage to Early Movement of Domestic Coal

IN URGING engineers to take up with their employers and clients the advisability of effecting an earlier movement of domestic coal—a step taken at the request of John Hays Hammond, chairman of the President's Coal Commission—the Federated American Engineering Societies has addressed a letter to its member societies, of which the following is a part:

Mr. Hammond stated that one of the important factors involved in the solution of the coal situation is that of coal storage. He further stated that it is a more difficult task to obtain the storage of domestic coal than that of coal purchased by large users. He is particularly anxious, therefore, that an effort be made at the earliest possible moment to obtain a larger storage of domestic coal. He believes that the engineers of the country are in a particularly advantageous position to encourage this movement. If engineers will point out to their clients and employers the advantages, accruing both to the public and to the coal industry, which can be obtained if coal is stored during the summer, it is believed that they will be willing to arrange for the domestic coal purchases of their employees.

The Coal Commission is particularly impressed by the plan devised by L. S. Storrs, of the Connecticut Company. Under that plan the employee submits, prior to April 1, an estimate of his winter fuel needs. Delivery is to be made at the option of the retail dealer during the six months' period beginning with April. Full payment for the coal will be made by the company at any time delivery is effected.

The company is reimbursed by deducting the cost of the coal from the employee's salary. These deductions, however, are spread in equal installments over the six months' period. Under this plan the employer can see to it that the coal is purchased at the best possible price. He can influence the dealer to deliver the maximum practicable amount of coal early in the season. The employees, many of whom are accustomed to buying coal in very small lots during the period of highest prices and distribution difficulties, can make substantial savings, and be assured of sufficient quantity of coal when needed.



Problems of Operating Men

Edited by James T. Beard



Retimbering an Old Slope

Two Methods Discussed—First, Gives Insufficient Support to Timbers Above — Second, Has Short Legs Hitched Into the Coal

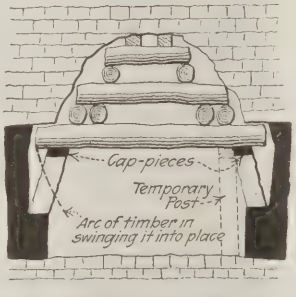
REFERRING to the problem presented in the inquiry signed "Mac," which appeared in *Coal Age,* March 1, p. 380, it occurred to me, in reading his letter, that both of the methods suggested for the retimbering of the old slope where the roof had fallen to a considerable height, could be improved.

The first method he mentions, using double timbers and supporting the collar on two legs set on the bottom is, in my opinion, very poor. Even if the bottom is hard and furnishes a good foundation for the legs, the use of double timbers on this 8-ft. slope is not to be recommended. In that method the legs stand out where they will be struck by the first car that jumps the track. This would mean a downfall of roof and tangled timbers requiring time to clean up and retimber.

If the bottom is hard, cap-pieces should be used over the posts. In fact they will serve a useful purpose in any event, as they assist to wedge the upper timbers and lagging tighter against the roof. For these reasons, I would set aside this first method as being in no way adapted to the situation.

Suggests Supporting Collars on Short Legs

The second method suggested, in which the collar beam is supported in hitches cut in the two ribs, strikes me as a great improvement over the first. However, let me suggest that the use of short posts resting in hitches cut in the coal, after the manner shown in the accompanying figure, will prove an advantage provided the coal is hard as I assume it is in this case.



COLLAR BEAM SET ON SHORT LEGS

The statement that the weight is breaking the timbers and the frail soapstone overlying the seam, and nothing being said in regard to the crushing of the coal, leave me to conclude that the coal is hard and will offer a good support for short posts used to support the collar beams.

The short posts will not add materially to the cost of the timbering, as compared with the method of supporting the collar beams in hitches cut close to the roof. The roof hitches would have to be cut wide enough to permit the collar beams to be swung into position. On the other hand, the cutting for the short legs will be no greater in amount and more readily made.

The length of these short posts will be governed much by the nature of the coal seam, as the posts should be set on that part of the stratum furnishing the firmest support. As shown in the figure, the posts should be inclined slightly toward the center of the opening, so as to throw the weight of the overburden into the rib.

As indicated by the dotted lines in the figure, a temporary post can be used, if needed to support the collar beam, while putting the timbers in place. At times, if desired, a short post may be set on one side of the entry only, the other end of the collar beam then being supported in a hitch cut in the rim, after the manner suggested by the correspondent.

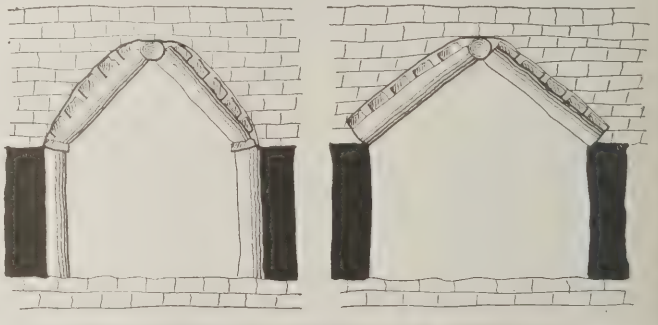
Fairmont, W. Va. M. L. O'Neil.

Another Letter

Herringbone method of timbering—Two plans suggested—Steel and concrete for support of ribs.

WHEN reading the inquiry signed "Mac," *Coal Age,* March 1, p. 380, it seemed to me that there would be nothing better for his purpose than the herringbone method of timbering. I have always found that method to give excellent results in the support of bad roof and particularly, in a case like this, where the roof has fallen to a considerable height.

In the use of this method, I have two plans to suggest, as shown in the accompanying figure. The plan



TWO FORMS OF HERRINGBONE TIMBERING

on the left of the figure, however, is open to the objection that the two legs forming a timber set crowd the entry and are liable to be knocked out by a derailed car. For this reason, I would only use legs for the support of the timbers in cases where the coal was very soft or it was impracticable to employ the method shown on the right of the figure.

By that method the two roof struts butt into the solid strata just above the coal seam, which gives them a firm support and leaves the roadway clear of all obstruction. In both of these methods, longitudinal stringers are used at the crown and are held in position by the diagonal roof struts, as appears in the figure. Lagging is used behind the roof struts, for the support of the loose material between sets.

In particular cases, where support must be given to the soft coal forming the ribs, I would use steel props and longitudinal girders. Between each prop a

form should be built and the space behind filled with concrete, which makes a permanent job. I have used these methods a great deal, particularly in longwall work where the roof above the roads had fallen to a considerable height. W. DICKINSON.

Bay City, Mich.

Relative Danger in the Working of Non-Gaseous Mines

Discussion not complete without considering the non-gaseous mines—Local explosions in those mines a twofold danger—Excessive use of blasting powder another danger.

RECENT issues of *Coal Age* have contained numerous letters relating to mine explosions and their prevention. While I am compelled to agree with what has been said by these correspondents, my feeling is that the discussion is incomplete, unless it considers alike the dangers of both gaseous and the so-called "non-gaseous mines."

Indeed, I often think that the gaseous mine is frequently the safest in respect to liability of explosion. At the present time, so much attention is given to the system of ventilation and the elimination of conditions that invite explosions of gas or dust, that there is little to fear, except from a possible accident to the system, or failure of some official to perform his duty.

TWO-FOLD DANGER IN LOCAL EXPLOSIONS

Of course, local explosions of gas in working places are chiefly confined to those mines known to be generating gas. At times such mines are worked with locked safety lamps and, again, open lights are permitted where an ample air current is in circulation. These local explosions are twofold in character. First, there may only result the severe burning or death of one or more men working in the place; and, second, the flame may be extended throughout the mine with terrible effects.

As has been previously remarked by George Edwards, the total of these local explosions is greater than is generally thought; because they are given no publicity, in comparison with the accounts that are broadcasted when a great mine disaster occurs. However, the second danger mentioned is not to be ignored, which consists in the liability of such a local explosion being propagated throughout the mine.

Taking these things into consideration, it is clear that we cannot afford to minimize the danger of a local gas explosion. In one respect it is true that the gaseous mine is more dangerous than a mine generating no gas, or in quantities so small as not to justify any alarm. The point I wish to emphasize, however, is that where a mine is well managed the danger arising from the presence of methane in the workings can be greatly reduced by proper ventilation.

COAL DUST MOST DANGEROUS FACTOR

Now, let me turn to another phase of the situation; namely, the danger of a coal-dust explosion. Probably, the most dangerous factor in this regard is the improper use of explosives. In most gaseous mines that I have visited, there are strict regulations relating to the use of explosives and the blasting of coal and rock.

On the other hand, in many non-gaseous mines we find the miners are the sole judges as to what is safe or unsafe in blasting. There is little restriction placed on the amount of explosive used in preparing a shot. Black blasting powder is employed and excessive charges are used with the idea of breaking the coal into smaller fragments so that it will be easier to load.

Even in machine mining, it is not uncommon to find the holes bored deeper than the cut and the charge located on the solid. The danger is all the greater when such a hole is tapped with coal dust. Surely, it should cause no surprise when such conditions as these result in an explosion; and it cannot be denied that these and other dangerous practices are followed, daily, by many miners.

It is not my claim, however, that all or even a majority of our miners are guilty in this respect. Nevertheless, if one miner out of a hundred at work in a mine takes a chance and an explosion follows, all the safety precautions that the remaining ninety and nine may take will not render them safe.

DANGEROUS PRACTICES COMMON AMONG MINERS

In this connection, let me mention a few other dangerous practices common in many mines. Briefly, these are the mixing of different grades of powder in the same hole; the use of too short a fuse or breaking off a part of the match on a squib; the firing of two or more shots, at the same time, in a close place and many like things that miners have been warned are dangerous.

My experience has been that such practices as these are more common in non-gaseous mines owing to the absence of strict rules and regulations in respect to blasting. To my mind the greatest need today is the enactment of certain laws that will apply to all mines whether or not they liberate explosive gas. Among these should be included the exclusive use of permissible explosives; the prohibition of solid shooting and providing for the firing of all shots by certified shotfirers. I believe this would eliminate one of the greatest dangers common to all non-gaseous mines.

Welch, W. Va. SAFETY INSPECTOR.

Correct Position of Regulator

Would place regulator on inby side of overcast—Danger of leakage into intake current much lessened—Position must be convenient and accessible.

ALLOW me to make a suggestion in regard to the position of the regulator shown in the figure illustrating the inquiry of James Bacon, *Coal Age*, Feb. 22, p. 341. In that figure, the regulator is shown in a position to the left, or on the outby side of the overcast.

If my understanding is correct, the right entries shown have been taking too much air and it was necessary to install a regulator to restrict the circulation in that pair of headings. As stated in the reply to this inquiry, the regulator should be placed "where it will not interfere with the hauling of coal."

In the present instance, no doubt, this requirement will place the regulator on the back entry. The reply states that it can be located on either side of the overcast. Allow me to suggest that it should be placed, preferably, on the inby or opposite side from that shown in the figure.

My reason for suggesting this change is that the air bridge would then be on the outby side of the regulator and subject to a less pressure. Should any leaks develop in the overcast, there will then be less of the return air escaping into the intake current than

would result with the regulator in the position shown in the figure, or when the air bridge is on the inby side of the regulator.

It is true that the difference in pressure and the amount of leakage will generally be quite small. It must be remembered, however, that a very small percentage of gas is a dangerous factor in respect to the dust question. For that reason alone, every possible precaution should be taken to prevent the contamination of the intake current with the gas in the return.

Linton, Ind. W. H. LUXTON.

Employment of Oriental Miners in Pacific Coast Mines

Misstatement of facts regarding employment of Oriental miners in Pacific Coast mines—Official figures show relatively small number.

IN the issue of *Coal Age* Feb. 8, p. 268, J. W. McBride of the Cinnebar Coal Mine, Bremer, Lewis County, Wash., writes informatively of the Pacific coal industry. With regard to the accuracy of certain statements attributed to the U. S. Coal Commission, the American Mining Congress and other authoritative sources to the effect that "there are one-third too many coal mines in operation," I have nothing to say.

In refuting this claim, however, Mr. McBride, after reviewing the production and consumption of coal in the West and Northwest, makes a brief reference to the class of miners employed in the mines of the Coast. He says: "The majority of the coal miners on the Pacific Coast of British Columbia are Japs, Chinese and Hindus—in the United States, all whites."

In this respect, the facts are that, according to the official figures for the year 1921, of the total number of men employed in and around the coal mines of Vancouver Island, 17.227 per cent were Orientals; while the percentage of Orientals employed underground was only 15.12. No Hindus were employed in these mines.

It is only fair to the Vancouver Island Industry, and to all associated with it, employees and operators, that Mr. McBride's sweeping and fallacious statement should be corrected. If allowed to go unchallenged its effect would be harmful, which I am sure the writer does not desire; nor would he wish to be responsible for such a result.

No doubt, the publication of the official figures for the year 1921, will serve to allay any misunderstanding that might exist in the minds of many who read the first article. The following table gives the number and race of the employees of the principal collieries on the Island of Vancouver:

	Number of Men Employed						
	Underground				Aboveground		
Name of Colliery	Whites	Indians	Chin.	Jap.	Whites	Chin.	Jap.
Western Fuel Corporation of Canada	1,112	3	0	0	504	109	0
Nanoose-Wellington Collieries	197	0	0	0	37	0	14
Granby Consolidated Mining, Smelting & Power Co.	344	0	0	0	132	0	0
King & Foster	17	0	0	0	10	0	0
Canadian Collieries (D) Ltd.	1,174	0	430	0	459	272	0
Pacific Coast Coal Mines	0	0	0	0	4	6	0
Total	2,844	3	430	0	1,146	387	14

Total number of men employed in and around the coal mines, on Vancouver Island, for the year 1921: Whites, 3,990; Indians, 3; Chinese, 817; Japanese, 14. Total, 4,824. These are official figures. R. D.

Victoria, B. C., Canada.

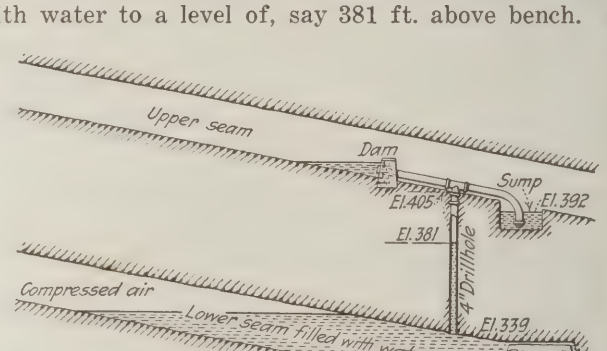
Inquiries Of General Interest

Pumping Phenomenon

Draining an Upper Seam Through a Drillhole Into a Seam Below Develops a Surprising Phenomenon for Which an Explanation Is Asked

IN THE mine where I am employed there is a 4-in. drillhole, sunk from the upper to the lower seam for the purpose of draining all the water into the seam below, or dewatering the upper seam at small expense. At this point both seams have an inclination of about 10 deg. All chambers are connected by crosscuts or breakthroughs and, about 300 ft. from the chamber in which the drillhole is located, some of the chambers have been driven through to the surface.

At the present time the lower workings are filled with water to a level of, say 381 ft. above bench. As



ILLUSTRATING A DRAINAGE PROBLEM

shown in my sketch, the corresponding elevations of the bottom and top of the drillhole are 339 and 405 ft., respectively, while the water level in the sump in the upper seam is 392 ft., or 13 ft. below the top of the drillhole.

There has been set in the rock, at the top of the drillhole, a 3-way connection, leading to the sump, the drillhole and a catch basin formed by a dam erected a short distance up the pitch from the drillhole, to collect the water coming from the upper levels. A pump is used to pump the water from the sump below the drillhole into the hole.

The point of interest that has puzzled us and which we would be glad to have explained is the following: Normally, the water in the drillhole rises to a height of 24 ft. below the top of the hole, which shows the elevation of water level in the old workings below 405 — 24 = 381 ft. But, after pumping the water from the sump below into the drillhole, say for five hours, when the pump is stopped the water will spout from the pipe leading to the dam and continue to flow for 2 or 3 hr. before it will slow down and finally cease. Following this action the water above the dam will then drain back into the drillhole where it will finally sink to a level of 381 ft., as before. PUMPMAN.

Mocanaqua, Pa.

Under the conditions explained in this inquiry there is nothing strange in the spouting back of the water,

after the pump has ceased forcing it down the drillhole into the old workings. In order to understand the situation, it must be remembered that the old workings are driven to the rise; and, while some of the chambers are said to have been driven through to the surface, there are doubtless others that form an airtight pocket at the head of the chamber where the rising water compresses the air after the water level has once reached the roof at the mouth of the chamber.

Under these conditions it is easy to see that the air in a number of these chambers is compressed to a pressure equal to the pressure due to the action of the pump, plus the head of water, as determined by the difference in water level in the chamber and the top of the drillhole. Naturally, when the pump is stopped this pressure acts to force the water through the pipe leading to the dam, under a pressure equal to that caused by the pump. The flow will continue until the compressed air has expanded to an amount that will just support the water column reaching to the dam. Beyond this point, as the water drains off gradually, in the old workings in the lower seam, the water level in the drillhole will again assume a normal position.

Examination Questions Answered

Alabama First-Class Examination, Birmingham, Jan. 22, 1923

(Selected Questions)

QUESTION—*What are the duties of a mine foreman? Explain fully.*

ANSWER—A mine foreman must devote all of his time to the supervision of the mine in his charge. He must reach the mine each morning in time to examine and sign the fireboss' report and see that no men enter the mine whose places are reported as unsafe for work, until the dangers reported have been removed, the places examined and found safe for work. The foreman must give his particular attention to the ventilation of the mine, the proper distribution of the air and the removal of all dangers that are reported to him.

The foreman should employ and assign work to such men as he finds are capable and fit for the work in hand. He must investigate all alleged violations of rules and ascertain as nearly as possible the causes of any accidents that may occur in the mine and the person or persons responsible for them. He must make out a full report of such accidents to be sent to the mine inspector in charge of the district. In a few words, the mine foreman is responsible for the safe and economic working of the mine in compliance with the mine law; and it is his duty to enforce all rules and regulations.

QUESTION—*Of what use is a correct map of a mine to the foreman?*

ANSWER—Such a map would enable him to plan all work on an intelligent basis and avoid the loss of much coal that will always result when entries and rooms are driven blindly or without the giving of sights to determine the direction of driving. If complete, the map will show many physical features that will enable the foreman to avoid running into danger.

QUESTION—*What are the dangers and the consequent results arising from not having accurate and complete surveys of the workings of a mine?*

ANSWER—One of the chief dangers is that of the near approach to old abandoned workings that may contain accumulations of water or gas. A body of water confined under a considerable head is a hidden danger that should be made known through careful and accurate surveys. The information conveyed to the foreman by an accurate map will enable him to avoid the danger present when driving under waterways or reservations for the prevention of damage to improvement on the surface. A wise foreman will always exercise special precautions under such areas, by leaving wider pillars and adopting methods of timbering that will prevent undue settlement and breaks that may extend to the surface.

QUESTION—*If when making an examination of a mine, you found a large body of explosive gas, state what precautions you would take to prevent an accident from same?*

ANSWER—If the discovery is made when the men are at work in the mine, no attempt must be made to disturb the gas, until after the men have been notified and withdrawn from the workings. Immediate steps must be taken to safeguard all entrances to the place or places where the gas is confined. Reliable men equipped with safety lamps must be placed where they will be able to prevent any person from entering such areas, until the danger has been removed after all the men have departed from the mine, and until the section has been finally examined and found safe.

QUESTION—*If a mine of which you had charge should suddenly develop firedamp, what would you consider your duty, according to the laws of Alabama?*

ANSWER—In such a case, the Alabama mining law (Sec. 11) provides that immediate notice be sent to the chief mine inspector and the inspector of the district, by the operator in charge of the mine. It is the duty of the foreman, therefore, to promptly notify the superintendent or manager of the mine, regarding the condition he has discovered. Having done this, his responsibility under the law ends, as far as notifying the inspection department is concerned. However, the foreman must still do everything in his power to safeguard the men, by withdrawing them promptly from the mine, by the safest route possible. He must then, in company with his firebosses, take charge of the work of removing the gas and making the mine safe.

QUESTION—*What is a safety lamp and why is it safe?*

ANSWER—A safety lamp, so-called, is a lamp whose flame is isolated from the outside atmosphere by means of a wire-gauze chimney and a similar gauze protecting all entrances for air openings to the lamp. Such a lamp, however, is only safe when properly handled by a competent person who understands its principle of construction and knows the danger of violating those principles by improperly handling the lamp or exposing it to a strong current or blast of air, or allowing the gauze to become heated or clogged with dirt.

QUESTION—*How many apertures are there in a square inch of the standard safety-lamp gauze?*

ANSWER—The wire mesh adopted as standard, by American and English safety-lamp manufacturers, is based on the experiments of Sir Humphry Davy, who found that the greatest degree of safety was insured by a mesh having 784 openings to the square inch, formed by 28 wires (No. 28 B.w.g.) to the inch.

Coal Wholesalers Issue Summary of Massachusetts Pure Coal Law

The Massachusetts Pure Coal Law, a recent enactment, is summarized by the American Wholesale Coal Association as follows:

Who Enforce the Law.—(1) Department of Public Health. (2) Local Board of Health. (3) Director of Standards. (4) Local sealers of weights and measures. (5) Or the agents or employees of any of them.

What They May Do.—(1) Enter each place where coal is stored or kept for sale. (2) Enter railroad trains, cars or any vehicle used to haul coal. (3) Inspect such coal and take a sample for analysis. (4) Analyze, inspect or otherwise test such coal. (5) Record and preserve as evidence the result of such tests. (6) If in the opinion of any of the several authorities the coal so tested is unfit for ordinary use they may (a) condemn, (b) destroy, (c) dispose of otherwise than for ordinary use.

Penalties.—(1) For interfering in any way with the designated officers in enforcing the law, a fine of from $100 to $1,000, or imprisonment from one month to one year. (2) For having possession of, with intent to sell, selling, exposing or offering for sale coal which has been condemned, a fine of from $100 to $1,000 and or imprisonment from one month to one year. (3) For having possession of, with intent to sell, selling, exposing or offering for sale coal unfit for ordinary use, a fine of not more than $1,000 and or imprisonment for not more than one year. (4) For placing any foreign substance in any container with coal, for selling, exposing or offering for sale, or having possession, with intent to sell coal packed in receptacles containg any unreasonable amount of foreign substance, a fine of not more than $1,000 and or imprisonment for not more than one year. (5) For violating any provision of the act, or failing to comply with any request for information, or direction of the authorities, or for giving a false answer, a fine of not more than $50. (6) For fraud or deceit as to weight, for selling coal which is short in weight or measure, or contains an unreasonable amount of impurities, a fine of not more than $1,000 and or imprisonment for not more than one year.

It will be noted, says the bulletin of the wholesalers, that there is no absolute measure established by the law for the determination of the amount of slate, other impurities, etc., and that the whole matter is left to the judgment of the several local officers. There may be as many different standards of purity as there are officers attempting to apply the act.

A. J. Hoskin Succeeds the Late Dr. Stoek as Head of University Mining Department

Arthur J. Hoskin, research assistant professor of mining, has been appointed acting head of the department of mining, University of Illinois, to fill the vacancy caused by the sudden death of Dr. H. H. Stoek, founder of the department of mining at that institution.

The following is a summary of Professor Hoskin's thirty-three years of experience in mining and metallurgical work. After being graduated from the University of Wisconsin in 1890 he went immediately into active mining work, as assistant to a mining engineer at Idaho Springs, Colo. This work covered mineral and patent surveys and mine development. He then became assayer for the Omaha and Grant Smelter at Denver and selling agent for twelve of the mines at Cripple Creek and Leadville. For one year he was engaged in the U. S. Surveyor General's office at Denver, later becoming consulting engineer at Leadville. Here he received his coal-mining experience and from 1903 to 1906 he was chief engineer for the Leyden Coal Co., opening and operating one of its mines in a new district, near Denver. He designed and erected the first automatic coal machinery, such as cagers, weighers, box-car loaders, etc., used west of Iowa. He received the degree of mechanical engineer from Wisconsin on the basis of his experience and thesis on the mechanical equipment of the Leyden coal mine.



A. J. HOSKIN

For two years he was assistant professor of mining at the Colorado School of Mines, then full professor for four years at the same institution, which at that time was the largest mining school in the country. At various times during his six years at that institution he taught every course in the mining curriculum, introducing courses in coal mining, which before that time had not been taught in that college. He was in business for himself in Denver from 1917 to 1920, and then became mill superintendent for the Colorado United Mines Co.

He edited for a while the *Mining and Metallurgical Journal*, Denver, and the *Mining American*, which later merged with the *Mining Record*. He then became Western editor of *Mines and Minerals*, at the same time that Dr. Stoek was the Eastern editor.

Since going to the University of Illinois in 1921 he has made an extensive study of Illinois coal-mining problems, has visited every mining district in Illinois, both coal and metal, and is now completing important research in power costs in Illinois coal mining.

Utilities Consume 3,251,097 Tons of Coal In February; Decline Due to Short Month

Electric public-utility plants consumed 3,251,097 net tons of coal during February, according to a report just issued by the U. S. Geological Survey. This compares with 3,561,236 tons consumed during January, according to corrected returns.

Fuel oil consumed by public-utility plants in February totaled 1,166,203 barrels, compared with 1,256,604 barrels in January and 1,306,930 barrels in December, 1922.

The average daily production of electricity by public-utility power plants continues to break all records, as the average production in February was about 1½ per cent greater than that for January. February is the seventh consecutive month which has established a new record of average daily output. All indications at the present time point to 1923 being a remarkable year in the production of electricity. The average daily output of electricity during February was 155,300,000 kw.-hr. compared with 153,200,000 kw.-hr. during January.

W. L. Abbott Is Chairman of Federated Engineers Coal Survey Committee

W. L. Abbott, of Chicago, has been appointed chairman of a committee to make a nationwide coal storage survey in co-operation with the U. S. Coal Commission and the Department of Commerce, according to an announcement by the Federated American Engineering Societies. Other members of the committee will be named in the near future. It is probable that the personnel will represent many groups, including coal mining, both bituminous and anthracite; transportation, public utilities, U. S. Bureau of Mines, chemical engineering, economics and equipment. It is proposed to complete the survey by Nov. 1 of this year.

Mr. Abbott is a member of the American Institute of Electrical Engineers and has been a leader in the engineering movement for government reorganization sponsored by the National Public Works Department Association.

Anthracite Operators Brand 1922 Strike as Hold-Up In Flagrant Violation of Anti-Trust Laws

Unless some remedy can be found "whereby force can be dethroned and reason recognized as ruler," anthracite operators contend in a brief filed with the Federal Coal Commission and made public April 16, there is "no salvation for the anthracite industry."

After reciting in detail the events leading up to the strike of 1922 the statement, signed by Walter Gordon Merritt, counsel for the operators, asserts that "this national hold-up, by refusing to negotiate with willing union operators with whom there was no dispute, by disrupting non-union operations, by avoiding an anthracite settlement, by flouting the President of the United States, and by refusing to arbitrate, had for its purpose the attainment of its ends by ruthlessly inflicting injury on the public, in flagrant violation of the federal Anti-Trust laws.

"The refusal to permit resumption of coal production by the producers of 90 per cent of the nation's coal supply, on any terms within the reach of the parties, was not to bring pressure on these producers to grant more concessions but to starve the public into submission through a protracted coal famine.

"The purpose to extend the power of the United Mine Workers by international combinations to deprive the American people of coal is clear if the report from London under date of April 12, 1923, is true, that President Lewis has offered a resolution before the Executive Committee of the International Federation of Miners declaring 'in case of strike all means should be taken to prevent export of coal to the country involved in strike.'

"Throughout the trying days of 1922 the operators were fighting for the principle of settlement by reason, and the mine workers were fighting for a settlement by force. The operators stood for arbitration in an industry of great public importance. The miners stood for coercion by public privation. In the end the demands of a frightened public, supported by the urgings of public officials, led to a sacrifice of the principle in order that the public might have coal.

"Unless that chapter of history can be reversed, unless the commission can find some remedy whereby force can be dethroned and reason recognized as ruler, there is no salvation for the anthracite industry. Nearly all other questions are subordinate to this. It is not as a wage-adjusting body that this commission can best serve its country but in establishing durable and workable machinery for the adjustment of peaceful methods of all differences that may hereafter arise and the elimination of industrial warfare.

"The strike is a legitimate weapon to drive an economic bargain with a selfish employer, but there is no moral right, and should be no legal right, to organize strikes or lockouts in basic industries or transportation where disinterested agencies for adjustment and adjudication are available.

"A national combination, controlling coal production, whether it be of employers or employees, which disregards the public interest and wilfully seeks to produce a coal famine by refusing to arbitrate industrial disputes, deserves correction and regulation at the hands of government. A government which is unafraid can do no less than meet this issue. If society has a right to protect itself against abuses in the coal industry, here is occasion to act. If this major problem goes unremedied, there is no consistency in proposing remedies for minor problems."

Mining Maps Need Not Be Shown to So Called Experts for Boosting Tax Valuations

Judges Strouss and Lloyd, in the Common Pleas Court of Northumberland County, Pennsylvania, have concurred in an important decision, ruling that mining maps do not have to be shown to alleged "experts" engaged by County Commissioners for the purpose of boosting coal-land valuations.

This is said to be the first clear-cut decision rendered on this particular issue. The inference which an outsider would draw from the whole proceeding is that the "experts" merely guessed at coal-land values, and then tried to compel their prospective victims to furnish information whereby they could bolster or correct their findings, or slide out gracefully, as the case might be.

As the decision of Judges Strouss and Lloyd is likely to serve as a precedent in similar anthracite tax proceedings, and in particular seems likely to cut some figure when the tax appeals come up soon in Schuylkill County, the complete opinion, rendered in the action of the Philadelphia & Reading Coal & Iron Co. vs. Commissioners of Northumberland County, is given herewith:

"This proceeding is before us at this time upon a petition and rule to show cause why an order should not be made permitting the Commissioners of Northumberland County by their counsel and engineers to have access to the records and the mines of the plaintiff company. The rule has its inception in an appeal from the action of the Board of Revision in assessing the real estate of the plaintiff company for taxable purposes. The rule has been pending for some time and when called for argument in open court, counsel for the Commissioners of Northumberland County appeared and there stated that they had no desire to have the rule prosecuted so far as the same related to the permission of their experts and engineers to examine the mines. The only question remaining for our disposition is whether or not an order should be made requiring the plaintiff company, being the appellant in said tax appeals. to produce its records, maps and other data for examination by the defendants prior to the trial. The cases of Happersett vs, Eaton, 20 D R 501; Graham vs. Cummings, 11 D.R. 68, are on all fours with the instant proceeding and the rule established by these cases and the authorities cited therein are controlling. The discussion in those cases are exhaustive, pertinent and illuminating to our present inquiry. Nothing could be gained by further elaboration thereon, and from the rule established therein we are of the opinion that we have no power to award the order as prayed for in said rule. And now, to wit, March 26, 1923, said rule is hereby discharged."

McNeil Coal Co. is Low Bidder on Coal For New Haven Railroad

The McNeil Coal Co., with offices at 342 Madison Avenue, New York City, was the lowest bidder for furnishing and delivering to the New York, New Haven & Hartford Railroad Co. 250,000 tons of bituminous coal for the eleven months period May 1, 1923, to April 1, 1924. The prices submitted by the company were $5.93 per gross ton on Fairmont coal and $6.04 on Kanawha coal for delivery alongside the railroad company's docks at Boston and Providence. The price at the mine is thus indicated at about $2.25 per net ton. The bids were not based on assigned cars.

Other bids reported were as follows: New England Coal & Coke Co., Kanawha, $6.95, and Fairmont, $6.49; C. H. Sprague & Son, Kanawha, $7.14; Steamship Fuel Co., Kanawha, $7.20; Consolidation Coal Co., Fairmont, $6.32, and Prudential Coal Co., Kanawha, $6.83.

The New Haven company will receive bids up to noon April 26 for furnishing and delivering approximately 17,000 tons of run of oven coke during the period May 1, 1923 to May 1, 1924.

National Guard Officers "Pass the Buck" For Not Stopping Herrin Massacre

Adjutant General Carlos Black, of the Illinois National Guard, blames Colonel Sam Hunter for the failure of the state to send troops to Herrin last June to stop the Herrin massacre. Colonel Sam Hunter blames Adjutant General Carlos Black. This official wrangle is going on before a special committee of the Illinois Legislature appointed to find out who is responsible for the inactivity of the state troops on those troubled days in June when a union mob besieged a non-union strip mine guarded by 26 hired armed men, accepted the surrender of 48 men and then brutally killed 22.

Colonel Hunter, who went to Herrin four days before the riot, has sworn that he repeatedly asked Adjutant General Black to send two companies of troops, even though Sheriff Melvin Thaxton declined to ask for them. He also declares that State's Attorney Delos Duty and County Judge D. T. Hartwell both refused to ask for troops, though he holds each had the authority. Duty is the man who has handled the two futile prosecutions of men indicted for murder at the massacre and Judge Hartwell heard both cases. Both juries acquitted the defendants and State's Attorney Duty said it was useless for the state to prosecute further and *nolle prossed* all the other murder indictments two weeks ago. Attorney General Edward J. Brundage went through the formality of filing a protest against dropping the cases.

Adjutant General Black has told the investigating committee that Colonel Hunter's testimony is "incorrect in some details." Most of these "details" are the vital ones in the matter. Colonel Hunter has been able, however, to present copies of telegrams and some other documentary evidence to substantiate his statements. He is slated for separation from the Nation Guard payroll on July 1 next. Adjutant General Black has been unable to explain to the committee why, if Colonel Hunter was so derelict in his duty last June, his discharge from the service was not arranged until recently, when it became evident that the Legislature was going to investigate.

Hoover Asks Aid of Trade Associations to Improve Efficiency of Railroads

In a letter addressed to approximately 3,500 trade associations Secretary Hoover asks for co-operation with the railway managers of the country in an effort to obtain the most efficient operation of the railroads. He points out that, due to the war and to the long-continued inability of the carriers to finance the necessary betterments, both productive capacity and consuming demands have now advanced beyond our transportation facilities.

The Secretary of Commerce goes on to state that while railway managers are making every effort in finance and expansion of facilities to meet the nation's necessities, full recovery of lost ground must be slow and he adds that if our present rate of productivity and employment is to be maintained it is vitally necessary that there be co-operation with the railway managements of both producing and consuming industries to assure the most efficient operation of the railroads. The principal direction in which such co-operation can be extended by the trades, according to Secretary Hoover, are: (1) Storage of their winter coal during the light-consuming season—that is, from now until Sept, 1, including the early movement of Lake traffic. (2) The loading of all cars to full capacity, and their prompt loading and discharge. (3) Reduction of reconsignment shipments and restriction of to-order bills of lading. (4) Demands for no more cars from the railways than can be promptly used.

"If we could secure the maximum efficiency in these directions," said the Secretary, "we will have added more effective commodity movement than would be brought about by the addition of 300,000 cars and 3,000 locomotives, and the addition of 10 per cent to our track mileage and terminal facilities.

"The importance of this lies in more than simply the maintenance of continuity of production and full supply of consumption because any strangulation in movement of commodities through car shortages affects the profits of every individual manufacturer by interruption in his production, and furthermore, such strangulation affects price levels in the most definite fashion.

"The full and smooth movement of all of the productivity of the country would be the greatest contribution that could be made at the present time in checking inflation or increase in price levels."

Railroads to Adopt Rating Plan in Illinois Whether Operators Agree or Not

The old order in rating Illinois coal mines for daily car allotment is changing. The principal coal-carrying railroads in that state, havng struggled for two months to get the operators to agree to their plan for rating mines by a railroad board, are on the point of putting the plan into effect. The operators tentatively accepted the plan but upon a condition which would require the Interstate Commerce Commission to render a decision on the assigned-car case after the new plan has had a 60-day trial. This is not acceptable to the roads.

States adjoining Illinois have already come to agreement with the roads. In western Kentucky the mine owners agree to abide by whatever rating the various roads put upon the mines provided they are not handicapped by whatever may take place on the same roads running across the river into southern Illinois. In Indiana the round-robin system of car distribution continues in effect with railroads fixing each mine's rating. The Big Four across southern Illinois has been working a round-robin plan for some time.

But in most of the fields of Illinois the old system, to which both the carriers and some of the mine owners object, remains in operation. A change may be expected at once. Under this old plan each mine gets its daily rating for each month based upon the average of each eight hours' production during the previous month, the operation reports to be made by the operator. There have been many abuses and a good deal of resultant discrimination as between districts.

Under the plan proposed by the road a railroad board will rate each mine arbitrarily, with mines under development getting special ratings, as now provided, and mine hours (not tipple time) will be the time basis. Reports are to be furnished monthly to the roads by the operators. If any operator persistently fails to do so, he can be penalized one-fourth of a week's allotment of cars. Joint mines will have to furnish the report to each road serving them.

The operators, through their traffic bureaus, by letter "tentatively accepted" the plan "with the understanding that the Interstate Commerce Commission will withhold its decision in case Docket No. 12530 in so far as that case applies to the rating of coal mines in the State of Illinois, and with the further understanding that if the operation of these rules during the first 60 days of the next car-shortage period does not result in an equitable distribution of coal-car equipment, as provided by the Act to Regulate Commerce and the decisions of the Interstate Commerce Commission, in the judgment of the operators, the Interstate Commerce Commission will render a decision immediately upon request of the Illinois operators on the evidence already submitted . . . and prescribe just and reasonable rules for rating coal mines." Docket 12530 is the now famous assigned-car case.

The position of most Illinois carriers is that they cannot make any agreement that binds the Interstate Commerce Commission or anybody else. Therefore it is expected the Illinois Central, the Burlington, C. & E. I. and one or two other of the principal coal carriers will put their rating plan into effect at once without any signed agreement.

FIELD INVESTIGATIONS into the question of community storage, studies in which subject are being made by F. R. Wadleigh, Federal Fuel Distributor, have been completed in Minneapolis and St. Paul, Mr. Wadleigh announced April 13. Similar field investigations are being made by E. A. Blake, G. S. Pope and G. J. Pride, in Chicago, Detroit, Buffalo, Worcester, Indianapolis and Cleveland.

Coal Commission Seeks Means to Curb Royalty Demands of Owners of Anthracite Lands

By Paul Wooton
Washington Correspondent of *Coal Age*

How under the laws of Pennsylvania, or by interference on the part of the federal government, can a curb be placed on the royalties demanded by those holding anthracite lands? This is a question which is uppermost in the minds of the members of the President's Coal Commission, now that they are concentrating much of their attention on the anthracite industry. Governor Marshall declared on Saturday that he would like very much to hear from anyone who has a sound idea as to how the land owners can be prevented from charging royalties which "they jolly well please." At that point Chairman Hammond interposed to say that he would put it stronger and say "what they damn please." It was stated at the Saturday conference that this question of meeting the royalty situation will be put to Senator Pepper and to every other person appearing before the commission who is likely to have an opinion on the subject.

All of the members of the commission, with the exception of Governor Marshall, will spend most of this week in the anthracite region. The commission will be accompanied by D. C. Ashmead and another of its anthracite specialists. Mr. Ashmead recently resigned from the editorial staff of *Coal Age* to engage in field work for the commission.

Much Evidence at Public Hearings Irrelevant

During the Saturday conference Governor Marshall went into detail in explaining why the commission will limit its public hearings. He stated that during the eight years that he was president of the Senate it was his observation that 75 per cent of the so-called evidence taken during public hearings was not pertinent and that the public money expended to print it was wasted. There will be public hearings, he said, but only on matters concerning which agreement as to the facts cannot be reached in any other manner.

He pointed out that the assembly of the contending parties to a controversy, each supported by smart lawyers, and where the main purpose is to put the other side in a hole, is not likely to bring out the real facts from which conclusions may be drawn. Governor Marshall said that he was disgusted with the way the testimony before the Kenyon committee was jumbled up by the lawyers. In such public hearings as the Coal Commission conducts, he stated, the text will be the exact fact in controversy and witnesses will be required to confine their remarks to that text. Moreover, he declared that the public hearings will be conducted along the lines of a lawsuit. No one will be heard until sworn.

The receipt of a 25-page letter from a woman residing at Herrin, Ill., appealing to the commission for relief on the ground that her husband had been discharged from his position because he served on the grand jury that considered the case against the rioters was cited by Governor Marshall as being typical of a general misconception that has grown out of the request of the commission for information as to breaches of civil rights of American citizens.

"The purpose of the commission in calling for information on the subject," said Governor Marshall, "is to get the evidence of these violations of law so that the principle can be stated and so that a determination can be reached as to whether or not the principle has been violated. Many unwittingly have conceived the idea that the commission is an organization which can assume the rôle of prosecuting attorney, grand jury, petit jury and sheriff, as the case may be, and that it has the authority to prosecute criminal causes and assist in the bringing of civil actions for damages.

"These are not functions of the commission. The courts are the places to prosecute criminal cases and claims for damages. The scope of the commission's work is limited to the ascertaining of the facts as to what are the civil rights of an American citizen, the breaches that have taken place, and to recommend legislation, if that be necessary, or other methods looking to a cure. The commission cannot bring prosecutions or furnish attorneys. All it can do is to make an honest endeavor to get the truth."

The fact that the act gives an immunity bath to those who testify before the commission is regarded by Governor Marshall as being helpful in that he believes that persons appearing before the commission are more likely to be entirely frank when there is no fear of being indicted for what they say.

The commission is face to face with the question as to whether unlimited and uncontrolled competition will result in cheaper coal to the consumer, Governor Marshall said, or whether that end can be attained better if controlled combinations are allowed. Conclusions, however, must await the time when all the facts are in, he asserted. In so far as anthracite is concerned, Governor Marshall said that he is "not certain that any cheaper coal has become available because of any dissolutions that have taken place." For thirty years, he said, there has been constant litigation between the United States and the railroads and mines in the anthracite region.

In Governor Marshall's opinion, the Hepburn Act now meets the full approval of the U. S. Supreme Court. The commission is interested, he said, in having coal furnished the consumer as cheaply as is consistent with fair returns to owners and legitimate investors; with wages to the men who do the actual work commensurate with the American idea of living conditions, and with reasonable freight rates. The commission wants to ascertain by what plan greatest economy can be effected in the mining, the transportation and the distribution of coal and which will insure to the consumer the proportionate part of those economies to which he is entitled. To these aims was added that of assuring an adequate supply of coal to meet the needs of the country.

To Study Mining Methods and Engineering Problems

The commission has advanced far enough with its compilation of facts as to the earnings of the anthracite producers to lead its members to believe that more absolute information in that particular will be available than has been compiled in any other industry. Those members of the commission who will visit the anthracite field will start their inspection visit at Scranton and will proceed through the Wyoming, Lehigh and Schuylkill districts. Mining methods and engineering problems will be studied particularly.

Chairman Hammond announced Saturday that the commission has received about twenty per cent of the 2,400 schedules covering wage rates that had gone out a month previous. Detailed reports on earnings covering 200,000 employees have been received. Early in the week beginning April 9 the commission's staff numbered 410. This is believed to have been the maximum number that it will be necessary to employ. On Saturday the total had fallen to 402, and it is believed there will be a gradual decrease in personnel from this time forward.

The specialists of the Public Health Service now are engaged in the Logan County and the Kanawha fields. The causes of strikes are being studied by a field force of fourteen men, who are making daily reports that are being analyzed at the commission's offices as they are received.

The schedules covering wholesaling and retailing of coal are practically complete and will be mailed out soon.

Prof. J. H. Hollander, of Johns Hopkins University, has been retained by the commission to make a special study of investments, profits and corporate control in the anthracite industry. Professor Hollander is an economist who has had wide experience in financial matters. As Treasurer of

Porto Rico, he organized the Treasury Department of the island and introduced its present revenue system. He was special commissioner to Santa Domingo in 1905 and was largely instrumental in readjusting its public debt.

Among those appearing before the commission last week were General Goethals and W. Thorneycroft. General Goethals pointed out the inefficiency of existing law in the handling of the coal situation in time of emergency. He urged the enactment of a law with teeth, which could be invoked if the situation should require it. In his opinion, the situation should be handled by an administrator who would have wide powers that would supersede those of any other government agency.

Mr. Thorneycroft conducts extensive coal operations in Great Britain. He informed the commission as to the practical working out of the profit-sharing arrangement now in force in the British Isles.

The Bureau of Mines has advised the Coal Commission that it will furnish it with a digest of certain state legislation affecting coal.

Grand Jury Indicts 32 in Connection With Armed March in Logan

Harold W. Houston, of Charleston, chief counsel of the United Mine Workers of District 17, and thirty-one others were indicted by a grand jury in Logan County on April 13, charged with being implicated in the armed march against Logan. Houston is specifically charged with being an accessory before the fact in the death of John Gore and three other deputies of Logan County during the march. No indictment was returned against C. F. Keeney, president of District 17, although there had been rumors that the grand jury might be asked to reindict him.

When the true bill was returned against Houston, who has had a leading part in the defense of others alleged to have been connected with the armed march, he was absent from the city preparing for the trials which were set to be called at Charles Town on April 16. Houston's name had frequently been mentioned in connection with testimony given at previous trials growing out of the trouble on the Logan border. It was stated on April 14 by T. C. Townsend, of Charleston, associated with Houston in the trial of the miners, that the chief counsel of the mine workers would voluntarily surrender upon his return to Charleston.

Among the others indicted were Elmer Blankenship, against whom indictments are already pending; G. C. Hickey, recently released on bail by the West Virginia Supreme Court; Henry Wright, Bert Castle, U. S. Cantley, J. E. Miller, Ed Kay, Anthony Ness, S. S. McDaniels, Anderson Fauber, William Danaway, A. C. McCormick, George Garrison, Frank Adkins, Walter Regner, Ralph Legg, Will Singleton, George Mathell, a man named Childreen and another man named Irons.

Failure of the jury to reindict Keeney and Fred Mooney district secretary of the union, does not mean that charges against them will be dropped, according to Prosecutor John Chafin. Keeney, he said, will be tried later under an old indictment charging him with being accessory to murder.

Strike Wanes in Kanawha Field

Although about 2,000 coal miners in the Kanawha field struck April 1, before the end of the week the number of miners on strike had been reduced to 825 in all as additional companies entered into a contract with the miners' union for the new coal year. Contracts had been signed covering about 70 mines, the new agreements being between individual mining companies and the United Mine Workers rather than between the miners' union and the Kanawha Operators Association as a whole, as some of the companies which signed the Cleveland pact withdrew from the association after becoming parties to the union agreement.

Approximately 50 coal companies, producing about 30 per cent of the tonnage in field, have signed the new agreement. The remaining companies in the field have not signed with the union and have indicated that they will not do so.

New York Mayor Submits Eight Queries to Dealers in Coal Investigation

Wholesale and retail coal dealers in New York City have received from John F. Hylan, Mayor, a questionnaire relating to their business, which they are requested to fill out and return to the Mayor's office not later than April 23.

The replies are to be used by the Mayor in his investigation of the Coal situation which he proposes to make in an effort to avoid a recurrence of last winter's shortage of fuel. Some replies, it was said, have already been received, but nothing could be learned as to what they disclosed.

The questionnaire contains eight queries, as follows:

How many tons of anthracite did you sell in New York City between April 1, 1922, and April 1, 1923?

How many tons of bituminous coal did you sell in New York City between April 1, 1922, and April 1, 1923?

What was the range of sales prices per ton between April 1 and Sept. 1, 1922, on anthracite and on bituminous coal?

Between Sept. 1, 1922 and April 1, 1923, on anthracite and on bituminous coal?

What proportion of anthracite did you sell directly to householders and what proportion to dealers?

What proportion of bituminous coal did you sell to householders (apartment houses, private houses, etc.), and what proportion for commercial use (factories, etc.)?

How many tons of anthracite did you sell in New York City during the twelve months previous?

How many tons of bituminous coal did you sell in New York City during the twelve months previous?

Between what range of prices?

Another questionnaire, for large users of coal, also was sent out, in which they were asked how many tons of anthracite and bituminous coal they used, the prices paid, by whom supplied, what proportion of hard and soft coal was used in previous years, the effect of the use of soft coal on boilers, on property and on the neighborhood, and what the user is doing to insure an adequate supply of hard coal during the ensuing twelve months.

Mayor Hylan asks that the answers to this questionnaire be mailed to him before April 30.

Having Licked All Comers Jack Dempsey, Now Will Try Running Utah Coal Mine

"If there is one thing I know more about than fighting, it's how to mine coal" are the words with which Jack Dempsey, heavyweight prizefighter of the world, astonished the world April 10. Whereupon it was officially announced at a meeting in Salt Lake City of directors of the Great Western Coal Mines Co., that William H. Dempsey (that's the rock crusher's home-grown name) had been elected president of the company and that John L. Kearns, the champion's manager, is now secretary and treasurer. Dempsey and Kearns have invested an unannounced amount of their cash in the company and will begin within six months to mine coal from their 2,000-acre tract in Carbon County, Utah. They also say they have taken over 6,000 acres of agricultural land in Castle valley, near by. A new townsite called Dempsey City is to be laid out and possibly populated. Dempsey said "If I ever fight again, that's where I'll train."

Class 1 Railroads Consume 10,358,000 Tons Of Coal in January at $3.75 per Ton

Class 1 railroads consumed 10,358,000 net tons of coal during January, 1923, as charged to account 394, compared with 10,127,000 tons in December and 8,121,000 tons in January, 1922, according to a recent report of the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. The delivered cost per ton in January last was $3.75 compared with $3.60 for the corresponding month of last year.

Consumption of fuel oil in January totaled 150,317,000 gallons, compared with 157,380,000 gallons in December and 126,796,000 gallons in January a year ago.

N. C. A. Directors and Smokeless Operators Pledge Aid To Coal Commission; Labor Evils Outlined

That the U. S. Coal Commission will be given all possible assistance in its work by the bituminous coal operators was assured by the directors of the National Coal Association and by the Smokeless Coal Operators' Association of West Virginia at meetings in New York City on April 11 and 12.

Both bodies received the report of the April 10 meeting of the Bituminous Operators' Special Committee, of which John C. Brydon, of Somerset, Pa., is chairman. The report outlined four major obstacles to satisfactory bituminous-coal mining from the standpoint of the public and the industry and for which solutions will be recommended to the Coal Commission. These evils, the report says, are:

"(1) Instability of labor conditions, due to the monopolistic power and methods of the United Mine Workers of America, with the following consequent handicaps to the industry:

"(a) Inability of mine owners to lay plans even a year ahead with any certainty of regular operation.

"(b) Inability on the part of the industry to make maximum use through steady shipments of the transportation facilities of the country.

"(c) High costs of mining, resulting in high prices, due to constantly interrupted and therefore uneconomic operations and to property losses through violence.

"(d) Exorbitant labor costs, causing prices which force other working people in effect to exchange from two to four days' labor for one day of mining labor when they buy coal.

"(e) Continual threats of even higher wage demands, to be enforced by bludgeoning and violence.

"(2) Transportation difficulties. These constitute an obvious and fundamental deterrent to satisfactory supply and price of coal. Problems of car shortage and suggestions for improving the present system of car distribution are being studied.

"(3) Seasonal demand. A determined and thorough effort by the industry to encourage and teach the storage of coal is certain to be one of the committee's recommendations.

"(4) Speculation. Out of the evils listed above grows destructive opportunity for the industry's barnacles, the speculators who, and those mines which, lie idle when supply is normal and strive for 'killings' when demand is hot and prices high. The great body of constructive business citizens who constitute the bulk of the bituminous mining industry are as desirous as the public itself to so stabilize the industry as to stamp out the speculator."

The report was discussed at length by the directors of the National Coal Association on April 11, at the conclusion of which Alfred M. Ogle, president of the association, said that it was necessary that the misunderstandings existing between the public and operators be gotten rid of. He said it was intended to start an educational campaign with that idea in view and that the special committee of which Mr. Brydon is chairman would have offices in Washington, from which place statements would be issued from time to time.

The Smokeless Operators' Association of West Virginia at a meeting held the next day also received the report of the special committee of operators and pledged its assistance to the Coal Commission. At the luncheon following the meeting Harry L. Gandy, the recently selected executive secretary of the National Coal Association, spoke briefly asking the co-operation of the members of the association in his work.

To assist Mr. Brydon's committee in its work of obtaining information needed, the following were appointed:

D. C. Botting, of Washington; Moroni Heiner, Utah; W. F. Megeath, Montana; P. J. Quealy, Wyoming; G. F. Bartlett, Colorado; J. G. Puterbaugh, Ira Clemens and W. L. A. Johnson, Southwest; E. C. Smith, Iowa; George B. Harrington and F. C. Honnold, Illinois; P. H. Penna, David Ingle, M. L. Gould and J. B. Pauley, Indiana; George H. Barker, W. D. McKinney, D. F. Hurd and S. H. Robbins, Ohio; S. Pemberton Hutchinson, Julian B. Huff and W. M. Henderson, western Pennsylvania; B. M. Clark and G. Dawson Coleman, central Pennsylvania; C. E. Reed, C. F. Richardson, Frank D. Rash, John Price and E. L. Douglass, Kentucky; R. E. Howe, E. C. Mahan, E. R. Clayton and Alex. Bonnyman, Tennessee; S. L. Yerkes, Alabama; E. E. White, R. H. Gross, C. C. Dickinson, Frank Lyon and Oscar Deyerle, West Virginia; C. E. Bockus, Virginia, and J. S. Brophy, Maryland.

U. S. Chamber of Commerce to Discuss Coal Problem at Annual Meeting

The coal problem will take up the entire session of the Natural Resources Production group at the eleventh annual meeting of the Chamber of Commerce of the United States in New York, May 7-11. Details of the group meeting program, announced by W. DuB. Brookings, manager of the Natural Resources Production Department of the National Chamber, indicate that three aspects of the coal situation will be covered in the addresses scheduled to precede the general discussions. The program follows:

"Some Problems of Coal Distribution," by J. D. A. Morrow, president, Morrow Callahan Coal Co.

"Labor and Its Relation to the Cost of Industrial Coal," by J. G. Bradley, president, Elk River Coal & Lumber Co.

"Economic vs. Legislative Solution of the Coal Problem," by George H. Cushing.

"Distribution is one of the most important elements in the entire coal problem," Mr. Brookings said in making the announcement. Mr. Morrow is admirably fitted to speak on this subject. During several years of active management of the affairs of the National Coal Association, he became familiar with the problems of distribution from the point of view of the operator. During the war and afterward he rendered valuable assistance to government officials in charge of the distribution of the nation's fuel."

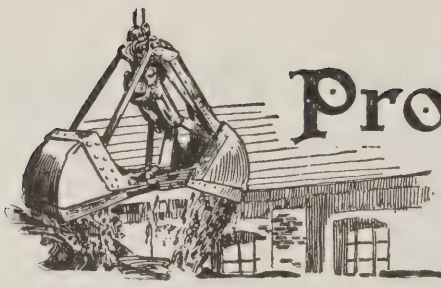
"The second subject to be presented for discussion, that of 'Labor and Its Relation to the Cost of Industrial Coal,' is obviously of vital interest to the manufacturer. As an operator for many years in the non-union fields and as past president of the National Coal Association, Mr. Bradley has a background which well qualifies him to handle this subject."

"The third subject, 'Economic vs. Legislative Solution of the Coal Problem,' presents an opportunity for the broadest sort of discussion. Mr. Cushing has been a student of coal for many years and is conceded to be one of the best speakers among coal men and one of the most original thinkers on the coal problem."

Coal-Investigation Bill Presented in New York Legislature

Albany, N. Y., April 16.—A bill creating a commission to investigate the production, transportation, distribution and prices of coal, and making an appropriation of $25,000 therefor, was introduced in the New York Legislature today by Assemblyman W. W. Campbell, of Schenectady.

The measure provides that the commission "shall investigate the quantity and kind of coal presently available and to be available in the future for the use of the people and industries of this state, the estimated amount of coal, of the several sizes and kinds, to be required for such use, and all matters and transactions affecting the production, transportation and distribution of coal for use in this state and tending to inflate the prices thereof, together with ways and means to prevent shortage of coal and excessive prices, to the end that the state, by remedial legislation, recommendations to Congress and otherwise, may take such measures that hereafter there may be a permanent and adequate supply of coal equitably distributed at reasonable prices."



Production and the Market



Weekly Review

Despite the general dullness of the soft-coal market, April so far has been exceptional in the steadiness of price and the quantity of output. Production continues at the rate of 10,500,000 tons per week, even though stocks at the end of the coal year were high for an off-strike year. Some indication of where the coal is going is found in the figures of coal used in coke manufacturing. In March nearly 7,500,000 tons of soft coal were used in the production of coke, both beehive and byproduct, as compared with an average per month in 1922 of 4,500,000 tons of coal. Railroads are consuming some 500,000 tons of coal per week more than a year ago and public utilities are consuming over 3,500,000 tons per month—some 500,000 tons more than in early 1922. Thus the largest users—the railroads, the iron and steel industry and public utilities—are taking more than half the current output of soft coal. There is no excitement in the trade, for this coal is moving forward quietly on current orders and more and more is being tied up on contracts. Kanawha and Fairmont coals have been offered without assigned cars on a basis of about $2.25 per net ton at the mines on railroad contract business.

Price Index Registers Slight Increase

The general status of the soft-coal market remained about the same as last week. *Coal Age* Index on Monday, April 16, was 235, as compared with 233 the previous week, the corresponding average price being $2.84. Price increases in Pocahontas, western Kentucky, eastern Ohio, Pittsburgh and Clearfield sections were offset by declines in southern Illinois, eastern Kentucky, Hocking, Cambria and Somerset.

Production for the week ended April 14 is estimated at 10,500,000 tons. Cumulative production in the calendar year to April 7 was 148,867,000 net tons, an increase of 15,744,000 tons over 1922 and 39,579,000 tons over 1921.

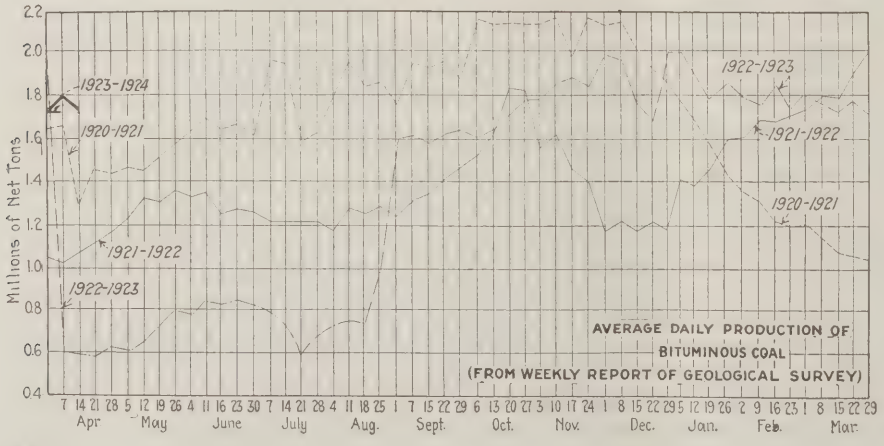
Lack of cars continues to be the principal factor limiting production in many fields, notably in the East. Since the first of the month the roads have ceased to give coal the preference in movement afforded during the winter. Total freight movement is at a record level and the share that is going to coal is decreasing. In the West the lack of market has long since been of more importance than cars. In the Middle West hope for summer operation is being pinned to a good market in the Northwest and among retail dealers. Down East and in the South the record rate of industrial activity is taxing railroads and using coal as fast as it is produced.

Little Export Business Being Closed

Export demand for coal continues quiet. There are some inquiries for July delivery, but little if any business is being closed. Italian gas companies last week asked for bids on upward of 30,000 tons of Youghiogheny or Westmoreland gas coal in competition with British coals. Some shipments on regular business were reported as having been made for South American railroads. Demand for coke was easier, one cargo being reported as having been sold for shipment to Belgium. Dumpings at Hampton Roads during the week ended April 12 were 393,848 net tons, as compared with 400,267 tons the previous week.

Buyers are puzzled over the outlook in New England. Production is ample, but rail transportation is causing apprehension. Rail routes are congested and embargoes were in force last week against the New Haven and the Boston & Maine railroads.

The closing of mines in union districts on Eight-Hour Day, April 2, reduced production on that day to about 42 per cent of the average of recent Mondays. The estimated total of coal raised during the week April 2-7 is 9,725,000 net tons, and the indicated daily average output for the week of 5.42 days is 1,794,000



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
March 24	11,448,000	10,424,000
March 31 (*b*)	10,469,000	10,430,000
April 7 (*a*)	3,835,000	9,725,000
Daily average	639,000	1,794,000
Calendar year	133,123,000	148,867,000
Daily av. cal. year	1,613,000	1,800,000
ANTHRACITE		
March 24	2,095,000	2,126,000
March 31	1,896,000	2,008,000
April 7	9,060	1,602,000
Calendar year	21,786,000	27,470,000
COKE		
March 31 (*b*)	191,000	388,000
April 7 (*a*)	175,000	427,000
Calendar year	1,983,000	5,137,000

(*a*) Subject to revision. (*b*) Revised from last report.

tons. The present week, April 9-14, opened with 38,188 cars loaded on Monday and on each of the next three days loadings were between 30,000 and 31,000 cars. The total output for the week probably will be about 10,500,000 net tons, says the Geological Survey.

Anthracite domestic sizes continue to move in good volume but not sufficiently to enable retail dealers to take care of their customers' orders. The steam sizes are dragging and some producers have found it necessary to offer inducements to keep them moving.

Midwest Conditions Unsatisfactory

Throughout the Midwestern region some domestic coal is still selling, due to chilly weather and also because of the transportation difficulties in getting Pocahontas and other Eastern domestics into Indiana and Illinois. Household trade in coal for next winter has not begun though retailers say there is more interest in "buy now" than there normally it at this time of year.

The middle sizes of Indiana and Illinois coal are dragging badly and choking up the lines with unbilled cars. On its Illinois lines alone the Burlington road during the week carried approximately 1,000 cars a day of no-bills. Most mines in those two states which depend to any extent upon spot market worked two days and numbers of them were shut down for the time being.

In southern Illinois several mines have been idle on account of a strike of the line men with the principal power company. Some mines in the Mt. Olive field have worked but two or three days during the last month. Equipment furnished is hopper-bottom that the country dealer cannot unload, and added to that the price is high, so that business in that field is almost at a standstill. In the Standard field there is little change from last week. The demand is not quite so good and railroad tonnage has fallen off. Car supply has been a little short at some points, but seems to be ample for the demand.

St. Louis Business Is Slow

Warmer weather eased up the domestic demand in the St. Louis market. Deliveries of anthracite became good during the week for the usual spring storage, but it is earlier this year than ordinarily. Wagonload steam has been good, but carload is slow.

Country domestic trade is almost at a standstill and country steam has not responded for the past two or three

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

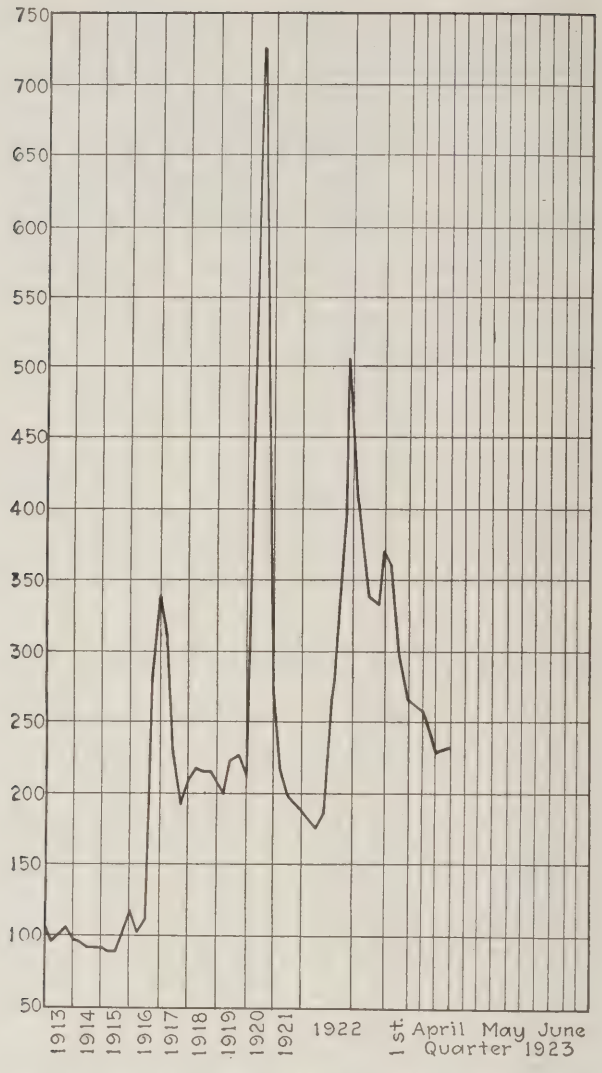
	Market Quoted	Apr. 17 1922	Apr. 2 1923	Apr. 9 1923	Apr. 16 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$2.85	$6.85	$6.25	*$6.00@$6.25*
Smokeless mine run	Columbus	1.90	4.25	4.25	4.00@ 4.50
Smokeless screenings	Columbus	1.40	4.25	3.75	**3.75@ 4.25**
Smokeless lump	Chicago	2.50	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	1.65	3.75	3.75	3.50@ 4.00
Smokeless lump	Cincinnati	2.35	6.25	6.00	**6.25@ 6.50**
Smokeless mine run	Cincinnati	1.70	4.00	3.85	**4.00@ 4.50**
Smokeless screenings	Cincinnati	1.60	3.85	3.85	**4.00@ 4.25**
*Smokeless mine run	Boston	4.75	6.10	6.25	**6.10@ 6.50**
Clearfield mine run	Boston	2.15	3.05	2.90	**2.40@ 3.50**
Cambria mine run	Boston	2.55	3.85	3.75	*3.25@ 4.10*
Somerset mine run	Boston	2.25	3.50	3.35	3.00@ 3.75
Pool 1 (Navy Standard)	New York	3.40	4.10	4.00	3.50@ 4.50
Pool 1 (Navy Standard)	Philadelphia	3.15	4.30	4.10	*3.80@ 4.20*
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.25	3.50	3.35	*3.00@ 3.50*
Pool 9 (Super. Low Vol.)	Philadelphia	2.75	3.50	3.30	*3.00@ 3.50*
Pool 9 (Super. Low Vol.)	Baltimore	.....	3.50	3.25	3.25
Pool 10 (H.Gr.Low Vol.)	New York	2.75	2.90	2.85	*2.35@ 3.00*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	.....	3.00	2.80	*2.45@ 2.85*
Pool 10 (H.Gr.Low Vol.)	Baltimore	.....	3.25	2.90	2.90
Pool 11 (Low Vol.)	New York	2.75	2.50	2.50	*1.90@ 2.75*
Pool 11 (Low Vol.)	Philadelphia	2.25	2.50	2.40	*2.05@ 2.45*
Pool 11 (Low Vol.)	Baltimore	2.75	2.35	2.25	2.25
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	2.90	2.40	2.30	*1.85@ 2.25*
Pool 54-64 (Gas and St.)	Philadelphia	2.15	2.30	.....	*2.10@ 2.35*
Pool 54-64 (Gas and St.)	Baltimore	2.90	2.40	2.25	2.25
Pittsburgh sc'd gas	Pittsburgh	.....	3.35	3.00	**3.00@ 3.25**
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	2.25	2.00	**2.50@ 2.60**
Kanawha lump	Columbus	2.30	4.25	4.00	*3.50@ 4.00*
Kanawha mine run	Columbus	1.60	2.75	2.50	*2.00@ 2.50*
Kanawha screenings	Columbus	1.50	2.30	2.35	*2.15@ 2.50*
W. Va. lump	Cincinnati	2.00	3.50	3.60	*3.25@ 3.75*
W. Va. Gas mine run	Cincinnati	1.75	2.75	2.60	*2.25@ 2.50*
W. Va. Steam mine run	Cincinnati	1.90	2.50	2.35	2.25@ 2.50
W. Va. screenings	Cincinnati	1.70	2.10	2.35	*2.00@ 2.35*
Hocking lump	Columbus	2.65	3.50	3.00	2.75@ 3.25
Hocking mine run	Columbus	1.75	2.35	2.10	2.00@ 2.25
Hocking screenings	Columbus	1.50	1.90	1.75	*1.50@ 1.75*
Pitts. No. 8 lump	Cleveland	3.40	2.90	2.90	**2.25@ 3.75**
Pitts. No. 8 mine run	Cleveland	$2.35	$2.25	$2.20	**$2.15@$2.35**
Pitts. No. 8 screenings	Cleveland	2.20	2.00	2.00	*1.85@ 2.05*
Midwest					
Franklin, Ill. lump	Chicago	3.30	3.85	3.85	3.85
Franklin, Ill. mine run	Chicago	2.75	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	2.75	2.05	2.05	*1.90@ 2.00*
Central, Ill. lump	Chicago	.....	3.10	2.75	2.65@ 2.90
Central, Ill. mine run	Chicago	.....	2.60	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.60	1.60	*1.50@ 1.65*
Ind. 4th Vein lump	Chicago	3.15	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	2.50	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.25	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	2.60	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	2.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.40	1.55	1.55	1.50@ 1.60
Standard lump	St. Louis	.....	2.60	2.50	2.50
Standard mine run	St. Louis	.....	2.10	1.85	1.75@ 2.00
Standard screenings	St. Louis	.....	.95	1.10	1.10
West Ky. lump	Louisville	2.35	2.50	2.50	2.25@ 2.75
West Ky. mine run	Louisville	2.00	1.85	1.85	**2.00@ 2.25**
West Ky. screenings	Louisville	1.90	1.75	1.75	**1.85@ 2.15**
West Ky. lump	Chicago	.....	2.85	2.85	*2.50@ 2.75*
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.50	2.50	2.50
Big Seam mine run	Birmingham	1.70	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	3.85	3.85	3.75@ 4.00
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.25	4.25	4.00	*3.50@ 4.25*
S. E. Ky. mine run	Louisville	1.75	2.85	2.80	*2.50@ 3.00*
S. E. Ky. screenings	Louisville	1.55	2.40	2.50	*2.15@ 2.75*
S. E. Ky. lump	Cincinnati	2.15	3.75	3.50	3.25@ 3.75
S. E. Ky. mine run	Cincinnati	1.90	2.60	2.50	*2.00@ 2.50*
S. E. Ky. screenings	Cincinnati	1.65	2.10	2.35	*2.00@ 2.35*
Kansas lump	Kansas City	4.25	4.50	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.00	3.50	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.50	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	April 9, 1923 Independent	April 9, 1923 Company	April 16, 1923† Independent	April 16, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.25@$10.00	8.00@ 8.35	**$8.50@$10.50**	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.25@10.00	8.00@ 8.35	**8.50@10.50**	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.25@10.00	8.00@ 8.35	**8.50@10.50**	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.50	6.00@ 6.30	6.30@ 7.50	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.50@ 3.25	3.50@ 4.15	**2.50@ 3.50**	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.50	3.50	3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	2.00@ 2.50	2.50	*1.75@ 2.50*	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.50	2.50	2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50	1.50	1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type,** declines in *italics.*



Coal Age Index 235, Week of April 16, 1923. Average spot price for same period $2.84. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

weeks. Indications are that there will be a light tonnage of anthracite available of this territory and gas-house and byproduct coke are reported as sold up until June 1.

Louisville Dealers Do Not Stock

Lake movement is slow in development, due to ice, late opening and the fact that the Lake buyers are opposed to paying prices as now quoted. While industrial demand is fair and some retailer demand in sight, the retailers are slow in stocking, as there is practically nothing to warrant an advance in the markets for some weeks to come.

Railroad consumption is heavy and the manufacturers of building supplies are operating at capacity.

Northwest Trade Is Quiet

Shipments from the Duluth docks fell off in March, only 10,826 cars going out. This compares with 13,966 cars in February and 21,249 cars in March last year. The falling off is opportune, as there are only about 700,000 tons of coal on the docks now, of which not more than 300,000 is free. Youghiogheny and Hocking lump were gone entirely as are also Pocahontas lump and mine-run. There is some Pocahontas screenings and a large amount of bituminous screenings left.

Mild weather for a few days lulled the Milwaukee coal market almost to sleep. The dock yards are well cleaned up, but enough coal is coming by rail and carferry to supply all demands. Jobbers are looking forward to a season of keen competition when navigation opens, because operators want to force an early movement of coal.

As Western Markets Sag, Prices Fluctuate

With an almost complete end to the demand for domestic sizes, mines through Kansas, Arkansas, Missouri and Oklahoma are closing rapidly. Few mines are open in Arkansas. Naturally, with such conditions, there is considerable price slashing.

In Colorado the dollar-off spring storage prices are beginning to move both lignite and bituminous to dealers' yards. Bituminous moves at $5 for lump and $4.50 for nut. This is 50c. under the price at this time last year. Good lignite lump goes at $3. Even these comparatively low prices are being undercut $1 in Denver by a little bituminous from Hanna, Wyo.

In Utah the market is soft indeed for everything produced and several mines have shut down. The average working time for the state during the week was 30 per cent. Prices fluctuate wildly.

Smokeless Features Cincinnati Market

The one bright spot in the Cincinnati market is the smokeless coal situation, advances having been scored during the past week on the prepared coals, due to the fact that most of the Pocahontas producers have all the business they can handle. The Lake situation has not cleared up to any appreciable degree, each rumor of sales casting a different complexion on the situation. The premiums that had been asked for byproduct coal have been pretty well wiped out in so far as spot coal is concerned. Nor does there appear to be much inquiry for future supplies or any deals on a contract basis. Rejections were reported as numerous, throwing more coal on the open market.

The chief feature of the Columbus market was weakness in all grades, but more principally in mine-run and prepared sizes. Buying was restricted largely to current needs. Contracting for steam tonnage attracted some attention, but many users have not yet closed up. In the meantime they are using up reserves which were accumulated in the past few months. Business is expected to be dull until the Lake season gets in full swing, which may be much later than was generally expected. A considerable Lake tonnage has been contracted for and prices are said to be generally good.

Surplus Fuel Disappears in Eastern Ohio

During the past week the surplus fuel around Eastern Ohio markets disappeared and there was little or no distress coal about. Demand picked up somewhat and inquiries were received on contract requirements. Contracting has not yet assumed any appreciable proportions because of price differences, and the closing of many contracts is being deferred awaiting stabilization of market conditions. During the week ended April 9 the lower Lake ports dumped 125,000 tons of cargo coal and in addition to this the boats took 10,000 tons of fuel.

In northern West Virginia the railroads have not been offering more than $2 to $2.25 for railroad fuel contracts and many operators have declined to sign at that figure owing to the fact that the Lake season should open soon, and then better prices may be obtained. Tidewater shipments are not so large and coal is being retarded in transit as a result of congestion at Curtis Bay and other piers. Some of the larger companies have their coke output sold up for April and May.

Pittsburgh Steam-Coal Mines Close

In the Pittsburgh district additional steam coal mines are closing, following the closing in the past few weeks of a number of mines in the Connellsville region. Practically no steam-coal contracts have been made for the coal year and only a few gas-coal contracts, but there are regular understandings whereby shipments are made and the price is adjusted at intervals.

There was no improvement noted in the Buffalo situation, though it was reported that there was not so much coal on track as a short while back.

Outlook Puzzles New England Buyers

Buyers in New England are puzzled over the outlook. The rail routes into New England are now heavily congested, available motive power considered, and the first half of April will doubtless show a material drop in receipts at the Hudson River gateways. Embargoes are now in effect against both the New Haven and the Boston & Maine, leaving the Boston & Albany the only line open at this writing.

A few stray cargoes of British coal were still being received for locomotive use, but the trade understands that this source of supply has now diminished to a point where it is practically negligible. There was still congestion at Boston and at Providence, especially at railroad berths, but fewer arrivals probably will be the means of clearing up this particular situation.

There continue to be ample supplies of navy acceptable coal on wheels at the Virginia terminals. Dispatch is excellent, but the spot market suffers from inadequate buying. Prices have not receded quite as expected, but most interests feel the trend is lower.

All-rail territory is being closely canvassed for spot business. Only a small proportion of mines in the central Pennsylvania districts have business ahead and quotations continues to sag. A few high-grade coals are still commanding a range of $3.50@$3.75 per net ton, but even these mines have few orders in hand and are being operated only from week to week.

Better Feeling Pervades New York Market

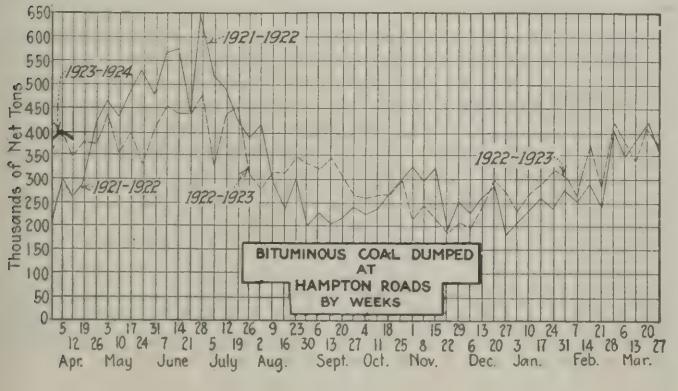
There was a better feeling in the New York market. Inquiries were more frequent, but actual buying was slow. Consumers are more particular as to the quality of coal purchased. The Philadelphia market was extremely draggy. There are no signs of heavy stocks around industrial plants and no amount of urging would induce consumers to take in coal. Some producers look for a decided change for the better about June 1.

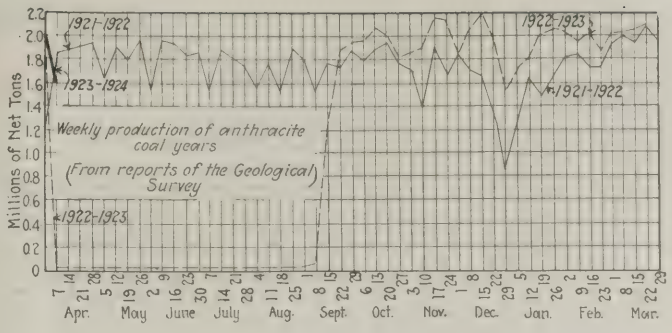
The demand at Baltimore was not heavy and contracts have not been closed in such volume as was hoped for.

The steam trade at Birmingham, Ala., remained quiet. Domestic sizes were in good demand, as the principal producers are pretty well sold up and there is ample spot business offered to take the tonnage above contracts on hand. Production for the week ended March 31 reached 416,000 tons, as reported to the Alabama Mining Institute. The output for the quarter ending with March was 5,017,000 tons.

Demand for Anthracite Continues Strong

Producers have no difficulty in moving their anthracite domestic coals. Demand continues strong and retail dealers could handle larger tonnages. Consumers are anxious to fill their bins for next winter. In the New York market the steam sizes are causing a little trouble, but so far not sufficient to make it necessary to send them to the storage yards. In Philadelphia the most wanted size is chestnut. The Baltimore situation is comparatively easy. During last week more than 250 cars were reported as





received. Consumers are being urged to lay in their next winter's coal.

"The observance of Eight Hour Day—April 2—as a holiday at the anthracite mines," says the Geological Survey, "was responsible for complete suspension of work, and production declined sharply in the week ended April 7. Using as a basis the 30,637 cars reported as being shipped by the anthracite carriers, the total output was estimated at 1,602,000 net tons, a decrease of 20 per cent over the week preceding. This suspension on Monday was not responsible, however, for the entire loss, as shipments did not reach normal until Thursday. The corresponding week in 1922 witnessed the outbreak of the miners' strike and production was but 9,000 tons.

"The cumulative output during 1923 to date now stands at 27,470,000 net tons, an increase over the corresponding period of 1922 of 5,684,000 tons, or 26 per cent."

Coke Production Rebounds

The production of beehive coke during the week ended April 7, says the Geological Survey report, showed a gain of 39,000 net tons over the preceding week, or 427,000 tons as compared with 388,000 tons the previous week. The increase was principally in Pennsylvania and small gains also were shown in the Southern Appalachian region.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Mar. 31, 1923 Inclusive	Week Ended Mar. 31, 1923
U. S. Total	55 7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	27.8	33.1
Panhandle, W. Va.	51.3	57.3	55.3	53.8
Westmoreland	58.8	65.8	53.7	49.2
Virginia	59.9	55.7	54.7	61.1
Harlan	54.8	22.1	22.2	23.0
Hazard	58.4	16.4	20.9	30.7
Pocahontas	60.0	36.6	37.9	38.8
Tug River	63.7	28.8	34.8	41.3
Logan	61.1	26.2	31.1	34.2
Cumberland-Piedmont	50.6	31.7	46.7	51.7
Winding Gulf	64.3	30.4	33.9	36.4
Kenova-Thacker	54.3	42.4	32.1	(a)
N. E. Kentucky	47.7	28.4	28.2	(a)
New River	37.9	31.6	35.6	43 1
Oklahoma	59.6	59.1	44.2	53 0
Iowa	78.4	75.9	80.1	92 9
Ohio, Eastern	46.6	40.8	34.8	38 8
Missouri	66.8	76.3	78.1	85.8
Illinois	54.5	49.9	48.2	40.7
Kansas	54.9	55.9	47.6	39.3
Indiana	53.8	37.7	52.7	45.1
Pittsburgh†	39.8	41.2	33.2	37.7
Central Pennsylvania	50.2	53.4	45.3	42.8
Fairmont	44.0	35.5	35.9	33.7
Western Kentucky	37.7	32.4	32.7	31.4
Pittsburgh*	31.9	56.1	59.2	45.0
Kanawha	13.0	15.6	22.6	26.6
Ohio, Southern	24.3	38.1	32.5	29.6

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended March 31, 1923	938,725	182,668
Previous week	917,036	185,062
Same week in 1922	821,808	185,521

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
March 28, 1923	14,196	3,785	68,986	29,281
March 21, 1923	12,741	4,111	71,443	29,915
Same date in 1922	206,746	72,566	.....	.....

Foreign Market And Export News

Holiday Reduces British Coal Production; Canada Enters Market

There were 4,874,000 tons of coal produced in Great Britain's mines during the week of March 31, according to a cable to *Coal Age*. The week included Good Friday with in most cases a holiday on the succeeding day, leaving virtually four working days in the week. The previous week's production was 5,703,000 tons.

The Welsh market is exceptionally busy satisfying Continental demand, and for the next two months the mines have heavy orders ahead. The main directions of export continue to be France and Italy, especially the latter, where the current rate of export is creating a record. During the past few days Canada has been asking for substantial quantities of Welsh coal.

Most of the north English mines are booked up until the end of June. Owing to political events in Germany, Belgium, France and Germany are showing less keenness to buy. The German State Railways inquired for 50,000 tons of Northumberland and Durham coal for shipment in April and May.

Coal exports officially reported from London for the weeks ended April 6 and April 13, were, in tons:

	April 6	April 13
South Wales District	32,485	.....
Newcastle (Tyne) district	3,783	1,140
Mersey	6,784	.....
Clyde	.....	4,700

Slight Dullness at Hampton Roads

Reduction in export business, with a slight slump in bunkers, caused dullness in the Hampton Roads market last week. Stocks continued to pile up at the piers, with a consequent drop in prices. The slump was regarded by the trade, however, as temporary.

Shipments to France continued on a small scale, indicating better business of this character later. Some bunker business was obtained for transatlantic vessels which put in here en route from New York, because of the coal handlers' strike there.

Coastwise trade was holding up fairly well. In the domestic trade preparations were being made for the advent of warm weather and the natural decline in business. The tone of the market was only moderately strong.

Export Clearances, Week Ended April 7, 1923

FROM HAMPTON ROADS

	Tons
For Canada:	
Amer. Schr. James M. W. Hall, for Hamilton	826
For Canal Zone:	
Amer. SS. Ancon, for Cristobal	9,800
For Colombia:	
Amer. Schr. Jacob W. Hook, for Cartagena	925
For France:	
Br. SS. Berwindvale, for Dunkirk	7,700
Br. SS. Rothley, for Havre	6,241
For Germany:	
Nor. SS. Aagot, for Emden	5,398

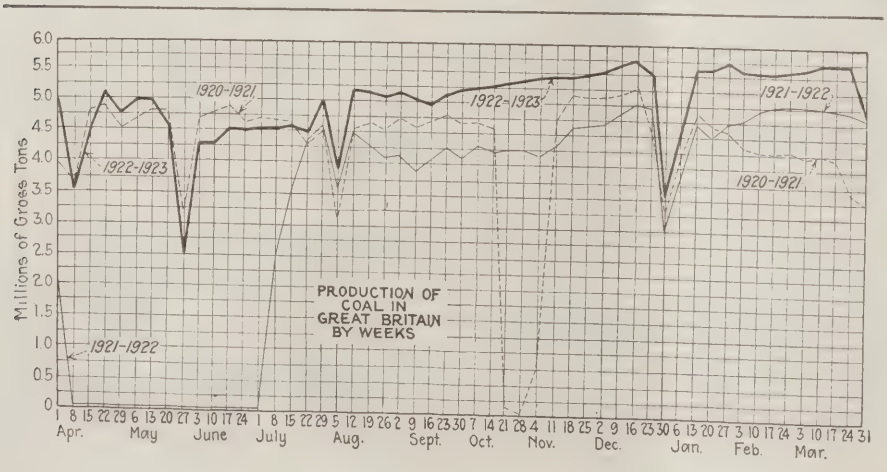
FROM PHILADELPHIA

For Belgium:	
Swed. SS. Kiruna, for Ghent	..
Dutch SS. Helena, for Antwerp (coke)	..
For France:	
Br. SS. Kenilworth, for Dunkirk (coke)	..
Fr. SS. La Perouse, for Dunkirk (coke)	6,124

United States February Coal Exports by Customs Districts

(In Gross Tons)

	Anthracite	Bituminous	Coke
Maine and New Hampshire	1	.....	185
Vermont	1,136	1,419	1,085
St. Lawrence	97,929	150,077	2,811
Rochester	2,767	41,102	1,000
Buffalo	219,233	342,881	39,495
New York	2,561	880	1,226
Philadelphia	6,184	5,468	783
Maryland	.....	6,346	548
Virginia	.....	49,838	.....
South Carolina	.....	7,382	.....
Florida	.....	.....	210
Mobile	.....	446	4,434
New Orleans	1	1,216	572
San Antonio	152	.....	.....
El Paso	20	1,731	1,011
Arizona	3	2,063	4,038
Los Angeles	18	35	.....
San Francisco	.....	447	19
Washington	2	2,204	.....
Dakota	186	8,426	4,013
Duluth and Superior	8	5,347	5
Michigan	150	177,790	9,456
Ohio	.....	866	92
Porto Rico	.....	9	6
Totals	330,351	805,973	70,989



Denmark's 1922 Fuel Importations

There were imported into Denmark during 1922, according to a report received by the Department of Commerce at Washington from Chargé d'Affaires P. L. Cable, 2,839,000 tons of anthracite and briquets as compared with 2,093,000 tons in 1921, and 794,000 tons of coke and cinders, as compared with 469,000 tons in the previous year.

Practically all of the coal imported in 1922 came from Great Britain; Germany supplied about 12,600 tons of anthracite, and the United States 121 tons. In addition to the coal and coke imports there were received into the country 76,000 tons of illuminating paraffin, 52,000 tons of petrol and 75,000 tons of other non-dutiable fuel oil.

United States February Coal Exports

(In Gross Tons)

Coal:	Feb., 1922	Feb., 1923
Anthracite	274,905	330,351
Bituminous	813,587	805,973
Exported to:		
France	3,785	.....
Italy	7,414	9,353
Netherlands	2,537	.....
Other Europe	3,893	.....
Canada	660,796	730,112
Mexico	5,254	4,301
Br. W. Indies	12,994	3,185
Cuba	50,101	55,511
Other W. Indies	437	209
Argentina	4,054	.....
Brazil	16,920	.....
Chile	6,889	.....
Egypt	21,401	.....
Fr. Africa	13,518	.....
Other countries	3,594	3,302
Coke	31,534	70,989

Hampton Roads Pier Situation

N. & W. piers—Lamberts Pt.:	April 5	April 12
Cars on hand	2,074	1,530
Tons on hand	133,348	99,747
Tons dumped for week	123,401	138,901
Tonnage waiting	18,150	30,000
Virginian y. piers, Sewalls Pt.:		
Cars on hand	1,145	1,646
Tons on hand	63,367	94,940
Tons dumped for week	153,255	94,582
Tonnage waiting	1,261	2,312
C. & O. piers, Newport News:		
Cars on hand	2,915	2,570
Tons on hand	152,735	135,335
Tons dumped for week	80,726	118,168
Tonnage waiting	1,605	1,050

Pier and Bunker Prices, Gross Tons

PIERS

	April 7	April 14†
Pool 9, New York	$6.20@$6.75	*$6.25@$6.65*
Pool 10, New York	5.50@ 6.00	5.50@ 6.00
Pool 11, New York	4.75@ 5.50	*4.50@ 5.50*
Pool 9, Philadelphia	6.45@ 6.90	*6.35@ 6.80*
Pool 10, Philadelphia	5.55@ 6.00	*5.45@ 5.85*
Pool 11, Philadelphia	4.60@ 5.00	*4.50@ 4.90*
Pool 1, Hamp. Roads	6.25	*6.00@ 6.25*
Pools 5-6-7 Hamp. Rds.	5.70	*5.50*
Pool 2, Hamp. Roads	6.25	*6.00@ 6.25*

BUNKERS

Pool 9, New York	6.50@ 7.05	*6.55@ 6.95*
Pool 10, New York	5.80@ 6.30	5.80@ 6.30
Pool 11, New York	5.05@ 5.80	*4.80@ 5.80*
Pool 9, Philadelphia	6.75@ 7.00	*6.65@ 6.90*
Pool 10, Philadelhia	5.80@ 6.35	*5.70@ 6.25*
Pool 11, Philadelphia	4.85@ 5.30	*4.75@ 5.20*
Pool 1, Hamp. Roads	6.35	*6.25*
Pool 2, Hamp. Roads	6.35	*6.25*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	April 7	April 14†
Admiralty, large	37s.6d.@40s.	**40s.**
Steam, smalls	30s.	30s.
Newcastle:		
Best steams	35s.	35s.
Best gas	35s.	**33s.@35s.**
Best bunkers	32s.@36s.	*32s.6d.@35s.*

† Advances over previous week shown in **heavy** type; declines in *italics*.

News Items From Field and Trade

ALABAMA

A temporary order was granted April 7 by Judge William I. Grubb, in the U. S. District Court at Birmingham **restraining the United Mine Workers from interfering by picketing or otherwise with the operation of the Beltona mine of the American Fuel Co.**, which alleged in petition to the court that it is engaged in supplying coal for trains operating in interstate traffic. The bill of complaint set forth that pickets "by force, threats of violence, jeers and other offensive conduct" prevented miners continuing in employment or accepting employment by the coal company and that such action had lessened the output of the mine to such an extent that its contracts with the Louisville & Nashville R.R. had been seriously interfered with. The order is directed against the national organization, district No. 20, and its officers, Beltona local and its officers and several individuals, including two district organizers. No date has been fixed for a hearing in the matter. The order is effective for ten days. Three hundred union miners employed at the mine have been on strike three weeks.

Deals are pending involving a consideration of $13,000,000 or more whereby developed and undeveloped coal properties in the Birmingham district will change hands if consummated. New York and Pittsburgh interests are said to be negotiating for the purchase of extensive mining interests, including a large acreage of undeveloped lands in Walker and other counties controlled by L. B. Musgrove and associates, the consideration reported as being around $3,000,000. Other interests are negotiating for the purchase of plants and equipment and coal tracts of two of the larger independent commercial companies, which it is stated will involve a consideration around $10,000,000. If the deals go through, the new owners contemplate extensive improvements and enlargements, including possibly byproduct coke ovens. Definite information is yet unavailable but deals are reported progressing satisfactorily.

CONNECTICUT

Bridgeport retail dealers have announced **a cut of $1 per ton in the prices of domestic sizes of anthracite.** They will sell for $15,50 per ton with pea coal at $14.

ILLINOIS

The Egyptian Coal & Mining Co., with two large mines at Marissa, capable of producing 2,500 tons daily are now sales agents for the entire output of the Nashville Mining Co. mine at Nashville. The maximum output for this mine is 1,000 tons a day.

Arthur Ratcliffe is drilling for No. 1 vein coal five miles west of Geneseo, with the idea of opening a wagon mine, on a cement highway connecting Geneseo and Moline.

Loss of approximately $6,000 was sustained by the Black Star Coal Co. recently when a group of houses belonging to the company was totally destroyed by fire. Miners in the employ of the company were living in the houses at the time and the loss is said to have been only partly covered by insurance.

The O'Gara Coal Co. has called a special meeting of stockholders to be held April 28 to vote on the plan **to increase the capital stock** from $6,000,000 to $16,000,000.

Articles of incorporation have been issued to the **West Side Coal Co.**, of Danville. Capital stock is listed at $25,000 and the incorporators are Al. L. Delvalley, A. J. Delvalley and Joseph F. Skelton. The company will engage in the mining of coal, fireclay, ores, metals and minerals.

Recent reports on the **Kathleen mine**, at Dowell, controlled by the Union Colliery Co., of St. Louis and Chicago, indicate that the mine **is being developed at a rapid pace.** The output of the plant has increased steadily until it now averages in the neighborhood of 4,000 tons daily. The company recently completed a 500-ft. drive through a solid rock fault and is now running entries on the other side of the fault. The output of the mine is expected to reach 8,000 tons some day.

The Illinois Central R.R. is contemplating the construction of a third track between Duquoin and Centralia to take care of the ever increasing coal traffic over that division. At the present time a third track is maintained between Du Bois and Duquoin, but the completion of the track into Centralia would facilitate the handling of the heavy tonnage immensely.

W. C. Schroeder, who has been Chicago sales manager for the Union Colliery Co. of St. Louis, Mo., leaves that company May 1. He is not yet ready to announce a future plan now taking form. Mr. Schroeder was a man of ripe experience in selling midwestern coals through Iowa before he went into the bigger selling field centering at Chicago, where he did a great deal to make well known the name of Kathleen coal produced and sold under the direction of Eugene McAuliffe, then president of the Union Colliery Co. This coal will hereafter be handled in Chicago territory by the Sheridan Coal Co.

INDIANA

Bids for 30,000 tons of coal were opened by the Ft. Wayne board of works recently. Eighteen firms were represented by the bids which range from $1.45 to $2.75 per ton. The contracts call for a regular weekly shipment from May 1 of this year to April 30 of next year. All bids were taken under advisement, the board members deciding that samples of the coal be submitted for their consideration. It is probable that the contract will be awarded soon.

Sealed proposals for approximately 7,500 tons of coal for the Auburn light and power plant were opened by the Auburn City Council recently. Thirty-three firms submitted bids. Any one of the estimates submitted will save the city at least $1 a ton, or nearly $8,000 for the year's supply. Proposals varied from $2 per ton for Indiana fourth vein (freight rate $1.83 a ton) to $3.40 per ton for Hazard No. 4 mine run (freight rate $2.90). The bids submitted will be considered soon.

The Calora Coal Co., with offices in Terre Haute, **has gone into the hands of a receiver** following a suit in the Superior Court of Vigo County by Mrs. Martha J. Jones, widow of the company's president, for settlement of account. John T. Reed, manager of the Indiana Refining Co., was appointed receiver and is ordered to sell all or any part of the property necessary to meet the demands of the creditors.

Considerable preparation is being made for the **Indiana coal traffic case**, to be heard soon before the Indiana Service Commission. The case affects the rates on Indiana mined coal for intra-state shipment. Cities in various sections of the state are compiling data which are being turned over to the Indiana State Chamber of Commerce, which will present the case through its traffic department.

The Akin-Burton Coal Co. has incorporated to produce and sell coal. Directors are Charles T. Akin, Sedgwick R. Akin and Charles E. Burton. The capital stock of the corporation is $50,000.

KANSAS

When the Jackson Walker Coal Co. closed its mine No. 16, near Pittsburg, **the miners petitioned Governor Jonathan Davis to compel the company to reopen it.** The petition carried the proviso, however, that the Governor should not put the matter before the Industrial Court. After other mines in the district were closed and other miners added their pleas the Governor promised a "personal investigation." Bernard Harrigan, Kansas commissioner for the Southwest Interstate Coal Operators' Association, said: "If the Governor will supply us with the market, we will run the mines." Operators add that the capacity of the mines being kept open is at least 10,000 tons a day more than is now being produced. Among the mines now closed in the vicinity of Pittsburg are Clemens Nos. 20 and 21, Sheridan Nos. 12, 14 and 16, Crowe No. 15, Girard Coal No. 7, Jackson Walker No. 16, Carbon No. 6, United States Nos. 1 and 2, Minden, Mine H; and one Liberal mine. **The Cherokee Coal Co.** within a few days **will close twelve of its mines** in Kansas.

KENTUCKY

The Pioneer Coal Co. of Kettle Island, whose tipple was recently destroyed by fire, has contracted with the Roberts & Schaefer Co., for a screen and loading booms to be installed in the new tipple which is expected to start up soon.

MARYLAND

In a recent issue of *Coal Age* it was stated that the **Equitable Fuel Co.**, Maryland Trust Building, Baltimore, had increased its capital stock to $10,000. **The company's capital has been increased from $20,000 to $30,000**, by the issuance of new stock.

Sealed proposals will be opened by the Superintendent of Lighthouses, Baltimore, at 2 p.m., June 5, 1923, **for furnishing anthracite No. 3 and bituminous steaming coal** for stations and vessels, 5th Lighthouse District, as required during the fiscal year ending June 30, 1924. Information on application.

MINNESOTA

Representatives of the Federal Fuel Distributor have been interviewing representatives of the coal trade in the Twin Cities **to ascertain what could be done to avert further coal shortages.** They interviewed wholesalers and retailers separately and, according to report, obtained some of the family gossip which each side furnishes against the other. They learned that there would be no autumn fuel shortage if the wholesale trade would buy coal earlier in the season, if the consumer would buy a three months' supply at once, and if dealers would buy earlier, thus providing steadier employment for the miners, resulting in more satisfaction and probably lower prices because the mines would be kept longer in operation and railroads would be able to handle coal better in summer than in winter. It was further unearthed that dealers did not buy early because they feared a price drop which might leave them with high-priced coal on which to take a loss. All of which is about as fresh as if it had been deciphered among some of the hierophyphs exhumed with King Tut-Ankh-Amen.

Fargo, N. D., and its sister city across the line, Moorehead, Minn., **are about out of fuel.** Neither city has had hard coal for some time, and now soft-coal substitutes have about reached their bottom—including lignite, briquets and coke.

MISSOURI

Announcement has been made at Bethany, that **a large New York syndicate is considering opening a coal mine at Cainsville** and using the fuel to generate power in that town for a large light and power system.

John Gantner and son, Leonard, have obtained a lease on the Schler farm, three miles southwest of Boonville, where they have unearthed a rich vein of coal.

The City Council of Bethany has announced that **a test of two months will be made with Illinois coal** at the city power plant to determine whether a saving in the fuel bill can be brought about. At present Iowa coal is being used, but no additional contracts will be awarded until the test is made.

NEW JERSEY

The State Board of Taxes and Assessment has **reduced from $1,170,145 to $313,662 the assessment** on personal property levied by the Saddle River, Bergen County, Tax Board **against the Pennsylvania Coal Co.** for 1922. The assessment was levied against coal mined and stored in the Township of Saddle River. The State Board held that the method of assessment followed by the Township Board was erroneous.

Retail dealers in Trenton have **reduced the prices for domestic sizes of anthracite** $1 per ton and 75c. for pea coal, making the prices $13.50@$14 for the larger coals and $11.15@$11.50 for pea coal.

NEW YORK

The Chicago Pneumatic Tool Co. announces that Robert F. Eissler, who, during the past two years, has been assistant to the vice-president, assumed his former position as district manager at Pittsburgh April 1. The appointment was announced of Nelson B. Gatch as assistant to the vice-president, headquarters at New York, succeeding Mr. Eissler. The appointment also was announced of William C. Straub as district manager of New York, to succeed Mr. Gatch, promoted.

In discussing **New York City's investigation of the coal situation** at a meeting of the Board of Estimate, April 12, Mayor Hylan said that if the Walker-Donohue transit bills are passed he will stop the Berwind-White Coal Co. from supplying the city's transit lines with fuel. The discussion that led to these remarks was the debate on a date for the city's hearing and investigation of the fuel situation that was blamed for the inadequate supply and the high prices for coal during the winter. The hearing will be held in the Board of Estimate chamber. The date will not be fixed until after the fate of the Mayor's transit bills is known. Neal J. Ferry, of the miners' union, testified before the board and said the operators were to blame for recent conditions.

The Burns Brothers plan of reorganization is expected to make its official appearance soon. No financing other than the offering of common stock to present holders will be necessary. The plan is said to call for retirement of two classes of preferred in exchange for present class A stock. Class A holders will receive free one share of the new common, which will pay a dividend of $2.50 a year for each share of A stock. In addition present holders will be offered an opportunity to subscribe to the new common at $35, proceeds to be used for retiring present outstanding preferred shares. The additional common shares, paying $2.50 a year, will mean a total return on present A stock of $10.50 a year.

OHIO

The Plainview Coal Co., Cambridge, capital $50,000, has been incorporated by A. V. Ferguson, C. F. Crow, A. T. Saviers, D. M. Wilson and Charles J. Bushdale.

The P. & O. Mining Co. has closed its Cincinnati office and **E. Manning,** who had charge, returned to Louisville, where he will be connected with the **Ballard & Manning Coal Co.**

Bids will be opened May 7 by the Columbus Board of Education for 12,000 tons of run of mine bituminous coal for the public schools for the coming winter. Active bidding is expected on this business.

The City Board of Purchase of Columbus has rejected all bids for 13,000 tons of nut, pea and slack opened recently because they were believed to be too high. Bids on the same tonnage for the municipal light plant, garbage disposal plant and the waterworks department will again be opened May 2.

Acting on an invitation extended by the Cincinnati Coal Exchange, officers of the **Michigan, Ohio and Indiana Retail Coal Dealers Association, will hold their annual convention in the Queen City** and have named May 22, 23 and 24 as being the dates acceptable. B. F. Nigh, secretary of the association, visited Cincinnati last week to make the preliminary arrangements.

The Besola Coal Co., St. Clairsville, capital $25,000, has been incorporated by W. E. Lahm, J. O. Somers, B. H. Beatty, Laura L. Somers and Emma C. Beatty.

PENNSYLVANIA

The Hillman Coal & Coke Co. has ordered 300 55-ton cars from the Standard Steel Car Co. and 300 70-ton cars from the Pressed Steel Car Co. The orders involve about $1,350,000.

H. J. German was elected president of the **Montour Railroad Co.** by the board of directors, effective April 3, 1923.

A six-hour day and minimum pay of $10 a day was predicted for the miners by George Isaacs, vice-president of District No. 1, United Mine Workers, at a mass meeting of miners held in Wilkes-Barre on April 2 in observance of the Eight-Hour Day.

Charged with being responsible for the mine gas explosion at Spangler, Cambria County, in which 77 men lost their lives, **W. H. Young,** superintendent of the Reilly mine, and **O. J. Flanagan,** mine foreman, **have each entered $1,500 bail for trial at court.** The men are charged with involuntary manslaughter. The explosion occurred in November, 1922.

The Judiciary Committee of the State Legislature has **reported affirmatively the Burns bill** giving the Public Service Commission power over the distribution and price of coal in this state. The vote as reported was 11 to 6. Protests against the bill have been made, coal operators contending that it will impose considerable additional expense, inasmuch as it will increase the cost of mining and also the cost to taxpayers.

There were twenty-three "outlaw" strikes in anthracite mines between Dec. 16, 1922, and Feb. 28, 1923, which involved suspension of work by 25,825 men, who lost $732,544 in wages, according to figures just compiled by the Anthracite Bureau of Information. The tonnage lost in the period of inactivity was in excess of 243,000 tons. "In the majority of the cases the cause for the strike was an attempt to enforce union discipline rather than any grievance against the companies," the statement of the operators said. "Under the agreement, all of the disputes leading to these strikes should have been settled by reference to the Conciliation Board."

Bituminous interests joined with the representatives of the anthracite regions to **oppose the Kohler mine-cave bill, the bill compelling coal companies to permit engineers employed by surface owners to enter the mines for the purpose of inspection and a third bill prohibiting the laying of gas pipes over mined-out areas.** A hearing on the bills was held April 10 and Representative Kohler, sponsor of all three measures, fought a lone battle before the House subcommittee of the Mines and Mining Committee. The bills were opposed by P. F. Murphy and G. B. O'Hara, of the Glen Alden Coal Co.; G. P. Gallagher, Lehigh Valley Coal Co.; P. H. O'Brien, Pennsylvania Coal Co., and Edward Griffiths, Lehigh & Wilkes-Barre Coal Co.

The Fowler full-crew bill, introduced in the State Legislature by David Fowler, **is being supported by the so-called anthracite bloc.** It is said they will vote as a unit in favor of the bill to put it on the calendar.

Sealed proposals will be opened by the Superintendent of Lighthouses, Philadelphia, Pa., 2 p.m., May 15, 1923, **for anthracite and bituminous coal,** gasoline, acetylene and acetone for the fiscal year 1924. Information on application.

Production for the six Johnstown mines of the Cambria Steel Co. for the month of March was 222,325 tons, which is the largest tonnage ever produced from these mines in a single month and is 35,000 tons greater than the previous record month, January, 1923. The production of the Slickville mines, in Westmoreland County, for the same month was 61,040 tons, making a combined tonnage for Slickville and Johnstown of 283,365 tons. The mines of the Union Coal & Coke Co., subsidiary of the Midvale Steel & Ordnance Co., located in Washington County, produced 158,743 tons, making a grand total of 442,108 tons for the entire department. J. C. H. Lubken is general superintendent of coal mining operations for the Cambria Steel Co, and the subsidiary concerns. A daily record for the Johnstown mines was made on March 28, when production reached 8,897 tons, and the combined record of 18,004 tons for all the mines was made the same day.

The men at the Lilley Coal & Coke Co., a union mine in Washington County, on the Monongahela River and the Pennsylvania R.R. a short distance below West Brownsville, have been on strike for the past three weeks in violation of their agreement. The trouble was caused by two of their men leaving their employ last autumn to work as union organizers in the non-union Connellsville coke region, and then coming back about three weeks ago and wanting their old jobs back, which were denied them. There is no more sign of a termination of the trouble than when it started, and **the strikers have been ordered by the company to return to work** in accordance with their agreement or vacate the company's houses.

Shipments of anthracite for the month of March, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 7,183,518 gross tons, as compared with 6,778,667 gross tons during the corresponding month last year, an increase of 404,851 tons, or about 6 per cent. Shipments of anthracite have exceeded 7,000,000 tons only six times previous to March of this year, and these were all in the war years of 1917 and 1918, when the washery tonnage was much more of a factor than it is at the present time. The March shipments exceeded those of February this year by 1,231,805 tons, or 20.7 per cent. Shipments by originating carriers were as follows, in gross tons:

	March 1923	February 1923
Phila. & Reading	1,370,476	1,206,538
Lehigh Valley	1,279,599	1,097,351
Jersey Central	622,710	521,430
Lackawanna	1,146,217	957,612
Delaware & Hudson	907,099	629,514
Pennsylvania	542,167	483,466
Erie	818,817	712,210
N. Y., O. & W	192,247	169,176
Lehigh & New Eng	304,186	174,416
Totals	7,183,518	5,951,713

The Bethlehem Steel Co. has absorbed the coal properties of the Midvale Steel & Ordnance Co. with the amalgamation of the steel companies. Thus the Acme, the Marianna and the Hazelkirk mines of the Union Coal & Coke Co., formerly having offices in Bentleyville, are now part of the Bethlehem Mining Co. with offices at Ellsworth.

The Judge Coal Co. of Scranton, with banks containing 1,500,000 tons of coal at Jessup, has recently incorporated with the following officers: Ed. A. Judge, president; Hubert Gordon, secretary; John J. Bolan, treasurer, and George Bell, superintendent.

The Tip Top Coal Co., of Scranton, with an operation at Scotch Valley, Columbia County, has incorporated with the following officers: W. L. Henwood, president; Boyd A. Musser, vice-president; Alfred E. Lester, treasurer; George E. Schultz, secretary, and E. A. Jones, superintendent.

The following companies were incorporated at the State Department, Harrisburg, recently: **Eureka Mining Co.,** DuBois, capital $15,000; James Jones, DuBois, treasurer; William Harringer, James Jones and J. J. Pentz, DuBois, incorporators. **The Miners Powder & Supply Co.,** Latrobe, $10,000; H. L. Donaldson, Ligonier, treasurer; John J. Crumbaugh, Latrobe; S. S. Brownfield and H. L. Donaldson, Ligonier, incorporators. Purpose: Dealing in explosives and mine supplies. **George A. Clark, Inc.,** Hastings; $5,000; George A. Clark, Hastings, treasurer; L. S. Clark and Louise Clark, Cherrytree, and George A. Clark, Hastings, incorporators. **Red Dog Coal Co.,** Pittsburgh; $10,000; incorporators, S. M. Kintner, H. Talbot Peterson and A. J. Loeffler, Pittsburgh.

The Cement Gun Co., Inc., Allentown, **announces the resignation of W. J. Roberts as president** of the company and the election of B. C. Collier to fill the vacancy. Mr. Collier has for several years occupied the position of vice-president and general manager of the company.

The stockholders of the **Glen Alden Coal Co.** at their annual meeting held at Scranton re-elected the following directors: F. J. Platt, F. H. Hemelright, John H. Brooks, J. Hayden Oliver and W. W. Inglis. At the reorganization meeting the following officers were re-elected: W. W. Inglis, president; S. D. Dimmick, vice-president and general manager; George England, secretary-treasurer; James L. Dodson, assistant secretary-treasurer. Mr. Inglis stated after the session that the matter of dividends was not considered by the directors.

The Rochester & Pittsburgh Coal & Iron Co. reports for 1922 gross earnings of $4,297,327; net profit after expenses, depreciation, etc., $556,658, and a surplus after cash dividends of $316,658. The balance sheet as of Dec. 31 last shows cash of $416,751, accounts receivable $4,001,927, accounts payable $3,688,503, profit and loss surplus $1,848,604 and total assets and liabilities of $16,380,763.

Reports from Somerset County, where an attempt was made to call out the non-union miners on strike on April 1, are to the effect that **there has been no drop in production.** The shipments on the last four working days of March were 265, 277, 219 and 168 cars respectively, while on the four first days of April there were 91, 205, 275 and 260 cars, respectively. The low shipment on the first day was due to Easter Monday, when but few of the foreign miners work at any time.

J. C. H. Lubken, retiring head of the Midvale-Cambria mines, was the guest of honor at a farewell gathering held at the Fort Stanwix Hotel, Johnstown, sixty officials and associates in the Cambria Steel Co. attending. Greetings also were extended to the new officials, **T. R. Johns,** manager of the Bethlehem coal mines, and Samuel Steinback, new division superintendent at Johnstown. Frank Horton, superintendent of mines at Johnstown, was toastmaster. Charles Young, mining engineer, T. R. Johns, of Bethlehem, and Mr. Steinback spoke. During Mr. Lubken's service in the Johnstown district he supervised the opening of seven mines, notably the two Rosedale shaft mines.

L. V. Walsh, for about twenty years treasurer and general manager of sales of the Pittsburgh Shovel Co., Pittsburgh, has resigned. **C. B. Steffey,** since 1917 secretary of the company, has been appointed general manager of sales and also retains his office as secretary.

UTAH

There are various reports that Los Angeles capitalists are soon **to develop coal lands around Provo,** county seat of Utah County. A big smelter also may be erected in that county, but details of this enterprise are meager.

VIRGINIA

Suits aggregating approximately $175,000 have been filed by the Norfolk & Western Ry. against four coal concerns with agents in Norfolk, for alleged demurrage due on carloads not released from the railroad tracks within the five-day free period. Beyond that period the railroad claims $2 per car per day. The suits, with their amounts are: Dexter & Carpenter, $1,990; West Virginia Coal Co., $2,183.06; Jewett, Bigelow & Brooks, $46,320; Algonquin Coal Co., $124,012.63.

WASHINGTON

The College of Mines of the University of Washington offers **five fellowships for research in mining, metallurgy and ceramics** in co-operative work with the Bureau of Mines. The fellowships are open to graduates of universities and technical schools who are qualified to undertake research investigations. The value of each fellowship is $810 per year of twelve months beginning July 1. Applications, which should include a copy of the applicant's collegiate record, should be sent to Dean Milnor Roberts, College of Mines, University of Washington, Seattle, not later than May 10.

WEST VIRGINIA

The Lost Creek Coal Co., of Clarksburg and Pittsburgh, has purchased the holdings of the Elk Smokeless Coal Co., owning a large tract of smokeless coal at Holley Junction, near Richwood. The consideration was not made public.

Miners of the Hutchinson Coal Co. are at work again after an unauthorized strike at the Mount Clare mine of the company in Harrison county, the strike growing out of a misunderstanding as to the terms of the new contract.

A death blow is believed to have been dealt to the Sutphin bill, having for its object the repeal of the law creating the West Virginia state police, in the House of Delegates on April 9 when **a motion to take the bill up out of its order** and advance it on the calendar **was decisively defeated** by a vote of 57 to 31. The bill had been before the House Judiciary Committee and was strongly supported by the United Mine Workers as well as by the State Federation of Labor. The miners' organization had counted on having a small margin over the opponents of the bill.

The Atlantic Smokeless Coal Co., whose annual meeting was recently held in southern West Virginia, has increased its capital stock from $250,000 to $300,000.

The Appalachian Power Co., Glenlyn, **is increasing its boiler-plant capacity** in order to keep up with the demand for electricity by the coal mines. Four Westinghouse underfeed stokers will fire four 1,232-hp. B. & W. boilers with Pocahontas coal. The installation will include power-operated dump grates, extension sidewall tuyeres; turbines will drive the stokers as well as the fans while Diamond double chain will transmit power from the turbines to the stokers.

The West Virginia Rail Co., Huntington, has decided **to add another unit to its plant** for the manufacture of frogs and switches, steel mine ties, and steel mine timbers. This addition will enable the company to furnish the mining industry complete track equipment from one point of shipment. This addition will cost in the neighborhood of $250,000 and the company hopes to be in position to make deliveries of this class of material within six months.

The Pan Coal Co. was awarded $25,566 in damages in its suit against the Garland Pocahontas Coal Co. a few days ago in southern West Virginia. A motion to set aside the verdict was taken under advisement by Judge I. C. Herndon. The plaintiff claimed damages in the sum of $100,000, alleging that the defendant had removed 27,000 tons of coal from plaintiff's land and had otherwise damaged the property. The jury decided upon 12,000 tons as the amount taken from the mine and estimated its value at $2 per ton.

The Eagle Island Coal Co. has just finished work on a **steel tipple and 700-ft. conveyor** at Crites, in the Logan field. In order to mine coal from an additional seam in Logan County the **Bengal Coal Co. has constructed a new tipple** at Kistler. The **Draper Eagle Coal Co. is constructing a modern steel tipple** near Logan. **The H. T. Wilson Coal Co.** is another concern in the Logan field which **is enlarging** the scope of its operations, being engaged in sinking a shaft to another vein. **The Island Creek Coal Co.**, one of the largest companies in the state, is now **engaged in opening several additional mines** on the acreage near Whitman. As a result of these improvements as well as through the installation of additional mining equipment, it will be possible to ship more coal than ever from the Logan field if car supply and market conditions are at all satisfactory.

The Riverside Coal Co. has been organized at Morgantown by George W. Simpson and West Virginia parties, with a capital stock of $150,000.

WISCONSIN

Formal announcement is made by **the Central Coal Co.** that it **has sold its coal docks** on the Menomonee River, Milwaukee, and at Escanaba, Mich., **to the Industrial Coal Co.**, of Pittsburgh, Pa. The consideration is given as "more than $500,000." It is said the Industrial Coal Co. is backed by Burns Bros. of New York, and that a $10,000,000 merger of coal interests in Pittsburgh, New York and the Northwest is being promoted. The Central Coal Co. will confine itself to the handling of Illinois coal by rail.

A bill before the Wisconsin legislature which would impose an occupational tax on coal on the docks at receiving points in the state, is being fought. **The bill would put a tax on dock coal but would not affect coal shipped by rail.**

Paul H. Pressentin of the Wisconsin Fuel Administration, **urges dealers to begin a campaign at once for coal orders for delivery when Lake cargoes arrive.** He suggests a system of credits when conditions warrant such action. He holds that cleaner and better coal, with smaller moisture content, will be secured if orders are placed early. Mr. Pressentin warns dealers against brokers who booked their orders during the past season and failed to fill them, or who cut in on their local trade. He says country dealers were at least entitled to a reasonable portion of their orders.

WASHINGTON, D. C.

A collection of samples of anthracite for the U. S. Coal Commission has been gathered by the Bureau of Mines for the purpose of **determining the percentage of coal, bone and slate contained in the supplies arriving at Washington.** Other coal information given out by the bureau includes a report with regard to the coal requirements of the various hospitals of the United States Veterans' Bureau. The Bureau of Mines also is collecting tipple samples at twenty coal mines on government property in Oklahoma.

CANADA

General repairs to approximately 300 lineal feet of the timber superstructure of **West pier** together with minor repairs to other portions of the departmental works at Rondeau, Ont., is to be undertaken during the fiscal year 1923-24. Ten thousand dollars has been allotted for this purpose.

Approximately half of the coal used by the Pere Marquette and Canadian National railways in western Ontario is imported by car ferry and collier in connection with the operations of the Lake Erie Coal Co. and the Marquette & Bessemer Navigation Co. between Rondeau and Conneaut, Ohio. The imports in 1921, consisting largely of coal, amounted to 250,450 tons.

The United Gas & Fuel Co., of Hamilton, Ont., has let contracts for the **construction of a byproduct-coke-oven plant** representing an investment of $2,500 000 to be completed by Nov. 1 which will give employment to 250 men. The plant will be erected by the Hamilton By-Product Coke Oven Co. which has a contract with the Semet-Solvay Co. of Syracuse, N. Y., under which they will be able to adopt the latest designs and processes for the manufacture of coke. The work has been rendered necessary by the decrease in the supply of natural gas, on which the United Gas & Fuel Co. was largely dependent.

News that Hamilton, Ont., is to have a $2,500,000 byproduct coke-oven plant has revived **talk of another oven at Ojibway**, near Windsor, where the Canadian Steel Corporation has spent millions on its steel plant. Completion of the project, it is stated, means another byproduct plant where most of the product will go to feed the blast furnaces, but it is believed there will be a surplus for domestic use.

Floating docks may soon be placed at Prince Rupert. B. C., for the handling of coal shipments from the Cadomin mine section of Alberta. It is stated that 2,000 tons a day will be provided from this field to supply the mercantile demands at the northern provincial port.

Since the disaster of last February in No. 4 mine, Canadian Collieries (D), Ltd., Cumberland, B. C., there have been **a number of prosecutions for infractions of the Coal Mines Regulation Act** by underground workers. In one case a Montenegrin miner was fined $10 and costs for taking into the mine a Wolf safety lamp that had not previously been examined by a competent person. A Chinaman was sent to jail for thirty days for taking underground a key to an electric safety lamp. It is understood that other prosecutions under the act will follow.

The Canadian National Railway is considering the establishment of reduced rates on coal from Alberta in order that the coal can compete with the American product in Ontario and Quebec, according to Sir Henry Thornton, president of the road, in a recent interview at Ottawa. The most advantageous time to bring out coal would be between April and August, Sir Henry declared.

The United Mine Workers of the maritime provinces district have affiliated with the Third Internationale, an envoy having been sent to Russia for that purpose. The district is defying the order of International President John L. Lewis to withdraw from the Internationale.

Recent Patents

Coal-Loading Device. Lester W. Parsons and Charles W. Morgan, Cristobal, Canal Zone, and Albert R. Hussey, Boston, Mass.; 1,435,730. Nov. 14, 1922. Filed March 6, 1920; serial No. 363,910.

Lamp Holder for Miners' Caps. Henson Davis, Roundup, Mont.; 1,435,817. Nov. 14, 1922. Filed Dec. 22, 1919; serial No. 346,447.

Rock Drill. Joseph Beaudry, Philadelphia, Pa.; 1,436,470. Nov. 21, 1922. Filed Oct. 22, 1920; serial No. 418,698.

Take-Up for Skip-Hoist Ropes. Robert H. Beaumont, Radnor, Pa., assignor to R. H. Beaumont Co., Philadelphia, Pa.; 1,436,566. Nov. 21, 1922. Filed Feb. 1, 1922; serial No. 533,213.

Safety Device for Steam Shovels. Lee Trower, Wilkinsburg, Pa.; 1,436,737. Nov. 28, 1922. Filed Jan. 21, 1922; serial No. 530,889.

Carrier Having Gripping Device for Use with Aerial Ropeways. John P. Roe, deceased, London, England, by Lucy J. Roe, executrix, London, England; 1,436,911. Nov. 28, 1922. Filed May 31, 1922; serial No 564,944.

Coal Auger. George E. Williams and J. E. Stultz, Stone, Ky., and R. E. Hill, Roanoke, Va.; 1,437,033. Nov. 28, 1922. Filed Sept. 27, 1920; serial No. 412,917.

Traffic News

The embargo placed by the New York Central R.R. **against** all freight destined to points on or **via the New York, New Haven & Hartford R.R. and Central New England Ry. was entirely cancelled** April 11.

The embargo placed by the Erie R.R. on carload and less carload freight from connections and Erie system stations for or via the D. & H., Binghamton, except livestock, anthracite coal, perishable freight, bituminous coal for railroad supply, field and garden seeds and such other freight as permitted by the D. & H. subsequent to March 2 was **modified April 10** to allow to go forward all freight for delivery at points on D. & H. lines via Binghamton.

On account of accumulation an **embargo was placed** March 31 by the New York Central R.R. against the acceptance of all carload and less than carload freight from all New York Central R. R. stations and from connections at all junctions for points on or via the Boston & Maine R.R. except livestock, perishable freight, Boston & Maine R.R. fuel and supplies and freight consigned to an officer of the U. S. Government.

In order to effect reduction in accumulation of cars for the B. & M. R.R. an **embargo was placed April 7 by the Boston & Maine on all coal, except railroad supply coal**, from and via the Delaware & Hudson Co., New York Central R.R. and Rutland R.R. at all junctions. This embargo automatically expired April 16, 1923.

On account of accumulation **an embargo has been placed by the New York Central R.R. against all shipments of coke** consigned, reconsigned or intended for the **McKinney Steel Co.**, Charlotte, N. Y. Shipments originating principally at Cleveland, Ohio.

The embargo placed by the New York Central R.R. against all freight from connections at 60th or 68th Street, New York City, Weehawken, National Junction or Harsimus Cove, for points on or via the Boston & Albany R.R. **was entirely cancelled April 11.**

To prevent an accumulation the New York, New Haven & Hartford R.R. on April 7 **embargoed all freight coming from the B. & A. and B. & M.** for delivery on bulk (team) tracks of the N. Y., N. H. & H. at Boston, Mass., or in Boston switching district.

Newport News is making a determined effort to obtain lower freight rates on anthracite. The present rates of $4.30 and $4.96 per gross ton to Newport News via the two available routes are higher by 90c. per ton and $1.56 per ton than the corresponding rate in effect to Norfolk and Richmond, Va. It is contended that Newport News is located on the same harbor as is Norfolk and is geographically nearer the coal field and customarily takes the same rates on other traffic as do Norfolk and Richmond. The position of the Richmond interests is not to oppose a rate on anthracite to Newport News which is no greater than the rates they enjoy, but the Retail Coal Merchants' Service Bureau and the Chamber of Commerce of that city have intervened to oppose any order of the commission which might be interpreted by the carriers as justification to increase the Richmond rate.

Colonel T. Q. Ashburn, director of inland water transportation of the War Department, made a recent visit to Minneapolis, Minn., announcing that **the government would institute a barge service between the "Twin Cities" and New Orleans,** to carry freight at 80 per cent of railroad freights. Four oil-burning packets, equipped to carry 160 tons of freight, will be installed in the service by June 15, according to J. S. Brodie, president of the River Transit Co. The contract has been let to the Midwest Boat & Barge Co., of Grafton, Ills., for them. The packets will be steel, stern-wheel, and will carry 100 tons each. Colonel Ashburn is to return to the Twin Cities soon in search of freight for the government barges. The government will use the barges, which have been held by Colonel Goltra, of St. Louis, and were recently ordered seized from Goltra for non-performance of contract.

Rates on coal from certain mines on the Kanawha, Glen Jean & Eastern R.R. to destinations on the Chesapeake & Ohio Ry. and its connections have been **found to be unreasonable.** Any rate exceeding the group rates contemporaneously maintained from branch-line points on the Chesapeake & Ohio in the New River district to the same destinations will be regarded as unreasonable.

No less than three roads, the Chesapeake & Ohio, the Kanawha & Michigan and the Baltimore & Ohio, **seek entrance to the Nicholas County coal field.** The first two have already applied to the Interstate Commerce Commission for a certificate of necessity permitting them to extend their lines into this field. Nicholas County coal lands are largely undeveloped, because of their inaccessibility.

The Interstate Commerce Commission has set May 28 as the date of the hearing in connection with the case of the **Ragland Coal Co. vs. the Virginian Ry.** The hearing will be in Washington before Examiner Hillyer.

Rates on coal from Brookside and Drifton, Ala., to Sloss, Ala., have been found unreasonable to the extent that they exceeded $1 per ton from Brookside and $1.10 from Drifton. The finding was made by the Interstate Commerce Commission in the case of the Sloss-Sheffield Steel & Iron Co. vs. the Director General.

The Interstate Commerce Commission has decided that **rates on buckwheat No. 2 and smaller from the Wyoming field to the Albany district of New York have been unreasonable** and unduly prejudicial. An order has been issued to the N. Y., O. & W. Ry., the D. & H. and the Boston & Maine to desist from present rates on or before July 6 and to establish by that date rates which shall not exceed the rates maintained by the D. & H. from the Wyoming field to the Albany district on its own direct shipments. The West Virginia Pulp & Paper Co. is declared entitled to reparation under the finding.

The Coal, Coke & Iron Ore Committee, Central Freight Association Territory, announces a public hearing 10 a.m., April 26, at the Chamber of Commerce Building, Pittsburgh, Pa., **to consider cancellation, on account of no movement, of rate of $2.39 per net ton on bituminous coal,** carloads, from mines on the Sandy Valley & Elkhorn, Long Fork and Millers Creek Railroads, to stations on the Lorain, Ashland & Southern R.R., Ashland, Ohio to South Amherst, Ohio, inclusive.

Proposed increased rates on coke from Chicago, Peoria and St. Louis to destinations in southwestern Missouri and eastern Kansas have been found by the Interstate Commerce Commission **not to be justified.**

General Superintendent E. L. Bock of the western division of the Chesapeake & Ohio Ry. stated a few days ago that the recently authorized purchase of **2,000 new 70-ton coal cars** will enable the road to materially increase its car supply in the coal fields. Mr. Bock also states that the road Chesapeake & Ohio planning to add materially to its equipment also is engaged generally in rehabilitating the coal cars heretofore in use.

Rates on bituminous coal from points in West Virginia to Elizabethport and Jersey City have been found unreasonable by a Commerce Commission examiner. The attack on the rates was made by the Seaboard By-product Coke Co.

An enterprising coal man, searching the code of West Virginia, has brought to light a statute long overlooked, regulating car supply within the state. A section provides that "It shall be unlawful for any railroad company to engage, directly or indirectly, in the business of buying and selling coal or coke, or to promise, pledge or lend its credit, money or other property or thing of value to another, either natural or corporate, engaged in such business, but nothing herein shall prevent such corporation from purchasing such articles for its own consumption or when it is the owner of any such commodities from selling and shipping the same; provided in doing so, such corporation shall not discriminate in rates, distribution of cars or otherwise and against other shippers of like commodities on its lines . . . Every railroad corporation along whose lines of railroad the industries of mining coal or manufacturing coke is carried on, shall, without discrimination between or against shippers and without unnecessary delay, make a reasonable provision for the transportation of all such coal and coke offered for transportation over its railroad, and no such railroad corporation shall discriminate in rates, distribution of cars or otherwise against or among shippers of coal or coke offered for shipment on its line or lines."

Representatives of the Elkhorn & Hazard Coal Co., appeared before the State Railroad Commission, at Frankfort, Ky., April 12, in a **plea for reduction of rates from the Whitesburg district to points within the state,** holding that rates now in effect prevent competition with some other state fields.

Association Activities

Grand Rapids Coal Dealers' Association

The Grand Rapids Coal Dealers' Association at a recent meeting elected the following officers: President, Isaac VanHeulen; Vice-President, W. J. Breen; Secretary, C. F. Hatch, and Treasurer, A. B. Knowlson.

Obituary

Alexander Dick, general manager of the Dominion Coal Co., Montreal, Canada, died suddenly April 12 in New York of heart disease while seated in restaurant with friends. Mr. Dick was fifty years old.

John Cain, 47, superintendent of the National coal mine, near West Terre Haute, died suddenly at his home early in April of heart trouble.

Horace O. Stone, lawyer, inventor and chief assistant to William H. Taft in the Presidential campaign of 1908, died April 10 after a stroke of apoplexy suffered while he was sitting in the Union League Club, Chicago. Mr. Stone was born in the Kalamazoo County, Michigan, in 1852. He invented a glass device to prevent damage by freezing of water in engines, methods of producing coke from poor coal and methods of effecting saving in blast furnaces.

Catesby Woodford, 74 years of age, Paris, Ky., prominent as a big coal land owner on the Hazard field, and more prominent as owner, breeder and racer of thoroughbred horses, died at his winter home at Fort Meyer, Fla., on April 8, the remains being taken to Lexington for interment. "Raceland," his Kentucky home at Paris, was one of the finest estates in Kentucky.

Coming Meetings

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting May 23 and 24 at Wilmington, Del. Secretary, W. M. Bertolet, Reading, Pa.

American Association of Mechanical Engineers will hold its spring meeting at Montreal, Quebec, Canada, May 28-31. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

National Association of Purchasing Agents will hold its eighth annual convention and Informashow at Cleveland, Ohio, May 15-18. Convention headquarters, room 219, Hotel Winton, Cleveland.

The National Association of Manufacturers will hold its 27th annual convention at the Waldorf-Astoria, New York City, May 14-16.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Mechants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey. The registration fee of $15 will include all meals except breakfast, transportation to and from the mines which will be visited, and the banquets. The only other expenses to be incurred will be hotel room and transportation to and from Scranton. Executive secretary, J. E. O'Toole, Philadelphia, Pa.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The Virginia Coal Operators' Association will hold its annual meeting on April 21 at Norton, Va. Secretary, G. D. Kilgore, Norton, Va.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24, Secretary-treasurer, J. G. Crawford, Chicago, Ill.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Indiana Retail Coal Merchants' Association will hold its annual meeting April 25 and 26 at the Claypool Hotel, Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs Va., June 11-14. Executive secretary, S. N Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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The Injustice of Impartiality

DISCUSSING "Bituminous Coal Problems" in the current issue of the *Harvard Business Review*, C. E. Bockus, president of the Clinchfield Coal Corporation, gives expression to many truths about the soft-coal industry in a frank and engaging manner. No coal operator in recent years has told so much in print about his problems and given the public such a comprehensive picture of the situation. Being an operator of non-union mines he does not stress though recognizing the complications that are introduced nationally by large-scale strikes in the organized fields. Overdevelopment and the effects of insufficient transportation are set down as basic problems in his field.

Mr. Bockus quite pertinently ventures the suggestion that in seeking remedies, as by the present U. S. Coal Commission, "it is going to be difficult to make consumers buy and store coal when they believe there is a falling market or to make producers sell for a lower price than they can obtain." He thinks that if some plan could be devised by which a regular contract shipper of coal had some advantage in his railroad-car supply over a "sporadic" shipper who comes into the field only when spot prices are high it would help. It is, in fact, the almost universal experience of the older, well-established companies, whose business has been built up on sound lines, that at the very times when their regular contract customers are in most urgent need of coal they are least able to ship the coal. When the occasional producer—the intermittent operator—finds a market for high-priced coal he demands and receives a share of the cars and takes a portion of the labor. The buyer, forced to take a pro-rata share from his regular supplier because of reduced car supply, must then purchase spot coal to fill his requirements.

This is the old story. The railroads meet it by assigning cars, thus getting the preference, and furnishing evidence that they know that a short coal supply is not the result of lack of coal but of cars and the transportation for which they, the railroads, are responsible. The public utilities regularly cover their needs for coal by contracts and they have repeatedly said that they would be satisfied if they could be sure of getting the coal they had bought. They too would like assigned cars. Mr. Bockus wonders whether his suggestion is "too much like 'assigned' cars, that anathema of most coal operators," and then answers for himself by stating that he would rather have the railroads get their coal in times of stress by assigning cars than by confiscating coal he has shipped to commercial customers. Is it too much to say that the railroads, without assigned cars, fill out the deficiences in their supply by *taking* spot coal, for they pay the invoice price on coal confiscated, and the commercial buyer *bids* for his share of the same spot coal? Of course, railroads have been charged with taking considerable pains to cut out of a yard of loads those cars for confiscation they had reason to believe were moving on low-priced contracts.

Those operators who will most heartily disagree with the idea that some prefence in transportation should be afforded contract shipments will be those who, unlike Mr. Bockus, would like to have their cake and eat it too. That is to say, there are many soft-coal producers who would favor a special supply of cars to protect their contract customers if on top of that they could have an allotment of cars in which to ship on the spot market. The practice of apportioning contract and spot shipments on the percentage of car supply is a case in point, though it finds some warrant from the fact that short working time increases costs of operation and thus may justify the attempt to obtain a higher average realization for the total product than would be afforded by contract prices. Mr. Bockus cites a particular instance where costs in December, because of short working time caused by lack of transportation, were 41c. per ton over May with full time, a factor in the business of the coal operator over which he has no control.

Subjects for Investigation

IF THE interest displayed by state legislatures is any indication of the public thirst for information about coal, the report and findings of the U. S. Coal Commission will be among the best sellers when given to the public. The latest—to come to our attention—is a bill introduced in the New York Assembly last week calling for a commission to investigate the coal industry and to ascertain why New Yorkers cannot get all the coal they want when they want it, and to report on how much coal New York needs, anyhow.

It is true that interest this summer may swing from coal to sugar, that in fact sugar is the real topic at Washington already. Later, if what the railroads prophesy as to transportation shortage next autumn comes true, there may be state commissions to inquire into speculation in railroad transportation. In passing it may be noted that it is going to be simpler for the purely political investigator to find a tail to which to attach his can in the case of sugar than in the case of coal. Some are blaming the tariff, others attribute soaring sugar prices to speculation in the established exchanges. Neither will suffice to explain away a situation in the coal industry.

It is not fair to lay all the politicians' interest in coal to politics. The people are greatly stirred up over the whole question and the local outbursts have an origin "back home." We believe the individual states would be best advised, however, to start their inquisitions into coal after they have the advantage of the national commission's findings. Thus not only would public money be saved but better results be assured. Since no generalization ever applies to Greater New York, an exception should be noted for Mayor Hylan's personal expedition into coal investigation, were it not that his questionnaires probably will be filed with the janitor.

Immigration in Relation To the Coal Industry

WHETHER or not a labor shortage is a good thing may be a timely subject for debate among employers in general industry but it is not going to trouble the soft-coal industry for some time. Judge Gary opened the debate in earnest a few days ago when he took occasion to oppose the present restrictive immigration laws and to urge a policy on the part of the country of taking in more foreign labor. He was perfectly frank in saying that the iron and steel industry needed more men and would like to have fresh supplies from abroad. Many other large employers hold the same views, for it is traditional in this country to draw raw labor from fresh stock.

Economists will long debate as to whether the admitted higher labor costs that will flow, and now are flowing, from a national policy of restricted immigration in a period of active demand are in the national interest. It seems quite certain now that there is a decided public opinion favoring the present plan, quite aside from what the labor interests think. The possibility of more complete and better assimilation of foreign labor already within our borders and the ultimate elevation of standards of living of these men is attractive and will have ample opportunity for trial before there is a change in national thought on this subject.

The anthracite industry is not overmanned. The high rate of production in these mines that has obtained since last September has been reached by hard work and no little overtime. With the soft-coal industry there is a different story. Production now is well above 10,000,000 tons per week, a figure that in a year will give more tons than the country has used save in three years—1917, 1918 and 1920. Yet the soft-coal mines are working but half time. There is labor at these mines sufficient to maintain 20 per cent more production and—at least on paper—labor to double the present rate.

In the face of this it does not seem possible that there can be a labor shortage at the bituminous-coal mines, yet such is possible locally. Just as there often is a car shortage and a car surplus at the same time, the country considered as a whole, so some operators may be short-handed while others have men idle. Districts such as Pittsburgh and Westmoreland, adjacent to active industrial centers, often experience a labor shortage while fields more isolated, as eastern Kentucky and parts of central Pennsylvania, have a surplus. Furthermore, a coal operator who obtains business that insures full running time, as railroad contracts, may be and often is short-handed at the same time that his neighbor, working a few days a week, has more men than he requires.

In certain respects coal-mine labor is fluid, as other labor. During the strike of 1922 union labor floated across the river from southern Illinois into western Kentucky, where the mines were the busiest they ever had been. During the dull period of 1921 union labor from the Pittsburgh district, where scales were fixed and inflexible and work scarce because of competition from mines with lowered wages, found employment in the Connellsville and other non-union fields near by, actually maintaining their residence in the meantime in the company houses in the union field. Operators in the Logan field of West Virginia often report an influx or exodus of labor, depending on the activity of the mines.

It is almost universally true that the older mines in a field have the greatest difficulty in maintaining their forces. Men seek the newer and easier places and during times of high prices find work in the small openings that do not hesitate to pay bonuses because not fearing to set precedents. Thus, despite the evident overmanning of the soft-coal industry, considered nationally, it is fully to be expected that if the present rate of output is maintained this summer, by autumn there will be the apparent anomaly of complaints of labor shortage from soft-coal mines. It must be apparent, however, that such a shortage cannot impair the ability of the industry to meet the country's demand for soft coal.

The Export Outlook

WHETHER the deadlock on the Ruhr is destined to result in such a coal famine in Europe, and indirectly in other countries, as will reopen in earnest the foreign market for exporters in this country depends largely if not entirely on how long the present situation endures. Information is lacking as to the degree to which the French have been able to revive coal production in that important field, but reports agree that no coal or coke is getting into Germany and that only driblets of coal and coke are finding their way west and north into France and Belgium.

Simultaneously with the stoppage of the Ruhr there is a definite revival of industry on the European continent, calling for more coal than last year, and with less available. France, Belgium, Germany and Italy first turned to Great Britain to fill the gap. The coal industry in that country, with 40,000 more workers than before the war, working at top speed, is able to produce at a rate between ten and fifteen million tons per year less than in 1913, when the output was 287,000,000 gross tons. The principal reason for this decline, of course, is the reduction from the 8- to the 7-hour day. Another factor is the lack of development, particularly of new mines. For the last five years the uncertainties of business and paucity of profits in the British coal trade have discouraged new investment in that field. It is a striking fact that with all the urgency of demand the exports of British coal in the first quarter of this year were less than in either the third or the fourth quarter of 1922.

There seems then to be little expectation of filling the widening gap between expanding requirements and decreased supply of coal abroad. The only other source competent to furnish the tonnage of coal that is, or will be, required is the United States. Buyers in Germany, Belgium, France, Italy and South America have been quietly covering their urgent needs on this side, at current market prices. So far there has been no precipitate rush for coal such as characterized 1920. A repetition of that avalanche of export business is not to be expected for two reasons: one is that the requirements for consumption over and above production on the other side is by no means so large as three years ago and the other is that shipping is abundant now and the demand will not be backed up by lack of vessels, as in 1919.

On the whole the outlook is for a steady summer market for producers of high-volatile coal on the Atlantic seaboard, with a distinct possibility that by autumn the export demand will assume large proportions.



Acid-Resisting Alloys for Use in Mine Water*

Analyses of Three Filtered Mine Waters—Montour No. 1 Water Contains Much Chlorine—Metals and Alloys That Will and Will Not Resist Corrosion—One Metal Gains in Weight—Some Lose by Pitting

By George M. Enos†
Pittsburgh, Pa.

WATER from coal mines frequently is acid, and by corroding pumps and pump parts, pipe lines and other mining equipment causes much trouble. Trouble of like kind is experienced also in metal mines, but to a smaller extent. Data and discussion on the corrosion of a large group of metals and alloys in the acid water from coal mines therefore should be of much value to mine operators and manufacturers of mining equipment.

The water from coal mines is rendered acid by the presence of free sulphuric acid. Usually associated with that acid are considerable quantities of the sulphates of iron and aluminum and smaller quantities of the sulphates of calcium, magnesium, sodium and potassium. Silica and chlorides generally are present. The ferrous and ferric sulphates and the free sulphuric acid found in mine water result from the action of air and water on the iron pyrite (FeS_2) and marcasite (white iron pyrite) with which the coal is associated.

The methods of determining the free and total acidity of the water have been described by Selvig[1] and Ratliff. Free acidity is defined as that due to the presence of free sulphuric acid. Total acidity is the acidity due to acid of that character plus the sulphates of iron and aluminum. Free acid may be present in any quantity from a trace to several thousand parts per million, and as much as 18,000 parts per million have been reported. Total acidity varies between wide limits but usually will be between 2,000 and 15,000 parts per million.

It is beyond the scope of this paper to review the extensive literature regarding corrosion or to discuss any of the theories regarding the manner in which it takes place. It may be well, however, to note some of the common ways in which mining equipment fails as the result of corroding processes. Unless protected, pipe lines of cast iron, wrought iron or steel are corroded rapidly by acid mine water.

Pipe May Corrode Away or Fail by Pitting

The failure may result from pitting or from a gradual wearing away or rusting of the pipe. A common point of failure is at a joint. In order to reduce the replacement of pipes to a minimum most companies operating mines having acid waters use wood-lined pipes. Lead- or porcelain-lined pipes or all-wood pipes having a bituminous coating also are used, but not so extensively as wood-lined pipes.

There are disadvantages in the use of any of these materials: (1) In order to carry any given volume of water the iron pipe must have a much larger outside diameter if it is to be wood-lined. (2) All-wood pipes do not have the required mechanical strength, and if the wires that bind the staves of the pipe together are corroded through, the section bursts and is useless.

*Published by permission of the Director, U. S. Bureau of Mines.

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[1]Selvig, W. A., and Ratliff, W. C., "The Nature of Acid Water from Coal Mines and the Determination of Acidity.": *Journal of Industrial Engineering Chemistry*, Vol. 14, No. 2, 1922, p. 125.

Note—Headpiece shows boxes at Calumet mine for testing effect of mine water in corroding metals and alloys.

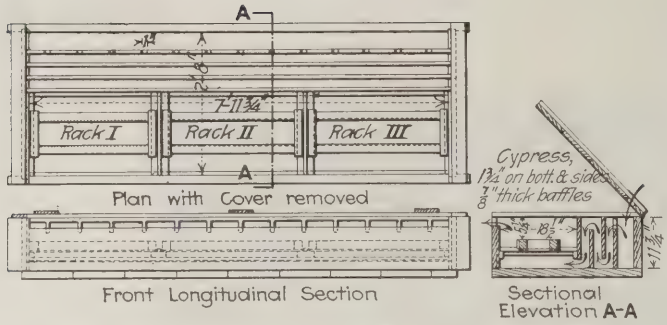


FIG. 1—BOXES IN WHICH METALS WERE TESTED

Metals were set in racks and mine water was passed through the boxes. The samples were only 2 x 6 in. and 16 gage where rolled materials and ¼ in. where cast.

(3) Lead- or porcelain-lined pipes are likely to cause trouble at the joints. The kind of pipe that should be used in acid mine water has not been determined beyond question, but so far the wood-lined pipe has been that most generally used.

The brasses or bronzes and the cast iron used in pump parts corrode fairly rapidly when exposed to the action of acid water. The valve seat, chamber, pump rod and other parts are subjected to the action of acid water flowing at a considerable velocity. It is fairly common practice to babbitt such parts as the chamber and piston, for babbitt resists the action of the water fairly well, although it is soft and abrades easily. In many mines it is not uncommon to have to change pump parts every month or six weeks, this renewal adding greatly to the pumping charge.

Less loss is caused by the corrosion of other equipment. Nevertheless it is important. Track frequently has to be replaced if exposed to the corroding action of acid water. A shovel may be ruined even if exposed to acid water for as short a time as over night.

Neutralization Underground Inexpedient

The question arises, Why cannot water be neutralized, thus saving the expense of frequent replacements of pump parts and pipe lines? Neutralization is practicable only above ground and here only after the water has already been handled by the pumping equipment. If it is necessary to use the water in the power plant, or if the products of neutralization—iron oxides—have a ready market the water can be neutralized with profit. Acid water cannot be neutralized profitably underground owing to the expense involved, not only in excavating the large sumps necessary for this purpose but also in lowering the lime rock, in filtering the effluent and in hoisting the resultant precipitate.

The U. S. Bureau of Mines, in co-operation with the industries, the American Society for Testing Materials,[2] and the Carnegie Institute of Technology,[3] has conducted several investigations into the corrosion of metals and alloys in acid mine water. In the tests already reported it was decided to test the metals and alloys as nearly as possible under service conditions—that is, to immerse the specimens in flowing mine water at the mines.

In the tests made in co-operation with the American Society for Testing Materials[2] test pieces of industrial grades of iron and steel, after weighing, were placed in racks, in suitable test boxes, and water from the mine was allowed to flow through the boxes at a carefully regulated rate. The test pieces measured 2 x 6 in., both 16- and 22-gage materials being subjected to the acid water. The pieces were frequently inspected and careful analyses of the water were made in the course of the test, which was made at the Calumet coal mine of the H. C. Frick Coke Co., Calumet, Pa.

In the second series of tests, made in co-operation with the Carnegie Institute of Technology, specimens of both ferrous and non-ferrous metals and alloys were employed. The non-ferrous alloys included brasses, bronzes, cupro-nickels, nickel-silvers and aluminum alloys. The ferrous alloys included only high-silicon cast irons, high-chromium steel and nickel-chromium-silicon steels. Nickel, copper, iron and aluminum also were included.

The test boxes were of an entirely different design from those in the first test, and the pieces tested were, for rolled materials, 2 x 6 in. and of 16-gage, and, for cast materials, 2 x 6 x ¼-in. The tests were conducted

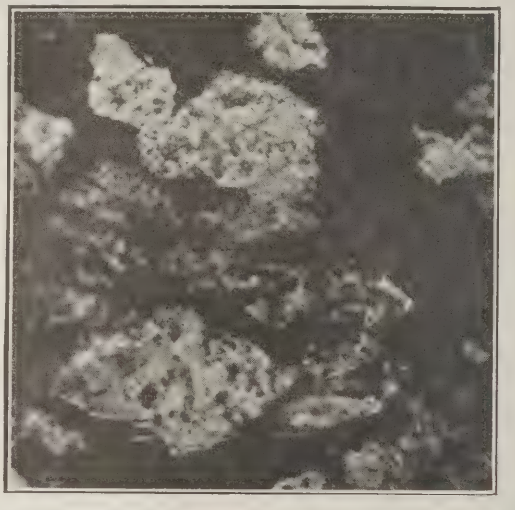


FIG. 2—CORRODED EDGE OF NAVAL BRASS SAMPLE

This alloy consists of copper, 60.40 per cent; zinc, 38.83 per cent; tin, 0.77 per cent. The light colored areas are what are known as Alpha crystals and they are relatively uncorroded. The surface is etched with $NH_4OH + H_2O_2$. Magnification 500 diameters.

at three mines in the western Pennsylvania coal region—namely, Montour No. 1 mine of the Pittsburgh Coal Co., at Southview, Washington County; Edna No. 2 mine of the Hillman Coal & Coke Co., at Wendel, Westmoreland County, and Calumet mine of the H. C. Frick Coke Co., at Calumet, Westmoreland County.

The weighed and measured pieces were totally immersed as in the previous test, the flow of water was carefully regulated and recorded, and inspections and analyses of mine waters were made at regular intervals.

In both series of tests the specimens were considered to have failed if the test piece had been corroded through or if the edge had been corroded to a depth of ¼ in. When the pieces failed they were removed either during the course of the test or at its conclusion. In either case they were cleaned and weighed, and the loss in weight was recorded. The headpiece of the article shows the arrangement of the boxes for the second test at the Calumet mine, and Fig. 1 shows the manner in which the boxes were constructed. Typical analyses of the mine waters from the three mines in which tests were made are given in Table I.

The first tests made at the Calumet mine showed that all the ordinary grades of iron and steel corroded

[2]Report of Sub-Committee 5 on total immersion tests, *Proceedings American Society for Testing Materials*, Vol. 21, 1921, pp. 157-194.

[3]Selvig, W. A., and Enos, George M., "Corrosion Tests on Metals and Alloys in Acid Waters from Coal Mines," Bulletin 4, Carnegie Institute of Technology, 1922; 71 pp.

TABLE I—TYPICAL ANALYSES OF FILTERED MINE WATERS

Constituent	Montour No. 1 Parts per Million (a)	Edna No. 2 Parts per Million (a)	Calumet Parts per Million (a)
SiO_2 (Silica)	160	129	67
Fe ++ (Ferrous iron)	1,216	516	11
Fe +++ (Ferric iron)	56	1,303	213
Al (Aluminum)	1,434	1,225	236
Ca (Calcium)	415	307	164
Mg (Magnesium)	9	122	191
K (Potassium)	373	332	0
Na (Sodium)	1,316	512	61
Cl (Chlorine)	590	37	17
SO_4 (Sulphate radicle)	11,898	11,750	2,229
Suspended matter (on unfiltered water) dried at 105deg. C.	26	19	43
Free acid (b) due to free sulphuric acid	1,200	1,940	340
Acidity (b) due to free sulphuric acid plus sulphates of iron and aluminum	11,070	13,280	2,950

(a) To convert parts per million to grains per U. S. gallon, multiply by 0.0583.
(b) Free acid and total acidity are reported in parts per million in terms of sulphuric acid.

rapidly, and the corrosion losses did not show any materials to be remarkedly superior to the others in resisting the action of acid mine water.

In the second tests the pieces showed a different loss in weight in each of the three mines, as, indeed, would be expected, although the relative order of loss was the same in nearly every case. In the water from the Edna No. 2 mine the losses were greatest. Table II gives the designation, composition and a number which expresses the relative loss in weight of the pieces exposed to the action of Edna No. 2 mine water. This number is based on the daily loss in weight expressed in milligrams per square centimeter of exposed surface.[4] The analyses of the metals in Table II are those given by the co-operating companies wherever they are marked with the notation (a).

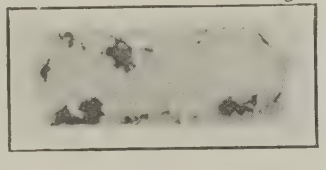


FIG. 3—CAST MANGANESE-ALUMINUM ALLOY

Shows deep pitting. Alloy consists of manganese, 1.81 per cent and aluminum. Unetched; magnification two diameters.

It was found that none of the brasses tested would resist the action of the acid mine water. Fig. 2 shows the corrosion edge of a brass of the Muntz metal type. The manganese brasses have a lower loss number, but on account of the rapid formation of a brittle copper-rich coating, they probably are but little better than ordinary brasses for resisting attack by mine water.

As bronzes have been used so extensively in pump parts, their losses from corrosion are of particular interest. It will be noted that of seven typical bronzes, five have a relatively low loss number. As physical properties may be the determining factor in choosing material for pump parts, it is not possible to say which is the best bronze to use in such cases, but it would seem that from the corrosion viewpoint the leaded bronzes are better adapted for such parts.

The cupro-nickels and nickel-silvers all show relatively high losses, and cannot be considered as having much value for use in acid mine water. Aluminum and aluminum alloys have a low corrosion loss number, but are of no value in acid mine water on account of the extreme rapidity with which they pit and the depth of the pitting. An example of pitting in a cast manganese-aluminum alloy is shown in Fig. 3.

[4]When 0 is used to denote the relative loss, it is understood to mean a corrosion loss of less than 0.5 mg. per square centimeter per day. The exact average loss figures in mg. per square centimeter per day for the Edna No. 2 mine are: High-silicon cast iron B, 0.00374; rolled rustless steel A, 0.00015; rolled rustless steel B, 0.00074; rolled high-chromium steel, 0.00030; rolled nickel, 0.00299, and rolled nichrome, 0.01812.



FIG. 4—CORROSION EDGE OF HIGH-SILICON CAST IRON A

Alloy consists of silicon, 14.5 per cent; carbon, 1.45 per cent; iron and minor impurities, the remainder. Surface is etched with $HNO_3 + HF$. Magnification 300 diameters.

There is a marked difference in the corrosion loss numbers of the high-silicon cast irons tested, which probably is due to the difference in the methods of melting and the difference in carbon content. Fig. 4 shows the corrosion edge of the high-silicon cast iron *A*.

The high-chromium steel and the chromium-nickel-silicon steels have a very small corrosion loss, and it would seem that for mining equipment which could be made of steel, either of these two materials could be used.

Pure nickel shows a very small loss in the Edna No. 2 mine water, but the loss was considerable in the other mine waters in which tests were made. Nichrome had a very small loss in all the waters. The group of copper-lead alloys had neither a high nor low loss number, as did monel metal and for certain purposes these alloys might find considerable use in acid mine water. A peculiar feature in connection with a 96-per cent lead alloy which was tested was the fact that it actually gained in weight during the tests, but as the surface was blistered and the ends cracked on test pieces it cannot be recommended for use in mine water.

An extensive discussion of all the phenomena observed cannot be given here, but the foregoing should be of service in making selections of metals and alloys for use in mining equipment which is to be exposed to the action of acid water.

Careful examination was made of all corroded test pieces, and the nature and extent of deposits, coatings, pits, pinholes and other phenomena were noted and are discussed in Bulletin 4.[5] Microscopic examination was



FIG. 5—COATING ON HARD-ROLLED PHOSPHOR BRONZE

Alloy consists of copper, 89.8 per cent; tin, 5.6 per cent; lead, 4.6 per cent; iron, a trace; phosphorus, 0.5 per cent. maximum. Surface is etched with acidic $FeCl_3$. Magnification 200 diameters.

[5]Work cited.

TABLE II—DESIGNATION, COMPOSITION AND LOSS-IN-WEIGHT NUMBER OF SPECIMENS CORRODED IN MINE WATER FROM EDNA NO. 2

Designation	Chemical Composition, Per Cent	Loss-in-Weight Number
Brasses		
Rolled high brass	Cu, 66.55; Zn, 33.45(a)	7
Rolled low brass	Cu, 80.09; Zn, 19.91(a)	7
Rolled naval brass	Cu, 60.40; Sn, 0.77; Zn, 38.83a	7
Rolled brass (Admiralty metal) grain size, 0.025 mm	Cu, 70.80; Sn, 1.14; Zn, 28.06	7
Rolled brass (Admiralty metal) grain size, 0.035 mm	Cu, 71.38; Zn, 27.36; Sn, 1.26	6
Rolled brass (Admiralty metal) grain size, 0.075 mm	Cu, 71.46; Zn, 27.42; Sn, 1.12	6
Rolled brass	Cu, 57.95; Pb, trace; Sn, 0.47; Fe, 0.55; Zn, 41.02	7
Manganese Brasses		
Cast manganese brass	Cu, 68.05; Zn, 27.89; Fe, 1.55; Pb, 0.45; Mn, 2.06	3
Cast manganese brass	Cu, 67.45; Zn, 28.84; Fe, 1.48; Pb, 0.28; Mn, 1.95	4
Rolled manganese brass	Cu, 67.10; Zn, 29.64; Fe, 0.97; Pb, 0.30; Mn, 1.99	4
Rolled manganese brass	Cu, 65.5; Pb, 0.5; Zn, 30.5; Mn, 2.2; Fe, 1.3	4
Bronzes		
Cast bronze	Cu, 89.8; Sn, 9.7; Pb, 0.5	2
Rolled bronze	Cu, 98.51; Sn, 1.49	7
Rolled phosphor bronze	Cu, 94.4; Sn, 5.5; P, 0.1	5
Rolled leaded phosphor bronze	Cu, 89.8; Sn, 5.6; Pb, 4.6; Fe, trace; P, trace	2
Cast leaded zinc bronze	Cu, 86.34; Pb, 0.83; Sn, 11.24; Zn, 1.60	1
Cast leaded bronze	Cu, 74.9; Pb, 14.3; Sn, 10.5	1
Cast leaded bronze	Cu, 87.5; Sn, 10.6; Pb, 1.6	3
Cupro-nickels		
Rolled cupro-nickel (coin metal)	Cu, 74.60; Ni, 25.40	7
Rolled cupro-nickel	Cu, 84.36; Ni, 15.64	7
Cast leaded cupro-nickel	Cu, 53.57; Ni, 25.30; Fe, 0.61; Pb, 19.58; Sn, 0.56	4
Cast chromium-iron cupro-nickel	Cu, 42.24; Cr, 11.89; Ni, 35.00; Si, 1.50; Fe, 9.35	7
Cast iron-manganese cupro-nickel	Cu, 71.16; Fe, 7.47; Ni, 19.01; Mn, 2.35	7
Nickel Silvers		
Rolled nickel-silver	Cu, 63.78; Zn, 17.68; Ni, 18.54(a)	7
Rolled iron-nickel-silver	Cu, 66.03; Zn, 23.99; Ni, 9.92; Fe, 0.05	7
Rolled nickel-silver	Cu, 52.79; Zn, 34.58; Ni, 12.63	7
Cast silicon-nickel-silver	Cu, 72.3; Ni, 16.5; Sn, 3.5; Zn, 7.4; Pb, 0.3; Si, trace	7
Cast tin-lead nickel-silver	Cu, 63.52; Ni, 12.85; Sn, 4.59; Zn, 11.55; Pb, 7.49	4
Cast tin-lead nickel-silver	Cu, 54.32; Sn, 2.54; Zn, 16.33; Pb, 6.30; Ni, 20.51	4
Copper-lead Alloys		
Cast copper-lead alloy	Cu, 53.4; Pb, 46.4	4
Cast copper-lead alloy	Cu, 68.0; Pb, 31.9	5
Cast copper-lead alloy	Cu, 73.01; Pb, 26.96	5
Aluminum Alloys		
Cast aluminum-silicon alloy	Si, 3.90; Al, 96.1; (Al by difference)	2
Cast aluminum-manganese alloy	Mn, 1.81; Al, 98.19; (Al by difference)	2
Rolled aluminum-manganese alloy	Mn, 0.95; Fe, 0.95; Si, 0.53; Al, 97.57 (Al by difference)	2
Rolled aluminum alloy	Cu, 3.62; Mn, 0.46; Fe, 0.45; Si, 0.56; Al, 94.91; (Al by difference)	2
High-silicon cast irons		
High-silicon cast iron, A	Si, 14.50; C, 1.45	5
High-silicon cast iron, B	Si, 13.80; C, 0.76	0
Rustless Steel		
Rolled high chromium steel	Cr, 29.5; Mn, 0.27; Si, 0.53; C, 0.36; Fe, balance	0
Rolled alloy steel	Ni, 23.87; Cr, 12.96; Si, 3.40; C, low; Fe, balance	0
Rolled alloy steel	Ni, 29.60; Si, 3.26; Cr, 10.73; C, low; Fe, balance	0
Miscellaneous Metals		
Rolled pure ingot iron	Fe, 99.9(a)	7
Rolled pure aluminum	Commercially pure aluminum (a)	2
Rolled pure copper	Commercially pure copper (a)	7
Rolled pure nickel	Ni, 99.+(a)	0
Miscellaneous Alloys		
Cast aluminum bronze	Cu, 93.9; Al, 6.1; (Al by difference)	5
Rolled iron-aluminum bronze	Cu, 86.23; Fe, 4.81; Al, 8.96 (Al by difference)	6
Rolled monel metal	Ni, 65.1; Cu, 30.52; Fe, 4.2	4
Cast high-lead alloy	Pb, 96.1; alkaline earth metals balance	Gained weight
Rolled copper-manganese-iron alloy	Cu, 94.81; Mn, 4.52; Fe, 0.67	7
Rolled nickel-chromium-iron alloy	Ni, 52.50; Al, 0.20; Cr, 9.29; Si, 0.19; Mn, 1.24; Fe, balance	7
Rolled nichrome	Ni, 57.44; Si, 0.55; Cr, 9.37; Mn, 1.75; Fe, balance	0

made of the entire series of metals and alloys corroded in the Edna No. 2 mine water, and the results will be published shortly.[6] In order to arrive at an intelligent understanding of corrosion processes, also of the relative value of various metals and alloys, it is necessary to consider not only the data as to loss in weight but also the condition of the test pieces after corrosion, as shown by careful visual and microscopic examination. Deep pitting, for example, may not result in much loss in weight, yet would render the material unfit for use in acid mine water.

In the course of the examinations made coatings were observed on many of the metals and alloys. These coatings may result from the decomposition of the specimen, by deposition from the water or from both causes. Many of the coatings could be easily removed, and it is not possible to say whether they accelerate or retard corrosion. Other coatings were relatively hard and impervious and could properly be designated as protective in nature. Such a coating is shown in Fig. 5.

As a result of the various investigations the following general conclusions may be drawn regarding metals and alloys for use in mine water:

(1) Ordinary industrial grades of iron and steel, brasses, cupro-nickels, nickel-silvers and aluminum and aluminum-alloys will not withstand the action of acid water from coal mines.

(2) A high-silicon cast iron, a high-chromium steel, two chromium-nickel-silicon steels and nichrome were very resistant to the action of acid mine water.

(3) Certain bronzes, copper-lead alloys, nickel and monel metal may be of value for special purposes where it is not desirable to use the materials previously mentioned.

The writer wishes to acknowledge the aid received from A. C. Fieldner, supervising chemist of the Pittsburgh Experiment Station, U. S. Bureau of Mines, and from W. A. Selvig and R. J. Anderson, also of the Pittsburgh station.

[6] Anderson, R. J., and Enos, G. M., "Microstructural Aspect of Metals and Alloys Corroded by Acid Mine Water," Bulletin 5, Carnegie Institute of Technology. Ready about May, 1923.

British Coal Exports Climb in 1922

Exports of British coal during 1922 amounted to 64,198,384 tons as compared with 24,660,552 tons the previous year and 73,400,118 tons in 1913. Comparative figures showing the exports and destinations for 1913, 1921 and 1922 follow, in tons:

	1913	1921	1922
Russia	5,998,434	138,878	584,069
Sweden	4,563,076	1,232,904	2,522,820
Norway	2,298,345	694,316	1,566,989
Denmark	3,034,240	1,803,561	2,866,233
Germany	8,952,348	817,877	8,345,606
Netherlands	2,018,401	1,787,678	6,067,789
Belgium	2,031,077	618,066	3,489,419
France	12,775,909	6,395,651	13 579,417
Portugal	1,201,722	436,365	784,356
Spain	2,534,131	1,021,472	1,711,021
Canary Islands	1,114,629	160,304	524,815
Italy	9,647,161	3,383,083	6,341,743
Greece	727,899	248,554	428,647
Algeria	1,281,664	455,364	1,032,282
French West Africa	149,107	48,730	119,327
Portuguese West Africa	233,015	107,022	193,667
Chile	588,526	22,624	84,311
Brazil	1,886,871	242,223	1,013,221
Uruguay	723,936	221,817	502,533
Argentine Republic	3,693,572	887,344	2,021,092
Channel Islands	167,862	113,964	160,636
Gibraltar	354,702	367,750	689,428
Malta	700,111	206,108	214,396
Egypt	3,162,477	1,017,748	1,743,643
British India	179,192	531,561	999,159
Ceylon	239,657	140,307	232,675
Other countries	1,749,877	1,462,453	6,168,825

THE TROUBLE SEEMS TO BE that too many people think the law should be enforced, and not enough think it should be observed.—*Portland Telegram.*

HISTORY DOUBTLESS WILL MAKE it plain that the Ruhr invasion was preceded by the Ruhr evasion.—*Boston Herald.*

Wahlen Micromanometer Accurately Measures Static And Velocity Heads in Mine Ventilation

Will Measure Differences of Pressure to Ten-Thousandth of an Inch of Water Pressure and Even Less—How to Separate Resistance Pressure from Velocity Head—Reliable Coefficients Need to Be Worked Out

By Louis W. Huber*
Urbana, Ill.

RELIABLE indications of air pressure are essential if the effect of turns, contractions, expansions and surface irregularities, such as steel and timber sets, rough ribs and roofs and standing props, in reducing the flow of air are to be measured. Economies that conceivably may be of great importance have not been made owing to the fact that up to the present we have not been able to evaluate with sufficient exactitude the savings that certain improvements in air channels would effect. The question is now being put under careful and scientific investigation, and it has been found that to make the necessary tests the introduction of new apparatus is needful. Here again it will be noted that the necessities of a line of inquiry remote from that of mining have furnished the coal-mining investigator with a valuable tool for the development of his industry.

The Wahlen gage or Illinois micromanometer is, strictly speaking, an alcohol gage for determining differential pressures. It was developed by F. G. Wahlen for the University of Illinois engineering experiment station. The need for such a gage was felt by the staff of that station for use in connection with its researches into warm-air furnaces. A manometer was needed for measuring the pressures associated with low air velocities of from 2 to 7 ft. per second or velocity heads of about 0.0015 to 0.0120 in. of water.

Exceedingly Sensitive to Pressure Changes

What was desired was a measuring device that would offer no frictional resistance to the flow of air, that would be exceedingly sensitive, readily portable and easy to operate. It was felt that a Pitot tube, used in connection with an extremely sensitive gage, would fill all requirements and allow the flow of air to be measured directly. A Chattock† gage was constructed and tested, but, although it was sensitive enough, operating difficulties prohibited its application to the work.

F. G. Wahlen was detailed to this investigation, and he developed a gage so sensitive and accurate that it would measure heads of less than 0.0001 of an inch of water and respond almost simultaneously to the slightest fluctuations in pressure.

The essential features of the Wahlen gage as shown in the illustrations (Figs. 1 and 2) are a rigid base supported by three leveling screws and leveled by means of a right-angle or "cross" spirit level, and two large glass bulbs (*A* and *B*) communicating with one another by means of an inverted U-tube, and supported by the rigid base. The left-hand bulb, *B*, is firmly and rigidly attached to the frame and is always stationary. The right-hand bulb, *A*, is fixed on a carriage which permits it to be moved vertically up and down. This motion is controlled by frictionless guides which eliminate all side motion. The bulb is raised and lowered by a micrometer screw reading to 0.001 of an inch direct, a slight swiveling action in the joints of the hinged connection of the glass tube at *E* admitting of this movement.

Alcohol saturated with kerosene of a specific gravity of 0.8195 and colored with aniline dye to a distinctive red color about half fills the two bulbs and the U-tube. The upper half of the U-tube is filled with a clear mixture of kerosene and ligroin, so apportioned that its specific gravity is about 0.0095 less than that of the alcohol. Ordinary kerosene may be used as the lighter

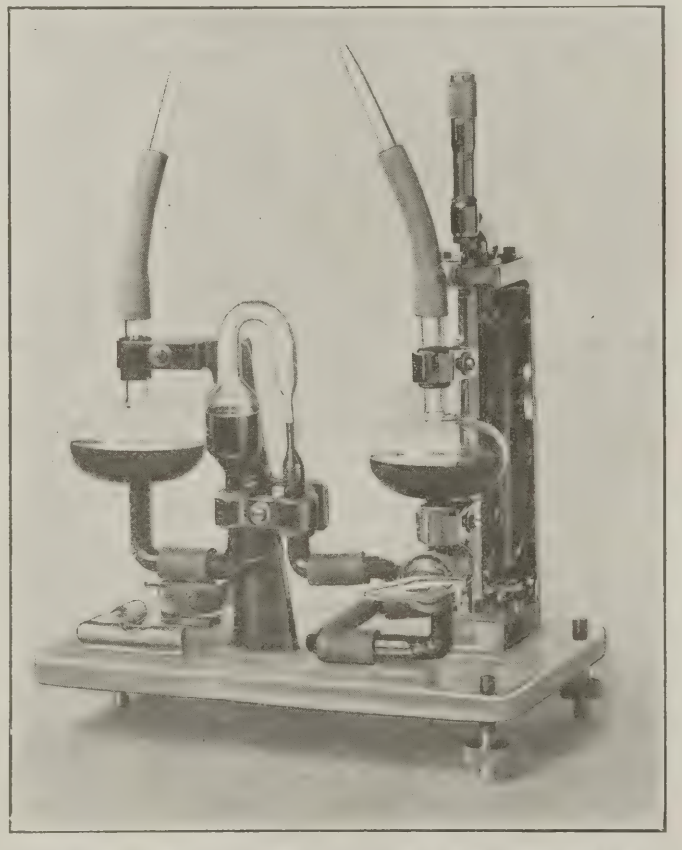


FIG. 1—WAHLEN GAGE OR ILLINOIS MICROMANOMETER
Air is received under different pressures in the two flasks, or bulbs, on either side of the instrument, and this disturbs the level of the fluid so that to keep the level constant it is necessary to raise the right flask. This is done by a micrometer screw the movement of which records that motion. The parts of the connecting tube which appear empty or filled with air contain pure kerosene or more usually a colorless mixture of kerosene and ligroin. The darker liquid in the tube and flasks is alcohol saturated with kerosene and colored with aniline dye. The junction of the two liquids, the level of which is manipulated by the raising of the right-hand flask, is brought to coincidence with an etched line in the constricted part of the tube.

*Graduate assistant in mining research, University of Illinois.

†See "Report on Wind Tunnel Experiments in Aerodynamics," by J. C. Hunsaker and others, page 12 and following pages. Published by the Smithsonian Institution, Washington, D. C., Jan. 15, 1916.

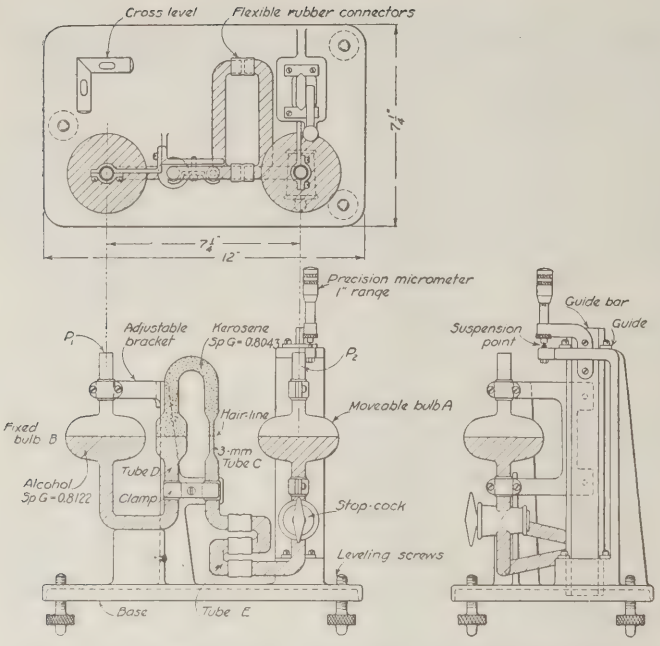


FIG. 2—DIAGRAMMATIC DRAWING OF WAHLEN GAGE

The adjustment of the instrument always is to the hairline in the 3-mm. tube *C*. Raising the right flask, or bulb, *A*, one-thousandth part of an inch moves the liquid in the 3-mm. tube ½₅ of an inch. This large multiplication of the movement of the bulb makes the adjustment of the gage quite delicate and gives a remarkably accurate measurement of the difference of pressure. The adjacent enlargement of the tube at the same level also makes it possible to adjust the instrument with remarkable accuracy.

liquid if the above difference in density is maintained.

It will be observed in the illustration that the right leg of the inverted U-tube is constricted at *C* and the left leg enlarged at *D*. These points are where the alcohol and the kerosene join. The left leg is enlarged so as to provide for maximum sensitiveness. The constriction in the right leg is for the same purpose. A hairline is etched around the middle of the constricted part of the tube.

In making a zero setting with equal pressure on the surfaces of the liquids in each bulb both bulbs are opened to the air so that the pressure in each is equal and the meniscus, or the juncture of the kerosene and alcohol, is brought to the hairline by raising or lowering the right-hand bulb with the micrometer screw. The reading of the micrometer when the meniscus is at the etched reference line is called the zero reading.

Meniscus Always Restored to Etched Line

It is seen then that if bulbs *A* and *B* were connected directly to pressures P_2 and P_1, respectively, and if P_1 were greater than P_2, greater pressure would be exerted on the surface of the liquid in bulb *B* than in bulb *A*; this pressure would tend to depress the liquid in *B*, force the liquid in *D* upward, and the liquid in *C* downward. This would tend to cause the meniscus to descend from the etched reference line, but this tendency can be neutralized by raising bulb *A* and thus causing a "head" of alcohol to work against the pressure tending to move the meniscus.

By means of the micrometer the bulb *A* is raised as high as is necessary to neutralize the pressure difference between P_2 and P_1. The exact distance that the bulb is raised is obtained from the difference between the zero, or initial, reading of the micrometer and the final reading. This means, then, that the difference between pressures P_1 and P_2 is equal to the head of alcohol obtained by raising bulb *A*. The distance the bulb is raised is measured directly to 0.001 of an inch on the micrometer and if necessary it can be measured to 0.0001 of an inch.

Knowing the head in inches of alcohol and knowing the temperature of the alcohol, which is, of course, the temperature of the surrounding air, the specific gravity of the alcohol can be found from a temperature-specific gravity curve and the head or pressure in inches of alcohol can be changed to inches of water, pounds per square foot, pounds per square inch, or whatever is desired. The specific gravity of alcohol varies with the temperature, so a specific gravity-temperature calibration curve is made of the alcohol in the gage each time it is filled. (Fig. 3.) A final zero reading always is taken after using the gage, and the initial zero reading and final zero reading should check within at least 0.001 of an inch.

Before filling, the glassware and rubber tubing of the gage must be chemically clean so that the liquids and particularly the meniscus or juncture of the alcohol and kerosene will rise and fall easily and cleanly. The red, or alcohol, liquid is put in the gage first so that it completely fills the inverted U-tube *C*, all the connections, and about one-third of the bulbs.

Care Used in Filling Micromanometer

A small measuring pipette with a stopcock to govern the flow and a small rubber tubing attached to the end is filled with kerosene. The kerosene is allowed to fill the rubber tubing completely so as to insure the absence of air bubbles, and the tubing is inserted down through bulb *B*, around the bend below *B*, and up through leg *D* of the inverted U-tube. The stopcock below bulb *A* is left open so as to permit equal displacement in bulbs *A* and *B*, and the kerosene, or colorless liquid, is allowed to ascend into the inverted U-tube and displace the alcohol. Enough kerosene is admitted (controlled by the stopcock in the glass pipette) to displace the alcohol and bring the two juncture points of the liquid within the constricted tube *C* and the enlarged tube *D*.

The specific gravity of the alcohol is obtained at several different temperatures by means of a Westphal specific-gravity balance, and a calibration curve, con-

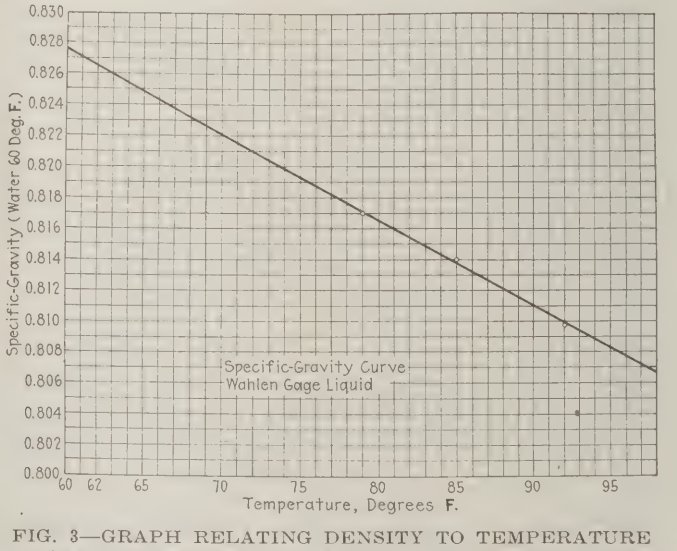


FIG. 3—GRAPH RELATING DENSITY TO TEMPERATURE

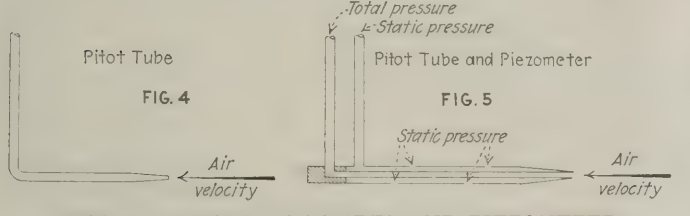
It has been determined that 0.8195 is a good working specific gravity for the mixture of alcohol and kerosene, but whatever it is its specific gravity must be known for every temperature likely to be encountered. This graph, starting at 60 deg. and ending at 100 deg., is adequate for intake temperatures, though only in places for those in the real workings.

necting specific gravity with temperature, Fig. 3, is drawn for the range in temperature under which the gage is likely to be operated.

A thousandth of an inch movement of the micrometer screw moves the meniscus about a sixteenth of an inch. This movement of the meniscus, however, can be adjusted to be greater or less by adjusting the difference in the specific gravities of the two liquids to be greater or less than 0.0085. This density, however, has been found to be about the "happy medium" for ordinary work.

In operating the gage after the bulbs are connected to the differential pressures P_1 and P_2, the stopcock below A is opened slightly until the direction of the movement of the meniscus is observed; it is then closed and bulb A raised or lowered to neutralize the pressure tending to move the meniscus; this is repeated until the pressures are balanced and the meniscus is stationary and at the etched reference line. In this way, by careful and delicate manipulation, the meniscus is never permitted to move out of the constricted part of the tube C.

It is evident then that, as there is no movement of



FIGS. 4 AND 5—PITOT TUBES AND PIEZOMETER

The pitot tube is affected by both velocity and static head, but with the piezometer attachment and the Wahlen gage the total head can be partly balanced by the static head and the difference will be the velocity head. The static head is obtained by openings the edges of which lie in the plane of the current and not at right angles to it.

the liquids, no corrections need be made for capillarity, viscosity, variations in the bore of the tubes, or conditions of the glass surfaces. The sensitiveness of the gage depends upon the relation between the areas of the cross-section of the large bulbs and the cross-section of the constricted tube, the viscosity characteristics of the two liquids, the small difference in specific gravity, and upon the fact that the constricted part of the U-tube is short. Other connections are large and free. The micrometer used is a standard machinists' micrometer with three-quarters of an inch to an inch measuring range.

The gage was developed primarily for measuring low air velocities with a Pitot tube, and it can well be used for this down in the mine, for no matter how carefully and accurately an anemometer traverse be made of a mine entry the results are not trustworthy as there are friction losses (especially if an anemometer cannot be rested on a firm base), mechanical defects in the anemometer, and quick changing puffs of air in the main flow due to innumerable projections and constantly changing eddy currents.

An anemometer cannot be calibrated so as to correct these defects and irregularities. When velocity readings are made with a sensitive gage and Pitot tube the readings are reliable, for by this system velocity pressure, and hence velocity, is measured direct, and the only requirements are that the Pitot tube be held out firmly so as to be stationary and meet the air flow squarely.

However, a plain Pitot tube such as is shown in Fig. 4 would measure not only velocity pressure but the static pressure as well. Air flowing in restricted passageways such as air duct, galvanized pipe or airways down in the mine is under three distinct pressures: the velocity pressure, static pressure, and dynamic pressure. The velocity pressure is that pressure necessary to change a quantity of air from a state of rest to a state of motion. It is, then, the pressure or head necessary to accelerate a mass of air from a state of rest to the final velocity attained.

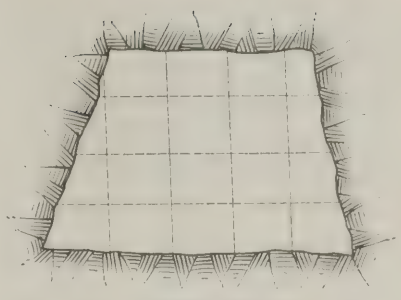


FIG. 6—MANNER OF DIVIDING AREA FOR PRESSURE SURVEY

Measurement of the pressure can be taken at the center of each square or at the intersections of the lines shown. In this way an average result for the airway may be obtained.

The static pressure, or head—also termed the frictional, or resistance, pressure, or maintained resistance—is the pressure necessary to overcome the resistance offered to flow. It is in reality the pressure exerted against the sides of the airway that the air is flowing in and is measured as such with the ordinary pressure gage. The dynamic or total pressure—also termed the impact pressure—is the sum of the pressures required to overcome resistance to flow and create the velocity of discharge. It is equal to the sum of the static and velocity pressures.

Modifying Pitot Tube to Get Static Head

Obviously then the pressure recorded by the Pitot tube in Fig. 4 would be the total pressure. We desire to measure velocity pressure, and can do so because velocity pressure equals total pressure minus static pressure. By measuring the difference between total pressure and static pressure we can measure velocity pressure alone. This is accomplished by attaching the two separate bulbs of our differential gage to the total pressure and to the static pressure and measuring the differential pressure, which is the velocity pressure or head. This is accomplished by means of a Pitot tube as shown in Fig. 5.

The piezometer and Pitot tube are combined in one tube in the above illustration. This is the standard tube which the American Blower Co. uses for fan testing. Static pressures are exerted through the small holes in the side of the outer tube whereas both velocity and static pressures are exerted through the center or Pitot tube. These tubes are completely separated from each other so that different pressures are exerted in each one, and the difference between them is measured.

By means of such a tube and a Wahlen gage a careful and accurate traverse of a mine entry can be made in a comparatively short time and the different velocity pressures or heads accurately determined. The best sort of a traverse is made by dividing the entry area into a number of squares (Fig. 6) and taking a reading either in the center of each square or at the cross points of the division lines and averaging the resulting heads.

The formula for getting velocity in feet from head in inches of water is derived from the formula for the

velocity of falling bodies, $v^2 = 2gh_x$. When g is the acceleration of gravity in feet per second per second, h_x is the head, or height in feet, of the flowing medium and v is the velocity of the flowing medium in feet per second. We cannot measure the head or height of air column inducing flow directly in feet of air, so we measure and express it in inches of water.

If h_x = head, or height in feet of the flowing medium, or air, and h_v = head in inches of water:

$h_x d = \frac{h_v k}{12}$, where d = density of air, lb. per cu.ft. and k = density of water, lb. per cu.ft.; 62.4 lb. at 70 deg. F. Then, $12\,dh_x = h_v k$

$$h_x = \frac{h_v k}{12\,d} = \frac{v^2}{2g}$$

$$v^2 = \frac{2gh_v k}{12\,d}\ ;\ v = \sqrt{\frac{2gh_v k}{12\,d}}$$

$$v \text{ in ft. per sec.} = 18.27\sqrt{\frac{h_v}{d}}$$

h_v is measured directly in inches of water and d can

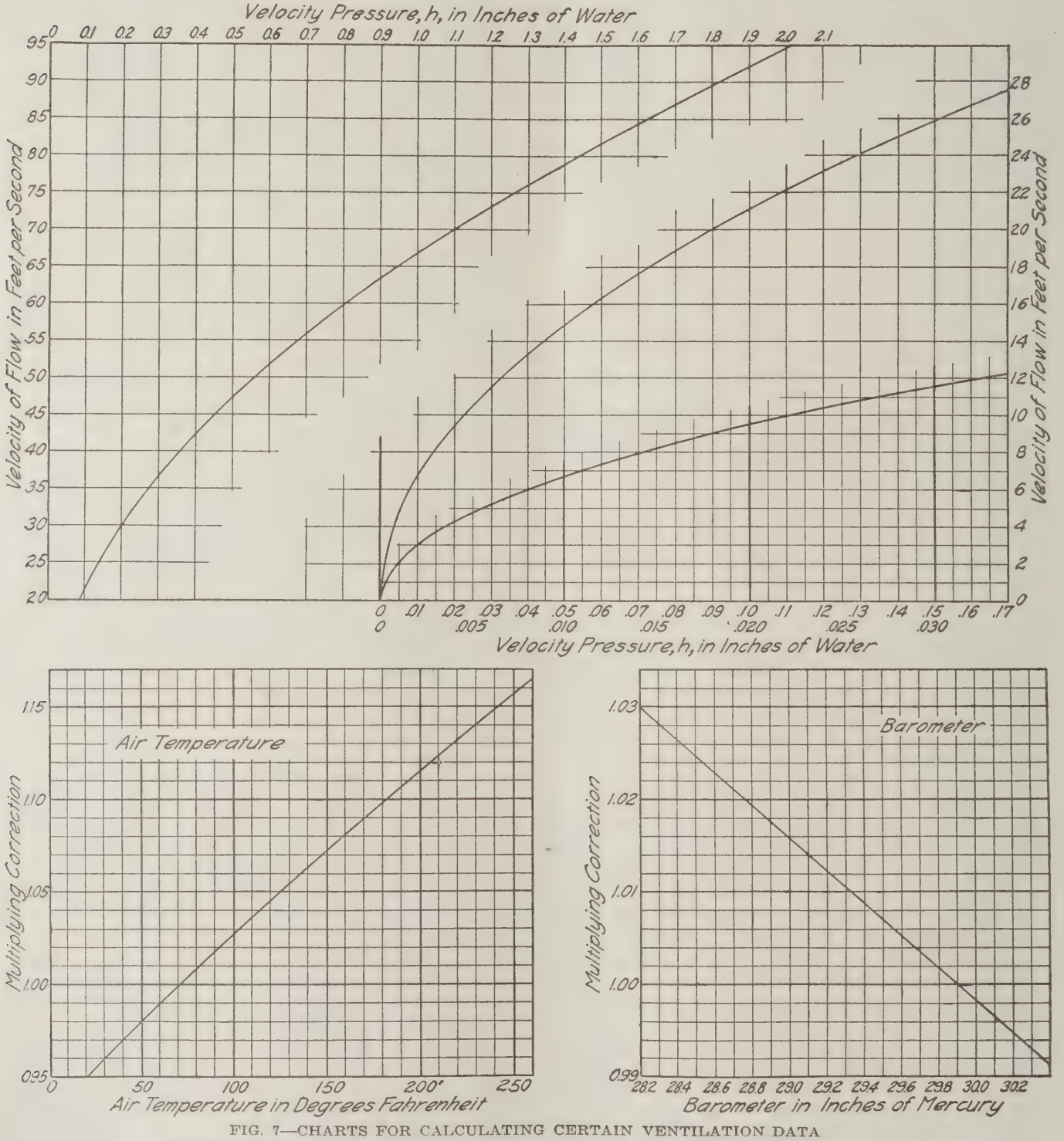


FIG. 7—CHARTS FOR CALCULATING CERTAIN VENTILATION DATA

The upper curves give velocities corresponding to velocity heads in inches of water, but these have to be corrected both for air temperatures and barometer readings. The gage-water density correction is negligible. $v = gkh/6d$ when g = 32.17; h = velocity pressure in inches of water; k = water density at 70 deg. F. = 62.4 lb. per cubic foot; d = air density at 70 deg. F. and 29.92 in. of mercury = 0.0749 lb. per cubic foot.

be calculated for any temperature and barometric pressure by means of the formula

$$d = \frac{1.325\,B}{T}.$$

B = barometric pressure in inches of mercury.
T = absolute temperature in degrees Fahrenheit.

This latter equation is derived from our formula for a perfect gas, namely $PV = MRT$. Air acts as such a gas and obeys this law within normal conditions of temperature and pressure.

P = absolute pressure in pounds per square foot.
V = volume in cubic feet.
M = weight of air in pounds = 1.
T = absolute temperature in degrees Fahrenheit.
R = 53.37, the constant for air.

$$PV = MRT \quad d = \frac{1}{V} = \frac{M}{V} = \frac{P}{RT}$$

$$d = \frac{144 \times 0.491 \times B}{53.37 \times T}$$

$$= \frac{1.325\,B}{T}$$

Much calculation, necessary to convert from inches of water to feet per second, can be avoided by means of the curves shown in Fig. 7. The results obtained from these graphs are accurate enough for all practical purposes.

The Wahlen gage is a precise and valuable instrument for measuring air velocities, but it has further values of some consequence in mine ventilation. The coefficient of friction for shaft lining and for sections of entry can be easily and quickly determined by means of the Wahlen gage and the static-pressure boxes developed at the University of Illinois mining engineering experiment station.

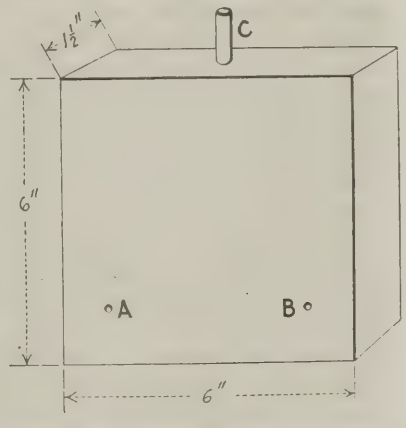


FIG. 8—STATIC-PRESSURE BOX

With the 1½-in. side of this empty airtight box facing the ventilating current the air has no easy task to find the minute holes *A* and *B*, and consequently the air in the box is subject to none of the pressure that is due to the velocity of the air in the passageway. The static pressure of the airway is all that affects the pressure in the box. That pressure is communicated through pipe *C* and thereby to one of the bulbs in the Wahlen gage.

These static-pressure boxes (Fig. 8) are empty galvanized-iron boxes, 1½x6x6 in., completely airtight, except for two No. 60 drillholes in each of the two broad sides and a hole in the top. Around this hole in the top a short piece of brass tube ¼ in. in diameter is soldered. When the box is set down in the mine entry with its narrow side facing toward the wind, only static pressure is transmitted through the small No. 60 drillholes in the sides, thence through the brass tubing acting as a nipple on the top, and thence through rubber or other flexible tubing to the gage, where it is measured. The distance through which the pressures are transmitted is immaterial, providing the pipe or tube through which they are transmitted is airtight and providing enough time is allowed for the pressure to become constant through the entire pipe or tube.

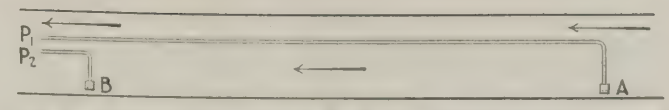


FIG. 9—METHOD OF USING BOX TO DETERMINE CHANGE OF STATIC PRESSURE IN ENTRY

The pressure P_1 from box *A* is taken to one bulb of the Wahlen gage and the pressure P_2 from box *B* is taken to another. The difference in pressure determines the loss of head resulting from the resistance of the airway.

In Fig. 9 the pressure boxes at *A* and *B* record the static pressures, P_1 and P_2, that exist at those points. These pressures can be transmitted through the tubing to a convenient spot where the Wahlen gage is located, and the difference between them measured. The difference between P_1 and P_2 represents the static pressure loss or the pressure necessary to force the quantity of air flowing (this quantity must also be measured) from point *A* to *B*. This is the pressure necessary to overcome the resistance offered to this quantity of air and is the part of the total water gage for which this section of entry *A* to *B* is responsible.

With two static pressure boxes, enough tubing, and a Wahlen gage an observer can go throughout the air courses of a mine and find the main causes of loss of pressure, and hence the power losses. The resistances offered by and the pressure lost in overcoming the resistance of each obstruction, bend, section of irregular and jagged entry, section of heavily timbered entry, approach and retreat to and from overcasts, sharp turn, and sump occurring in the air courses can be segregated and the mine resistance thoroughly investigated.

Are Bends and Obstructions Bad as Stated?

If the exact pressure and power loss caused by some obstruction or irregularity in the ventilating system is known, it is easy to calculate whether or not it would pay to remedy the obstruction. At present the mining engineering experiment station of the University of Illinois, College of Engineering, is investigating the power losses caused by sharp bends and sumps at the bottoms of airshafts.

In a paper read before the West Virginia Coal Mining Institute at its summer meeting in 1910, Thomas W. Fitch, Jr., stated that: "The resistance offered by turns can be disregarded for low velocities, but where the velocities are high, the loss of pressure becomes serious. Where air is forced around a right-angled turn, with the corners square, the pressure loss usually is assumed to be double the velocity head. For example, if air is traveling in an airway at a velocity of 1,000 ft. per minute, its velocity head is 0.06 in. water gage, and the loss due to a right-angle turn would be 0.12. Where a curve is used this will be greatly reduced."

Mr. Fitch's conclusions were not based on actual experiment in the mine but rather on similar experiments with piping systems. With the Wahlen gage and static-pressure boxes sufficient data can be collected showing at different velocities the resistance of all sorts of turns, expansions and contractions which Mr. Fitch asserts are serious sources of pressure losses when the velocity is high. From these a reference curve or table can be constructed.

By referring to such a curve or table for bends and irregularities and using a dependable coefficient of friction for stretches of entry, the mine resistance and

operating water gage could be estimated much more closely than it is now by means of the coefficient of friction alone.

The coefficient of friction to which reference most frequently is made is that advanced by Atkinson and is 0.0000000217. This is the resistance, in pounds, offered by 1 sq.ft. of rubbing surface to air flowing at the rate of 1 ft. per minute. This coefficient will suffice for rough, crooked, irregular and timbered air passageways, but is much too high for average airways. Much work must yet be done before good standard and reliable coefficients for different conditions are established, for from Atkinson's time to the present the general coefficient for average airways has been given values of from 0.000000001872 to 0.0000000219.

Operators and superintendents are coming to realize more and more that power losses in the ventilation system are much more serious than they seem to be, because the ventilating fan and system is in operation 24 hours a day seven days a week. If we consider a small mine producing 1,000 tons of coal per day as requiring 50,000 cu.ft. of air per minute; in a week the mine will produce 6,000 tons of coal, but the fan, working continuously and blowing air at the rate of 50,000 cu.ft. per minute through the mine, will have handled

$$\frac{50{,}000 \times 0.075 \times 60 \times 24 \times 7}{2{,}000}$$ or 18,900 tons of air.

This means that for every ton of coal that was hoisted 3.15 tons of air was forced through the mine.

The Wahlen gage is not as yet a practical gage for everyday use, because it is delicate and heavy and must be manipulated carefully in order that trustworthy results can be obtained. It is an extremely valuable instrument in the hands of one who has become accustomed to its manipulation while making accurate ventilation determinations or while making researches into the flow of air and ventilation.

To Discuss Equipment Problems in Forum At Mining Congress Convention

THE national expositions of mines and mine equipment have become a permanent and important feature of the annual conventions of the American Mining Congress, which are the recognized meeting place for mining men from all parts of the United States. At the two previous expositions the attendance was made up largely of mine executives and high operating officials. The attendance of these men have been of great value but naturally the exposition, with its comprehensive display of every type of mechanical equipment entering into mine production, is of special interest to the operating men, who have daily problems to solve in connection with the handling of particular phases of mechanical equipment.

As a matter of fact the objective of these expositions has been and is primarily to furnish the mine operator with an opportunity of studying and comparing all of the different types of equipment in order that through such comparison he may be able to solve his equipment problems and to obtain the exact type of equipment particularly adapted to the working conditions in his mine.

The value of this opportunity can hardly be overestimated, says E. C. Porter, convention manager, but the greatest benefits will never be obtained until the mine owner and mine executive makes it a point to see that the different operating men in his mines dealing with electrical equipment, transportation problems, the handling of explosives, etc., are sent once a year to these expositions at company's expense to study and report and thereby be in a position to use the knowledge thus gained as a basis of saving money and of lowering costs through intelligent purchase of the right type of mining machinery and mine equipment.

In order to give operating men an opportunity of discussing in an informal and practical way the day-by-day equipment problems which are met in mining enterprises, the convention and exposition management has arranged this year as a special feature of the Milwaukee meeting, Sept. 24-29, a series of group conferences between the representatives of the exhibitors and the operating men which has been designated the "Open Forum."

Will Educate Coal-Mine Operatives

PENNSYLVANIA STATE COLLEGE, through its president, Dr. John H. Thomas, has outlined a plan for helping ambitious young men who are engaged in mining to learn more of the technical as well as the practical side of the work.

State College already has a course in mining engineering but Dr. Thomas plans a short course in practical mining where young men may receive instruction either personally or by mail. The course is designed to teach how to operate pumps, fans, mine cutters, fan systems, electrical apparatus and other machinery with which mines are now equipped. This is not the work of the mining engineer, but the work incident thereto pays well nevertheless and operators and mining companies are finding it increasingly difficult to get competent men to fill these positions.

Heretofore operators could get skilled men for such jobs only by training them at the mines. Men with the proper training and ability are paid from $200 to $400 per month, and the jobs are well worth while to the young men who equip themselves for that purpose. This work has been conducted in a haphazard manner in the past and it is the opinion of Dr. Thomas that a school such as is planned can do much to bring about better results, especially in the central Pennsylvania bituminous field.

State College is situated near a field that mines one-twelfth of all the coal produced in the United States. The school will be designed distinctly for coal miners. No technical or educational attainments will be required for entrance into the school save a reasonable, natural aptitude and the ability to read and write. Thus there will be no barriers to keep out ambitious young men.

Dr. Thomas is of the opinion that such a course would tend to keep young men in the business and increase their earnings. In connection with the course, camps of instruction would be established at central locations, near a well-equipped mine, where practical instruction could be given.

MINERS APPEAR CONFIDENT, for some reason, that the Government could run the coal mines better than it ran the railroads.—*Washington Star.*

WHAT WE NEED just now is not the output of the best minds so much as the output of the best mines.—*New York Tribune.*

Tank for Cleaning, Classifying and Thickening, in One Operation, Fine Anthracite or Bituminous Coal

Water Near Top of Tank Drawn Off by Centrifugal Pump and Fed in Slowly Revolving Jets to Bottom Stratum, Where It Loosens Mixture, Permitting Coal to Float to Base of Clear Zone

By John F. Hardecker
Brooklawn, N. J.

TO THE coal industry, breaker, or washery, slush is at present an ever-growing nuisance. In fact in most cases it represents an actual monetary loss to the operator. It is essential that this, as indeed every other waste, should be eliminated. Breaker water in itself is in many instances a source of no inconsiderable expense. To recover most of the coal in the slush and clarify the water so that it may be used again and to do both of these things economically and practically would be an advantage to everybody. If this could be done the apparatus would not only save coal but render the water from the breaker available for re-use. Such a device, therefore, would be to the operator a source of additional output and profit.

Before examining the method to be advocated it might be well to review the means by which efforts are being made in some few places to eliminate this waste. These involve the use of three machines. A classifier is used to remove from the breaker slush all coarse granular matter, but that, unfortunately, includes all the impurities. An effluent much diluted, but carrying nevertheless much coal and impurity, is discharged from the classifier. This discharge is then treated in a thickener, which thickens it to about 50 per cent moisture. Even this is not a perfect action, as much fine coal escapes with the water that leaves the thickener. The product of the classifier contains such a large quantity of impurities that it is necessary to treat it in a concentrator, which at best leaves from 8 to 12 per cent of impurities in the final product.

Cleans, Sizes and Thickens Product

The machine to be described does the work of all three machines, acting at once as a thickener, classifier and concentrator. Furthermore, it will catch all of the extremely fine and all the coarse coal, separate the impurities, and leave the coal product in a thickened state ready for distribution.

The machine is illustrated by a sectional view in Fig. 1, an exterior view being shown in Fig. 2. It is intended for washing and purifying the finer grades of coal direct from the crusher or breaker, separating them in particles of a size suitable for the grade they are to occupy, and collecting and thickening the extreme fines, which are ordinarily washed to waste. The entire operation is performed in one passage through the machine and is applicable to both bituminous coal and anthracite. The machines can be made of any size and for any capacity. They have been made to deliver 500 tons per day but can be designed to have even greater output.

The machine is so constructed that when filled with a dilute mixture of solids circulation is caused by withdrawing liquid from above through an annular suction conduit, *A* (see Fig. 1), and projecting it toward the bottom from rotating jet nozzles, *B*. These nozzles rotate automatically about a cylindrical base, *C*, being suspended from above by a cylindrical shaft, *D*.

The arms from which the jet nozzles project, *E*, are immersed in the liquid, and due to their relatively slow velocity, scarcely disturb the liquid through which they are passing. The overflow launder takes out all excess water that accumulates in the system as a result of the continuous introduction of slush-laden water. The circulating pump, *F*, has a bypass above it for regulating the volume of circulation and controlling the strength of the current issuing from the rotating nozzles. To aid in the work of classification the tank is constructed with sloping sides. It also has a V-bottom for the better accumulation of the impurities.

The circulating pump withdraws thin liquid from the suction level and forces water through the rotating arms. This water escapes as jets from the revolving nozzles and sweeps through the solids to the bottom of the track. These streams, impinging on the bottom, cause a continuous return movement of water to the suction inlet. This upward flow in the tank extends only to the suction level, *G*, below which all the solids fall and are confined. The space above, termed the "clear zone," is a quiescent settling basin, undisturbed by any action from below.

The jet streams merely loosen the submerged strata and allow the impurities to settle back into place, the coal floating upward. It is a well-known fact that when sand or fragments of impurities heavier than coal are kept in close liquid suspension they will cause the coal, which is of lower specific gravity, to float to the

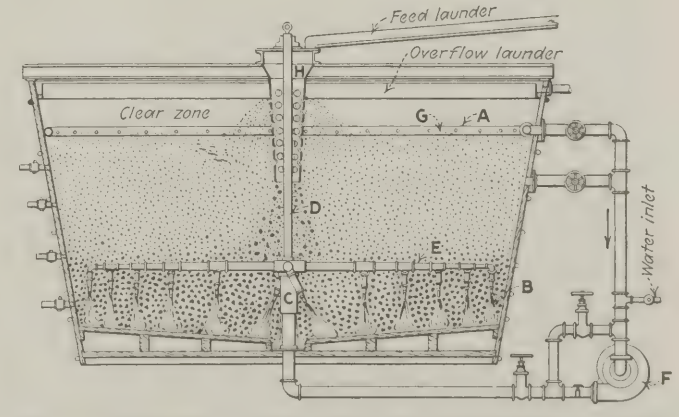


FIG. 1—SECTIONAL VIEW OF TANK THAT WILL CLEAN, SIZE AND PARTLY DEWATER COAL

By this tank the water is so freed from coal and impurities that it can be used over and over again in the washing process. The finer coal rises to the bottom of the clear zone and when removed is in a fairly thick condition. Middling coal may be discharged separately and still further reduced in size by crushing, after which it can be returned to the tank for further purification. The slate, sand or clay particles and the pyrite can be removed by a pipe near the bottom. An overflow launder is used for the discharge of clear water. Concentration and classification take place also as the tank is being fed with slush.

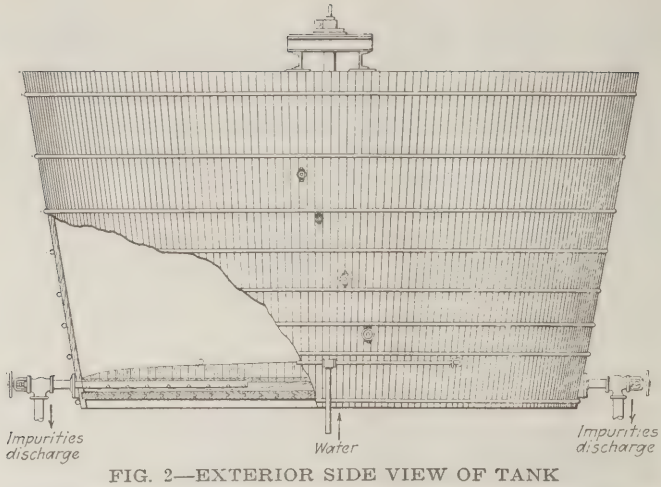


FIG. 2—EXTERIOR SIDE VIEW OF TANK

Note the flaring sides which with the growing decrease in the crowding of particles make the velocity of the water and coal on rising continuously decrease so that both finally come almost to rest, permitting sedimentation of even the purest and smallest of particles and the formation of a zone of clear water near the surface of the fluid in the tank. The impurities are drawn out at the bottom.

surface of the denser medium. To this extent the machine becomes a classifying thickener, which gathers the inflowing solids and stratifies them according to size and quality.

When the solids in the form of finely crushed coal (more or less impure) are introduced into the distributor, *H*, either in the dry or dilute condition, the coarser and heavier particles fall directly to the bottom of the tank, where they accumulate and augment the thickened strata. The lighter particles of coal spread above the impurities. When sufficient solids have accumulated in the tank the jets passing among them cause pulsations, which allow the coal to rise and form a separate stratum above the impurities, permitting the heavier particles, consisting of sand, slate, bone or other ash-forming material, to form a bed on the bottom of the tank.

Jets Loosen Impurities in Bottom of Tank

As the coarse solids thus accumulate the jets loosen the impurities so that any coal particles imprisoned by them are released and thus can pass upward in the liquid. The bed of impurities usually is allowed to accumulate to a considerable depth, as it will be more completely impure at the bottom, from which point it is discharged either continuously or intermittently.

As the bed of impurities is increased in depth it will contain a higher percentage of coal toward the top, and as the column ascends it will merge into clear coal. Therefore the mergence may be automatically controlled by regulating the discharge of impurities. (See Fig. 2.) This will be especially desirable where the coarse particles discharged are reground so that further impurities may be released.

The coal, forming a suspended stratum or column above the impurities, automatically stratifies with its heavier particles below, graduating upward to the finest. The greatest upward velocity of the liquid is between the coarser particles, through which it first passes. As the liquid rises, the tank widens and there is less obstruction from solids, and so the velocity of the liquid decreases. The upward current gradually subsides to minimum velocity and holds only the finest of the coal in suspension. Some of the extreme fines may flow with the circulation through the pump, but, due to the velocity in the tank, they must always return upward into the current when released into the tank by the jets.

When a charge has accumulated, the content of the different strata may be continually discharged from one or more outlets, the hydrostatic pressure being sufficient effectively to force coarse material from the lower outlets, the finer sizes being easily extracted from outlets higher up. To conserve water it is essential to keep the coal strata at maximum density before discharging. Under ordinary conditions, if the coal is fed into the machine with excess dilution, all excess water will escape at the overflow in a clear state.

The apparatus contains no gears or complex mechanism of any kind. It is a rugged, simple, completely balanced machine and is almost foolproof. The circulating medium has a balanced head. There are no torsional stresses or unbalanced resistances, and there is little greater stress on the mechanism when operating at full capacity than when at absolute rest. This is due to the fact that all moving parts are balanced in liquid suspension.

The machines can be modified so as to be purely classifiers for extremely fine coal or they can be used as classifiers for fine grinding machines or they can be employed for separating fine coal into merchantable sizes. As thickeners for gathering and thickening fine coal from water they have great capacity and will produce an extremely dense discharge.

When operating in connection with a fine grinding machine for eliminating impurities and producing fine coal for special purposes, water admitted through the water inlet at the right (see Fig. 1) will assist in regulating the discharge to extreme fineness.

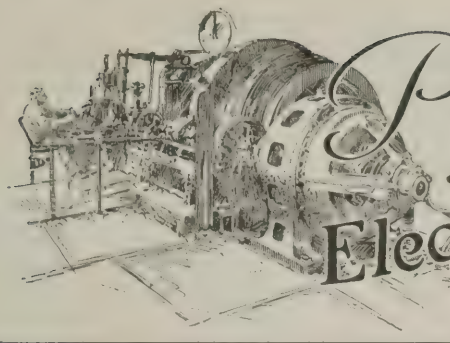
Elements of Mining

FULL credit should be given to George J. Young for his book entitled "Elements of Mining." The material in it is well selected and carefully grouped. It follows a well-conceived plan and evidently represents many years of methodical correlation.

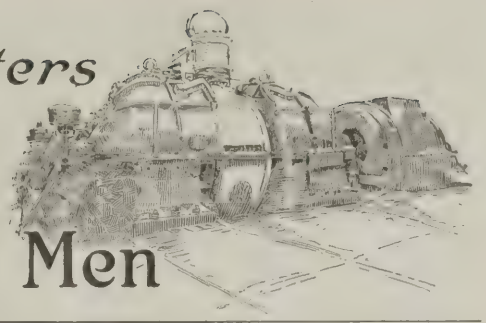
Unfortunately for the coal-mining man, the author does not have the coal problem definitely in view. It seems even to appear as an aside or after-thought, even as any unwelcome, unbidden guest. As a result the book is better suited to the metal-mining man than to those whose duties are connected with the extraction of coal. Yet it must be confessed that this is in fact a merit in the book rather than a defect. Many readers would testify that a book with a predominance of metal-mining was just exactly what they wanted.

The treatise also keeps closely to a certain class of information and does not attempt in its 671 pages, measuring $5\frac{3}{4} \times 9$ in., to cover the multifarious side issues of the mining problem, the mechanical and electrical equipment or the subject of preparation.

The duties of mining, mechanical and electrical engineers at mines tend to overlap and the information needed by each is difficult to define with exactitude. This book, however, is written for the first of the three and especially for the man who is engaged in metal mining. To coal-mine engineers it may be said, however, that no technician safely can afford to shut his eyes to the developments of sister sciences, so readily may the achievements and concepts of one be transferred to the other. The book is published by the McGraw-Hill Book Co., 370 Seventh Ave., New York City.



Practical Pointers for Electrical and Mechanical Men



An Important Point with Reference to the Polarity of the D.-C. Generator

Where there is danger of lightning which connection and polarity should be used?—Can the circuit breaker be located to relieve short-circuits in the generator?

I HAVE heard it mentioned that there are some installations of generating equipment at coal mines where the series field winding is operated as the positive of the generator feeding direct current to the haulage and general direct-current system.

Sometimes one of our generators builds up with the wrong polarity but we are always careful to change it so that the armature lead is positive.

If there are any particular advantages in operating the machines with the series-field lead positive I would like to know.

A READER.

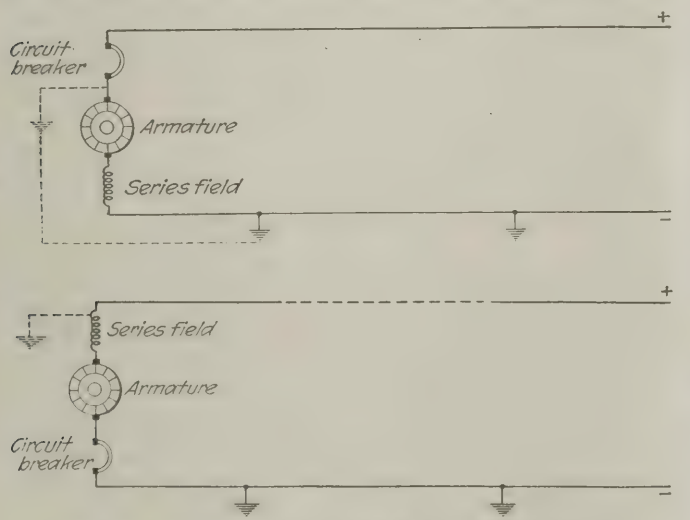
Here is a page or two of what you have been looking for. Not that it is new in "Coal Age" but it is brought together particularly for your convenience. Send in your ideas, experiences and questions. These pages of Practical Pointers are for you.

One of the greatest advantages and arguments in favor of making the series field end of a generator positive is attained where the feeder line or trolley line is run on the surface of the earth some little distance before entering the mine. Here the trolley line or feeder on the surface is exposed to lightning.

Looking at Fig. 1, where the armature lead is positive and the circuit breaker is in the positive line, a stroke of lightning near the lines in the case of the negative line would run off to ground because it is grounded, but in the case of the positive it probably would seek a path to ground through the machine; if lightning struck the armature it probably would break down the insulation there. The armature winding is difficult to repair and, furthermore, the circuit breaker would be of no avail in breaking the short-circuit thus resulting, as shown by the dotted lines.

In Fig. 2 the series field is positive and the circuit breaker is in the negative lead. A stroke of lightning now coming in on the positive line no doubt would break down the insulation of the series field. The series field insulation usually can be more readily repaired than the armature insulation; also, since the circuit breaker is in the grounded side the short-circuit resulting from the breakdown of the series field would be immediately opened by the opening of the circuit breaker.

Frequently machines are designed so that the series field should be the grounded side and of course not heavily insulated. Under these conditions it is not always possible to make the series field positive and ground the other lead, because this puts full voltage strain on the insulation of the series field.



TWO CONNECTIONS FOR THE D.-C. GENERATOR

In the first figure it is evident that a ground between the circuit-breaker and armature is not cut off by the circuit-breaker. The second figure shows a connection which may be used to advantage where the positive line is exposed to lightning disturbances.

An Easy Method for Obtaining the Diametral Pitch of Gears

ONE of the most difficult pieces of repair equipment which the electrical or mechanical man about the mines is called upon to order is a gear or pinion. Numerous catalogs and bulletins are published and available around the mines which explain various formulas about the design of gears and gear teeth. In these bulletins the pitch circle, diametral pitch, tooth root, tooth addendum, etc., are explained in detail. All of these points are interesting, but when a new gear is to be ordered the difficulty lies in this fact: Who remembers the mass of gear formulas he thought he had learned?

The importance of having the proper pitch of the teeth in a gear or pinion needs no argument, yet the question of determining this pitch from an old gear perhaps several miles underground is a real difficulty for almost anyone.

There are two ways of measuring the tooth pitch of gears, one is called circular pitch, which generally is used to measure the pitch of cast gears, and the other

is known as the diametral pitch, which generally is used to designate the pitch of cut gears. It is this last group which is most popular and the one which we will now consider.

First of all it is important to understand what diametral pitch means. Diametral pitch is the number of teeth per inch of pitch diameter, or, in other words, the result obtained by dividing the number of teeth in the gear by the diameter of the pitch circle, expressed in inches. For example, a gear may have 69 teeth and the diameter of the pitch circle be 23 in.; in this case 69 teeth ÷ 23 in. gives 3 diametral pitch. Note that this 3 is not 3 in. It is important to remember this point because 3 in. would be altogether incorrect, and would result in a gear far different from that desired.

The diametral pitch of a gear usually is an even number or common fraction thereof, the most popular for mining equipment being 3, 3¼, 3½ or 4.

So far we still have that difficulty in determining what the pitch diameter of our gear is. Fortunately, certain relations exist in cut gears which greatly simplify our difficulty. Perhaps the easiest method of obtaining the diametral pitch is from the formula: number of teeth + two ÷ by outside diameter = the diametral pitch.

In other words when getting data for a new gear the electrical or mechanical man need only have a rule for measuring the outside diameter of the gear and count the number of teeth. This information will give him or the manufacturer sufficient data for determining the diametral pitch.

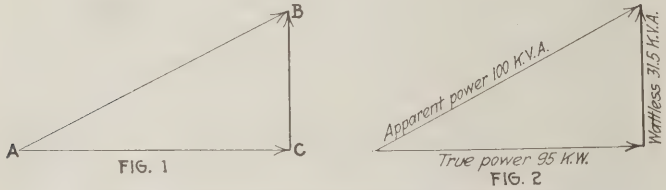
Example: A gear has 69 teeth and the measured outside diameter is 23⅝ in. Therefore, 69 + 2 ÷ 23.625 = 3.005. The actual outside diameter of the gear was 23.667 in., but 23⅝ or 23.625 in. was the measured diameter with the rule, which shows the diametral pitch to be 3, since the calculation with the slightly inaccurately measured outside diameter indicates close to 3 and far distant from either 2¾ or 3¼.

An Advantage of the Reactive-Factor Meter Over the Power-Factor Meter

WHEN buying switchboards and equipment for alternating-current systems we frequently have the choice between power-factor meters and reactive-factor meter. All of our meters at present are power-factor meters, yet I would be pleased to have a discussion of these two meters in your paper.

PURCHASER.

A discussion on these meters would no doubt be interesting. The subject of power-factor is one which most customers were introduced to by the power companies during the war. Many coal operators had not given much thought to the matter of power-factor and are now paying the costs. The question of high wattless current in the lines and equipment is not only a live one for the purchaser of power, but also for the isolated power plant at the mine.



FIGS. 1 AND 2 SHOW VECTOR RELATIONS

In Fig. 1 the ratio $\frac{AC}{AB}$ represents power-factor and $\frac{BC}{AB}$ reactive-factor. Fig. 2 shows a condition of high power-factor but a large proportion of wattless kva.

The principal difference between the power-factor meter and the reactive-factor meter is that one indicates a ratio between true power and apparent power, sometimes called the cosine; while the other indicates a ratio between the wattless component of apparent power and the apparent power, called the sine.

With reference to Fig. 1, power-factor is the ratio AC ÷ AB, while reactive-factor is the ratio BC ÷ AB. In the figure AC represents true power, BC wattless component and AB apparent power.

Under some conditions the reactive-factor meter seems to be the more desirable; to illustrate, Fig. 2 shows a right triangle representing 95 kw. true power, 31.5 kva. wattless component and 100 kva. apparent power.

The power-factor meter under these conditions shows 95 per cent, while the reactive-factor meter shows 31.5 per cent. In this case the power-factor meter reading of 95 per cent is good, but althought it is what is called good, it does not give any indication of the amount or ratio of the wattless component, which it will be observed is one-third of the true power, thus indicating that the wattless component is of a very appreciable amount.

Why Choose 440 Volts for Distribution Instead of 220 Volts?

WE HAVE a new bank of transformers for use on a new line which can be laid out for 220- or 440-volt equipment. The bank of transformers has a secondary winding suitable for either 220- or 440-volt connection. What are your recommendations as to which voltage we should use? REPAIRMAN.

From the question as presented it is probable that the equipment to be used on this line will consist for the most part of induction motors.

Induction motors are made to operate satisfactorily on 10 per cent under-voltage or 10 per cent over-voltage. This being the case the low limit of voltage on the 220-volt motor is 198 volts or an allowable 22-volt drop; the low limit of voltage on the 440-volt motor is 396 volts or an allowable 44-volt drop. The 440-volt motor therefore gives us twice the permissible voltage drop allowed the 220-volt motor.

For a given load the current at 440 volts will be half that at 220 volts; therefore the size wire, from this point of view alone, would be half that for the 220-volt load.

The two factors of greater permissible drop in volts and reduced current in favor of the 440-volt system mean that the size wire for the 440-volt distribution need be only one-fourth that required with 220 volt.

Get out your pencil and paper and figure this out for your personal satisfaction; it is an interesting point.

As a result of such advantages and economies the development in the application of alternating-current is along the lines of higher voltages. A few years ago it was considered a dangerous and novel feat to use 2,300 volts in the mines but today it is common to operate even small motors at 2,300 volts or higher, thus obtaining better operation from the equipment.

Reforesting Denuded Timber Land a Means of Reducing Freight and Material Costs of Roof Support*

Timber Shortage in Sight—Trees Should Be Cut When Mature, Leaving Smaller Trees Uninjured for Later Cuttings—Individual Better Than State Ownership—Ill Effect of High Local Freights and Excessive Taxation

By E. S. Stackhouse†
Shickshinny, Pa.

THE growing scarcity of timber of all kinds and the increasing exhaustion of producing areas brings to our attention problems regarding the cultivation, production and marketing of timber, not alone for general use but more especially for mine purposes. Particularly acute is the need of the anthracite districts of Pennsylvania. The policies of the past have brought about present conditions, and it goes without saying that these are far from satisfactory. As we look back on the last thirty to forty years we can see in relation to our timber supply nothing but blunders and neglect, ignorance and wastefulness.

A resource and an industry of prime importance has been allowed, through get-rich-quick methods, to dwindle into insignificant proportions just as the need for its ministrations is greatest. Would that man's foresight might be at least in small measure equal to his hindsight. The trouble is that during this period there has been no broad policy at all and nothing constructive until within the last few years and the efforts made since the importance of the issue has been recognized have all been too puny to stay the big economic fact that a timber shortage is in sight.

A Spoliation and Restoration Forest Policy

The government has adopted a policy of conservation which, however, applies largely to the Western domain. Pennsylvania and other near-by states as well as the larger coal companies have adopted a reforestation policy and are carrying it out vigorously. This takes the land after it has been denuded of its timber, and by a long, tedious and costly process restores in part its timber productivity, but the pity of it is that forest lands should ever have been allowed to become a wilderness when a far-sighted constructive policy in their handling would have kept them forever in a productive state. This is a crime against civilization and posterity, and, as usual, our children will pay the bill. It is worth our while even in this late day to examine the matter critically and to see what may be done to ameliorate the situation—to study how we may change our present destructive policy to a constructive one. The two main elements which enter into this problem are wrong methods of cutting and neglect.

The section in question, the northeastern portion of the United States, has been blessed with some of the finest forest-growing conditions in the world, with a great variety of timber growth well adapted to the varied needs of its inhabitants. The conifers which so abundantly clothe its valleys are easily reproduced in a natural way by seedlings as quickly as an opening is made in the ground, and the hard woods which cap its hills and ridges immediately respond through sprouting to the great laws of reproduction. Nature has done well, but man has deliberately defeated her most beneficent plans. He has walked with the precision of a devastating army throughout the length and breadth of the land and for the sake of a little quick gain, which has been followed by neglect, has absolutely destroyed a golden heritage, a most precious possession—the reproductivity of our forests. The devastation of the Germans was child's play to the destruction wrought by the "lumberjacks" in our own land during the past fifty years.

But as we talk time passes. It serves no good purpose to dwell on the mistakes of the past except as we learn the lessons they teach. Our problem now is to



TREES ON AREA REFORESTED AND GUARDED FROM FIRE

Scene on the property of the Kingston Coal Co. The average smoker or hunter might hesitate to devastate a thrifty growth of timber like this but he counts the early stages of timber development as of little importance and throws his matches and builds his fires without scruple.

*Article prepared for *Coal Age* but read before Foresters' and Timber Owners' Meeting at Wilkes-Barre, Pa., an assembly at which most of those present were interested in the development of the burned-over and reforested lands of the anthracite companies.

†President, E. S. Stackhouse Coal Co.

look into the needs of the future and prepare as best we may by wise, constructive and courageous action to meet them. In order to accomplish this we must analyze somewhat our present methods of cutting and make such changes as the conditions demand. It would seem that in the serious situation now facing us every branch of the trade—owner, producer, dealer and consumer—would cheerfully co-operate in any common-sense methods that would conserve their interests for the future and perpetuate their chosen industry.

We have inherited an entirely wrong conception of handling our timber lands, coming down from the days



ARTIFICIALLY PLANTED AREA AFTER A DECADE OF PROTECTION AGAINST FIRE

European larch of 10 years' growth may be seen in the rear. In the foreground is Norway spruce of 9 years' development. These trees are on the property of the Kingston Coal Co.

of our unlimited primeval forests. Methods that might have been excusable in those days may be absolutely inexcusable in the changed relations of the present. Germany, France, Switzerland and other European countries have long since been forced to adopt improved methods, and our time is at hand. Will we have the courage and determination to enforce those measures which are absolutely necessary to conserve our already sadly depleted forest reserves?

Planting forests is all right but the old adage applies—an ounce of forest conserved is better than a pound of forest planted. Coming back to basic facts, the trouble is that by wrong methods we are destroying our forests by wholesale. We cut them clean and then abandon them. We kill them ruthlessly and then do not even obtain the services of an undertaker to care for the remains. Then along comes the kindly disposed, fatherly State, takes over the corpse and by ample funds, tender nursing, loving care and watchful waiting, attempts to bring the dead to life again. I submit that this is not fair, that it ought to stop and stop quickly. The love for quick gain ought to submit to a broad conservation policy for the good of all.

Such methods of cutting as will preserve our forests should be put into practice. Provision should be made for the reproduction of timber and every protection against fire afforded. When this is accomplished we can look forward to a time when the forest growth will take care of the people's needs, which will, of course, adjust themselves to the supply. Then our forest problem will be placed on a sound economic basis instead of the uncertain, slipshod, headlong conditions now prevailing. The methods needed are exceedingly simple. To apply them is not so easy.

First of all, education is necessary, to create a wholesome public sentiment that will welcome and stand by any measures necessary to the end in view. It is surprising how a new policy will change the whole attitude of a people. Evidence of this may be found in the public viewpoint as to forest fires. The "Smith and his woods be damned" attitude has changed to "I'll be glad to help you put it out." Every timber owner and lumberman realizes the devastating effects, the losses, the ruin of present policies and, I believe, would submit more easily than we think to a curtailment of his privileges and a slight regulation of his methods to the advantage of all. He would soon learn that his interests in improved methods would be largest of all for it would protect him by assuring him that his industry would last indefinitely. The public is ready right now, in my judgment, for such action as would assure protection to our remaining forests.

Every Clearing Should Be Proved Necessary

Broad visioned and firm, yet fair and practical legislation should be passed and strictly enforced preventing any owner from cutting any forest clean except for a clearing that can be justified. No cuttings should be allowed under certain limitations except for improvement purposes. The protection of young timber should be encouraged in every possible way. By this method the conditions of the problem would be radically changed. All privately owned forests would immediately become part of a general conservation system. Every forest owner would stand for protection on account of the equity which he is forced to retain in his forest. The general indifference to cut over land would give place to an increasing interest and to a careful study on the part of owners to get by prudent management the greatest productivity from their holdings; self-interest thereby advancing conservation.

The greatest force for conservation remains with individual owners. They should be encouraged, instructed, urged and legislated into handling their forests in the interest of conservation. In the final analysis it is their job, and I submit that a host of interested owners scattered all over the state, living mostly near their holdings, incited by self-interest and economy can better work out this problem than the State. It is a question that belongs to the State only should others fail. The Commonwealth cannot do it as well nor as cheaply and should not undertake it except as a last resort. What has been done by Pennsylvania and other states has been forced on them by the mistakes of private ownership.

It is not my intention to discuss the importance of care in culling, cutting and handling to protect the younger growth and the importance of greatest and best utilization. These are details of the general prob-

lem of conservation and bear an important part in the policy as a whole.

Other matters now may be suggested whose influences are not so obvious, but are nevertheless real in their bearing on the question. One is the fact that the local railroads serving the territory in question, the anthracite coal roads, are discriminating heavily against local timber shippers in their rates and favoring shippers of the South and West. They probably have their own arguments for this policy, but I venture to say that in arriving at their conclusions they have not taken into consideration the influence which a fairer rate, meaning a greater realization to the local timber owner, would have had on his attitude toward conserving and preserving his timber supply.

I wish to suggest that a close community of interest should and must obtain between the consumer and the grower of wood products if the best results are to be attained. The purchaser should understand the problems of the lumberman in his relation to the general conservation scheme and be willing to adjust himself in as far as he can to the interests of the scheme as a whole. He may have to discard some of his old customs, theories and requirements, but he will be glad to do this when he sees the interrelation of his business with the conservation idea.

Purchasing Agents Should Aid Timber Men

One of the most important groups in local timber conservation should be the anthracite coal companies' timber purchasing agents. They are being forced by economic conditions to open their eyes to the problems involved, but if they were fully awake there would be less discrimination and greater co-operation in their contact with timber growers. To cite one instance, if during the devastation caused by the chestnut blight the purchasing agents had found ways and means to use more of the dying chestnut in lumber and mine timber, thousands of cars of valuable forest products which have been going to waste could have been substituted for other material which might then have stood untouched for the future, when it will be so badly needed.

The tax question is most intimately associated with forest conservation where this work is being undertaken by individuals. The State has a great advantage over the private owner, but inasmuch as it is greatly concerned that individual owners shall practice conservation and reforestation, every effort should be made to lighten the burden on forest lands undergoing rehabilitation or subject to conservation. A long series of years must elapse while nature by a slow process restores the wealth which has been taken from the land. Forest lands on which conservation methods are practiced are put at a great disadvantage because the costs of cutting, skidding and hauling are higher than with the old clean-sweep methods of lumbering. As a matter of fact the interest on the investment, the taxes and the interest thereon for many years, the cost of fire protection, the hazard of investment and the long deferred return must cause any individual to pause before attempting to rehabilitate in forest growth a denuded piece of land. Finally to cap the climax the federal government, according to present laws, comes along and says that when the long-deferred harvest is reaped from lands purchased since March 1, 1913 (that deadly dead-line date), the original investment alone, which is only a small fraction of the total investment constantly increasing by accruing interest, can be depleted and that all other net returns are subject to federal income taxes. In the face of conditions such as these it takes a courageous investor and one of large faith to attempt forest rehabilitation on any considerable scale. The whole problem is so acutely serious that all who are familiar with it should unite to obtain a fair show to the man who seeks to perform a great public service and at the same time obtain a practical and sound investment for his posterity. Our own and other states have done much to lighten the tax load on land under timber, but the problem is one that goes to the heart of conservation and deserves careful thought and action especially in its relation to federal taxes.

The railroads and mining companies are showing greater interest in forest protection. Nevertheless one of the principal causes of fires is the cloud of ashes from their locomotive stacks. These in both large and small locomotives should be equipped and carry at all dangerous times some form of spark arrester that will arrest. Many mining companies as well as the railroads every year through sheer carelessness unnecessarily burn over thousands of acres.



ALL THAT REMAINS AFTER A FOREST FIRE

The ground, no longer protected by trees or leaves is easily swept away by drenching rains, filling up the water courses and giving any future vegetation reduced humus for sustenance. Many years will be required to overcome this handicap.

A pointer should be given to forest owners whose chestnut has been destroyed by the blight. The roots on this land are now sprouting and forests of the same kind of tree probably will ultimately be re-established. We believe that many of these sprouts will be immunized from the blight, just as mankind is freed from certain diseases by once having been subjected to them. We are becoming more confident of this each year and now have on our own lands four-year sprouts free from blight. We notice these have a lighter colored bark than those they succeeded. Let us encourage these growths in every way possible, especially in the way of fire protection, for if this land is burned over it probably will forever lose all chance of ever coming back in chestnut, which in many ways was our most valuable timber.

To sum up, let us by every force of education, encouragement and law protect our remaining forests from denudation. Let us make it easy and profitable to conserve timber and thus encourage forest rehabilitation and conservation by individuals and corporations, and wherever the people fail individually to promote these ends, let the State carry forward its splendid plans to reforest those large areas which were so blindly denuded many years ago.



Problems of Operating Men

Edited by James T. Beard



Coal Brokers vs. Co-operative Sales Agencies

Possible Valuable Service of Coal Brokers Not Fulfilled in the Past—Little or No Invested Capital—Co-operative Sales Agencies Needed

IN SUPPORT of the brokerage system of marketing coal, which has grown to large proportions during the past few years, M. R. Atkinson writes in an interesting manner, *Coal Age*, Mar. 22, p. 493; but his arguments are not convincing to my mind.

It will be readily agreed that the coal broker does, under present marketing conditions, fill an economic need. He renders, to both the industry and the consumer alike, a distinct service by giving the buyer a wide variety for selection and the operator a broader market for his products. It cannot be denied, however, that he has not been scrupulously conscientious in the performance of this service or that it has not been economical in respect to the public or beneficial to the industry.

Logical Result of Brokerage Systems

It is probable that an unbiased survey of coal-market conditions covering the past few years would show that the brokerage system is largely responsible for the public antagonism to the mine owner. During periods of coal shortage the broker has skimmed the cream from the profits of the mine owners and fleeced and outraged the public.

Analysis, I believe, will show that this is the logical and unavoidable outcome of the system. The broker has no heavy investment in mines and equipment, and takes no special interest in the establishment and maintenance of those valuable commercial relations between producer and consumer that insure fair prices and an honest product. His actions are governed largely by the desire for immediate profit.

If this is the true condition in respect to the brokerage business the best interests of the producer and the consumer alike can be served by the complete elimination of the coal broker and the setting up of other machinery or employing methods that will perform a more useful service than the broker has yet rendered the industry. The functioning of a properly organized system would certainly be free from the evils inherent in the brokerage system.

Co-operative Sales Agencies the Remedy

The solution that most readily suggests itself to my mind is the organization of a system of co-operative sales agencies, in the different fields, sufficient to take care of the output of those mines whose production is too small in volume to justify the maintainance of a private sales office.

This would probably embrace not more than twenty per cent of the total production of the district; but the efficient distribution of even this proportion, at a fair price, would do much to clear the entire industry of the charge so frequently made of profiteering and unfair dealing.

The co-operative sales agencies would be financed by the mine owners and the actual selling expense would be added to the mine price. This would insure lower prices to the consumer and in many instances, better profits to the operator.

————, Ky. KENTUCKY OPERATOR.

Superstition Giving Place to Facts

Beliefs of early miners in the supernatural—Advance in knowledge dispels superstitious fears—Risks common to mining to be avoided.

SOME time ago, I remember reading an interesting article that dwelt on the superstitious beliefs of miners, having particular regard to accidents in mines (*Coal Age*, Vol. 22, p. 326). Since reading the article, I have done considerable thinking along this line and recall many things that have occurred in my own experience in that connection.

It is only fair to say that when first going into the mine, years ago, I possessed many of the same superstitious fears and beliefs. Among a large class of miners many of these beliefs still prevail and influence, to a large extent, both their lives and actions.

Many a time have I heard a miner say, "I don't feel like going into the mine today. I have a fear that something is going to happen." Still, the man would go in and nothing unusual took place.

No Wonder That Not Knowing the Causes Mine Occurrences Excited Fear

In the early days of mining, mysterious noises were heard in the coal; strange occurrences were observed in sections of the mine; lurid flames would burst forth in volume, leaving sulphurous fumes that could not be breathed; lights would go out and could not be relighted; and miners would become unconscious and die from no apparent cause. Is it strange that the poor miner, ignorant of the conditions that surrounded him in the mine, ascribed these doings to spirits or the work of a gnome?

There is a one common belief among miners that I first learned when a boy. A number of old Welsh miners told me that when the rats begin to leave a section of the mine, it is time for the men to go. They said there is sure to be a heavy cave in that section when the rats are seen to scamper for other quarters.

Perhaps there is more reason for this belief than for some others I could mention, inasmuch as these rodents run up and down the timbers and invest every nook and crevice of the workings. They are alert to

every noise and movement about them and it is not so strange that they should leave the place in a body when danger was imminent.

Not so reasonable, however, was the claim of some miners, who found their oil cans running low, that these knowing creatures would run their tails down the spouts of the cans and then lick the oil from their tails. The idea was a curious invention of the mind and not given general credence.

Advance in Mining Knowledge Explains Mysteries of the Mine

The rapid advance in the knowledge of mine gases and geological conditions, a little later, served to explain many of these mysterious (?) happenings. The discovery of the presence of mine gases explained both the lurid flames and the suffocating effects that produced unconsciousness and death when there was no apparent cause; while the mysterious noises heard were shown to be the working of the strata following the extraction of the coal.

It is hard to understand how intelligent miners will still hold to the belief mentioned by Mr. Edwards in the article to which I have referred, that "if a fatal accident occurs in a mine two more are sure to follow." The better judgment of men should teach them that the occurrence of a fatal accident has nothing to justify the claim that others will follow. Neither does an accident on the first trip down into the mine, in the morning, forecast bad luck for the day.

Let an accident occur in a mine and you will frequently hear a miner remark, "I just felt it in my bones that something was going to happen today." It is an easy matter for us to say, after a thing has happened, "I told you so." But, if such a presentiment was true, it should have had the effect of a forewarning that would have avoided the occurrence.

Let us come to believe and understand that behind every occurrence there is a reasonable cause and put aside the superstitious beliefs that have no basis in fact. For example, let us realize that the lack of ventilation in a gassy mine forecasts a gas explosion. Or, taking no precautions in the operation of a dry and dusty mine, especially where the coal is blasted with black powder, means, sooner or later, a dust explosion.

Failure of Officials and Men to Perform Duties Brings Disaster

Failure to properly timber a treacherous roof, or to make suitable provisions for safety on haulage roads and travelingways, or a failure to enforce safety rules and regulations, each and all spell disaster in the near future.

Not long ago I was looking over a mine with the foreman when we came to a bad fall, in an old abandoned working. Though the roof was hanging in a dangerous manner, the foreman insisted on going over the fall and went over alone, as I refused to take the risk, there being nothing to be gained by so doing.

With reference to the statement: "When a man takes a job in a mine he assumes his own risks," it is true there are many risks in the mining of coal. However, it does not occur to me that miners are any more indifferent to the dangers pertaining to their calling than are workmen of other occupations.

Compare, for example, the iron worker driving bolts at the top of a fifteen- or twenty-story building in the course of construction. While he is indifferent to the danger of his position, the same man would not consent to work in a mine, because of its assumed danger. On the other hand, the miner could not be induced to expose himself to the danger of working astraddle of an iron girder several hundred feet above the ground.

Each of these workers regard the other's occupation as a more dangerous calling than his own. The truth of the matter is that continued exposure to these dangers has a tendency to make the worker disregard them. While it is well for every worker to have a wholesome regard for the danger to which he is exposed, a superstitious fear or dread of impending danger has no tendency to safeguard the miner or make him immune from accident. My observation is that men who are naturally nervous and fearful of accident are, perhaps, more subject to such occurrences than those who are less concerned, regarding their own safety.

John Rose.

Dayton, Tenn.

Avoiding Squeeze in Miller Seam

Soft nature of coal invites squeeze—Action once started difficult to control—Good barrier pillars needed to safeguard entries.

ONE of the essential things to be borne in mind when laying out or planning the inside workings of a mine is the liability to a creep or squeeze in the later development of the mine. This thought has been impressed on my mind, particularly by reading the several letters regarding the working of the Miller seam, in Pennsylvania.

Those familiar with the conditions existing in that seam know that the coal is of a soft nature and crumbles readily. To make matters worse, the seam is underlaid with fireclay and when this becomes soaked with water, in the working of the mine, it is not able to withstand the heavy roof pressure coming on the pillars.

We all know that a creep or squeeze once started cannot be stopped in that particular place. All that can be done is to keep it from spreading to other sections of the mine. This may often be accomplished by the rapid extraction of pillars over a considerable area, so as to give sufficient room for a good clean break to take place in the roof.

Much will depend on the strength of the overlying strata. If the roof is tough and strong it will be necessary to extract a number of pillars, in a group, before a good clean break will occur. Following such a break, there will seldom be any further trouble from squeeze, provided the pillars are taken out clean and no stumps or timbers left standing in the waste.

Protection by Good Barrier Pillars

I have referred to the need of a good plan in laying out a mine and want to say, here, that the barrier pillars protecting the main headings should not be less than 150 ft. in width and the entry pillars at least 40 ft. wide if squeeze is to be prevented in working the Miller seam. On panel entries the barrier pillars should be 100 ft. in width.

While these dimensions may seem unnecessarily large, they will serve to arrest a squeeze should one occur, and prevent its crossing the headings. Where this system is adopted, I would favor driving the rooms and extracting the pillars as the butt headings are advanced. But room pillars should never be extracted closer than 40 ft. from the butt headings.

On the other hand, if there are no large barrier pillars left for the protection of the main and panel headings, I would drive the butt headings to the limit of the panel, before turning any rooms. The rooms should then be started from the inby end of the heading and when a sufficient number of these have reached the limit, the pillars should be drawn back in a group of six or more, so as to provide a good area for breaking the roof. I feel sure that such methods as these, if followed, will prevent any disastrous squeeze or creep.

Kantner, Pa. GRIFF GRIFFITH.

Standard Rule for Estimating Available Tonnage of Coal per Acre

Improved methods of mining have given increased extraction of coal—Old rules for estimating available tonnage per acre no longer apply.

REGARDING the question of formulating a standard rule for estimating the tonnage of coal available, per foot-acre, in a given property, as suggested by J. F. Healy, *Coal Age*, Feb. 15, p. 302, it seems to me that his assumed arbitrary figure of 1,800 tons per foot-acre will not fit all cases.

It is true, as Mr. Healy has stated, that this figure should be multiplied by an assumed percentage of extraction, which will allow for the different results obtained in the mining of coal. But there is another factor that must be taken into consideration before we can establish a general rule that will cover all conditions. We must allow for the varying hardness or specific gravity of the coal.

Reports of the U. S. Geological Survey and the Bureau of Mines show that the specific gravity of bituminous coal varies from 1.21 to 1.44, in different localities. Estimating on a short ton of 2,000 lb. and taking a coal of specific gravity 1.21 weighing 1.21 × 62.5 = 75.6 lb. per cu.ft., the number of cubic feet per ton of this coal would be 2,000 ÷ 75.6 = say 26.5 cu.ft.

Again, making the same calculation for a specific gravity of 1.44 shows that such coal would weigh 1.44 × 62.5 = 90 lb. per cu.ft., which gives 2,000 ÷ 90 = say 22.2 cu.ft. per ton. The tonnage per foot-acre, in the first case, is 43,560 ÷ 26.5 = say 1,644 tons. The estimated tonnage in the second case is 43,560 ÷ 22.2 = say 1,960 tons.

Clearly, the average figure of 1,800 tons, per foot-acre, lies between these two estimates and is only for use in making a rough estimation of the available tonnage when the specific gravity of the coal is an unknown or an undetermined quantity.

The point to which I wish to draw attention is that, in order to make an accurate estimation of the available tonnage, per foot-acre, it is not only necessary to know the percentage of extraction of the coal; but the estimate must be based on a fairly close value representing the average specific gravity of coal in the seam.

University, Ala. H. D. PALLISTER.

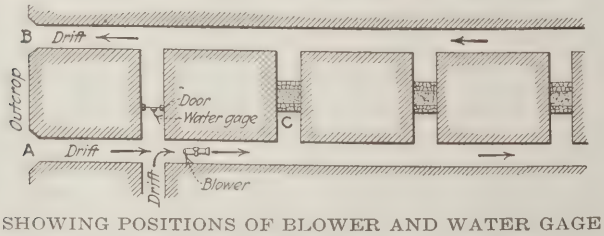
Inquiries Of General Interest

Effect on Water Gage Outby of Blower

Small Blower Located Inside Drift Mouth — Position of Water Gage Outby of Blower — Effect on Gage in this Position

IN A SMALL drift mine where I am employed, the ventilation is secured by means of a small blower located just inby from the mouth of the drift. The arrangement is shown in the figure, which though roughly drawn will help to make my meaning clear.

Not long ago, I attempted to get a water-gage reading, for the purpose of estimating the power on the air



SHOWING POSITIONS OF BLOWER AND WATER GAGE

and showing what efficiency we were getting from the blower installed in the drift. As indicated in the figure, the water gage was placed on the main door, in the first crosscut between the intake and return entries and, in this position, was outby from the blower.

Much to my surprise, the gage gave no reading and it looked to me as though a logical conclusion would be that we were getting no efficiency from the blower, though that hardly seemed to be the case, inasmuch as a fair current of air was passing in the mine.

Kindly explain why it is that the water gage gave no reading where it was placed. Also, explain where the gage reading should be taken for the purpose of determining the power on the air. W. B. L.

Besoco, W. Va.

The reason that the water gage gave no reading, in the position indicated in the figure, is that the pressure on both sides of the door where the gage was placed is practically the same; namely, the atmospheric pressure. Referring to the figure, the air entering the mine at *A* is under the atmospheric pressure, until it has passed the blower where the pressure is increased by an amount due to the action of the blower. This increase of pressure is the measure of the mine resistance, which is its cause.

Starting from the blower and following the air current in its course throughout the mine, the pressure moving the air decreases regularly as the resistance becomes less and less, until it is finally *nil* at the mouth of the discharge opening marked *B* in the figure. It is, therefore, clear that the pressure on the air both at *A* and *B* is only that of the atmosphere and, there being no difference of pressure, there can be no water-gage reading at that point.

In order to obtain a water-gage reading representing the resistance of the mine, the gage must be moved to a point inby of the blower, say at the second crosscut, marked *C* in the figure. Or, a partition could be erected at the blower and arranged so that all of the air passing sufficient size to make this arrangement practicable. into the mine must pass through the blower, if it is of In that case, the water-gage reading would be taken on the partition erected at the blower.

Examination Questions Answered

Examinations Under the Mine Act, Alberta, June, 1922

(Selected Questions)

QUESTION—*How should a safety lamp be treated when found to be full of flame as the result of being in an explosive mixture?*

ANSWER—Should this occur in the examination of a mine for gas, it will require much presence of mind, on the part of the fireboss or person holding the lamp, to avoid the danger that is imminent. Any quick movement, particularly in a sidewise direction, would be apt to force the flame through the mesh of the gauze and ignite the gas surrounding the lamp. The lamp should be lowered promptly but cautiously, holding it in an upright position and making no quick movement, which would increase the danger. In no case should the lamp be permitted to remain in the mixture, as the gauze would quickly become heated and the flame pass through the mesh, thus causing the lamp to fail.

QUESTION—*When the fireboss reports in his record book certain dangers he has discovered during his examination, what would then be your duty as mine foreman? If the report applies to the old workings, state how you would proceed.*

ANSWER—The law makes it the duty of the mine foreman to take immediate steps for the removal of the danger, if that is possible. In case it is not practicable to remove the danger at once, it is the duty of the foreman to withdraw all men working in proximity thereto or who may be in any way endangered by reason of this condition. The foreman must see that the place is safeguarded so that no one will run into the danger, not knowing of its presence.

Assuming that the danger reported by the fireboss exists in the old workings of the mine, the fireboss must act according to his knowledge of the situation and take prompt measures to insure the safety of the live workings. In any case, he must make sure that no air passing through the old workings finds its way into places where men are working. The investigation may show the need of sealing off the old workings, or changing the ventilation in such a manner that the air circulating through them will be conducted at once into the main return and pass out of the mine. There must be no delay in safeguarding the situation to avoid possible accident from poisonous or explosive gases finding their way into the live workings of the mine.

QUESTION — *What quantity of marsh gas in air crowded with coal dust will make the mixture explosive? Can this quantity be detected on the flame of a safety lamp?*

ANSWER—An atmosphere crowded with coal dust may be a dangerous condition though no gas is present. The danger will depend on the fineness and inflammability of the coal forming the dust cloud. The fine dust of a highly inflammable coal when held in suspension in the air will readily be ignited by the flame of a blown-out shot or the flame of an ordinary shot when black powder is used, no gas being present. Again, a dust cloud of a less inflammable coal would be rendered dangerous by reason of the presence of a small amount of gas, when neither the dust cloud or the percentage of gas present would be dangerous of itself when present alone in the mine air. Such a small percentage of gas would not ordinarily be detected on the flame of a safety lamp.

QUESTION—*Will coal dust extend a mine explosion throughout the entire mine in the absence of explosive gas?*

ANSWER—Yes. A local explosion of coal dust occurring at the face of a working place will often be propagated throughout the entire mine if the conditions are favorable. That is to say, if the timbers, walls and floors of the roadways, air-courses and travelingways throughout the mine are covered with fine dust and no means have been taken for its removal, with a view to making the mine safe. The extent of the propagation will depend very largely on the fineness and inflammability of the dust, assuming no gas is present. Any isolated accumulations of gas will greatly assist in the propagation of the flame.

QUESTION—*Give your opinion of the best method of rendering coal dust harmless.*

ANSWER—Experiments of the Bureau of Mines have shown that a harmless condition of fine coal dust is only attained when the dust is so wet as to become so plastic that it can be molded in the hand, which is hardly an obtainable condition in mine practice. An adequate distribution of fine stone dust or salt has been found efficacious in reducing explosive conditions in dry and dusty workings. This is not to say that a good spraying system is without benefit in such mines.

QUESTION—*Give your opinion as to the best method of humidifying the air in mines.*

ANSWER—The most successful means to this end is the introduction of steam in the intake current, after the latter has been heated to increase its capacity for absorbing and holding moisture. The air entering the mine is made to pass over steam coils arranged in the mouth of the air course. The steam is allowed to escape from the end of the pipe where it strikes a baffle or curtain to effect a better distribution in the air and a more complete saturation of the air current.

QUESTION—*What percentage of relative humidity would you consider necessary to render a dusty and gaseous mine safe?*

ANSWER—A high percentage of humidity is always desirable in working a dusty mine generating gas; but humidity alone will not make such a mine safe. The best working conditions are attained when the mine air contains from 60 to 70 per cent of moisture. In addition to this care must be taken to prevent any accumulations of gas or dust and to enforce strict regulations in regard to blasting, besides maintaining an ample ventilating current.

Corrections—In the reply to the third question (Mar. 1, p. 381), the second part of the answer should read as follows:

(*b*) The velocity of the air current being 350-ft. per min., the volume of air in circulation is 350 (8 × 12) = 33,600 cu.ft. per min.

Again (Mar. 8, p. 419) in the reply to the third question from the last on that page, the third line should read: 675 ÷ (1 — 0.04) = say 703 ft. per min. This would make the last line of the answer read: 703 × 66 = say 46.400 cu.ft. per min.

March Anthracite Output Equals Record

Anthracite production in March, according to the Geological Survey's revised estimate, based on final data of shipments in that month, was 9,382,000 net tons, including mine fuel, local sales and dredge and washery output. This figure equals the previous high record of monthly production made in March, 1918. An output of 9,000,000 tons per month has heretofore been attained only in the months of March, June, August and October, 1917, and in March, July and August, 1918, which were years of maximum anthracite production and also times of very large washery output.

The total production of anthracite in the coal year 1922-1923 was 56,576,000 net tons, 36.4 per cent less than in the coal year 1921-1922 and 38.3 per cent less than the average for the past nine coal years.

PRODUCTION OF ANTHRACITE IN MARCH AND TOTAL OUTPUT FOR THE COAL YEAR
(In Net Tons)

Coal year	March Production	Cumulative Output Coal Year to March 31
1913-1914	6,863,000	88,323,000
1914-1915	6,654,000	90,298,000
1915-1916	7,964,000	93,318,000
1916-1917	9,026,000	87,949,000
1917-1918*a*	9,382,000	100,372,000
1918-1919*a*	5,190,000	92,790,000
1919-1920	7,935,000	91,790,000
1920-1921	7,677,000	91,130,000
1921-1922	8,757,000	88,909,000
1922-1923	9,382,000	56,576,000

(*a*) Years of very large washery production.

New Production Records Made in March

Record productive activity in both raw and finished products occurred in March, according to the Survey of Current Business reprinted from *Commerce Reports*, while an increasing consumptive demand apparently digested the goods produced without an appreciable increase in stocks. Cotton consumption and pig-iron production broke all previous records since data for these movements have been available, exceeding even the high records made during the war. Steel-ingot production and locomotive shipments were the highest since 1920, and unfilled orders for locomotives made a new high record. Zinc production was the highest since 1917. March production of bituminous coal was exceeded only twice since 1920—in January, 1923, and March, 1922. The production of anthracite was the greatest since August, 1918.

Retail sales both by 10c. stores and by mail-order houses surpassed all previous records for this month since 1920, at the peak of high prices. Car loadings were the highest on record for this time of year. The wholesale price index advanced two points, being the highest since February, 1921.

Consumption of cotton by textile mills in March broke all records, and at 623,105 bales was about 8,000 greater than in May, 1917, the previous high month. More spindles were active in March than in February. Export of raw cotton declined to 318,210 bales in March. Imports of cotton, exclusive of linters, declined to 53,219 bales. Prices of cotton and cotton goods made substantial advances during March. Silk deliveries to mills declined from the high point reached in February.

Pig-iron production broke all previous records in March at 3,521,275 tons, and steel-ingot production, allowing for companies not reporting, amounted to 3,888,897 tons, the highest since March, 1920. Unfilled orders of the United States Steel Corporation increased to 7,403,000 tons, the highest since January, 1921. Unfilled orders for locomotives increased to 2,316, a new high record.

The output of pneumatic tires and the consumption of crude rubber in February, which figures have just become available, were the highest on record since these statistics were established, in November, 1921.

Automobile shipments for March increased, and on the basis of shipment figures the total production of automobiles for March is estimated as 346,000 cars and trucks, the largest monthly production on record, being double that of March, 1922, and 25 per cent greater than February of this year.

The total value of building contracts awarded in 27 Northeastern States in March was $334,000,000, or about 14 per cent greater than a year ago.

The cost of building materials as represented by the Department of Labor index is still upward, while the labor shortage in the building trades is growing more acute.

Wheat movement for March was about the same as a year ago, but the visible supply was 28,000,000 bushels larger. The 1923 winter-wheat estimate of 572,000,000 bushels by the Department of Agriculture on April 1 points to the smallest crop since 1918. Prices of wheat and flour in general declined in March.

Freight-car loadings for March were not only the greatest on record for this season of the year but on a level not normally reached until about midsummer or early fall. As compared with a year ago, the March average loadings of ore were 150 per cent greater, while coal and forest products were upward of 40 per cent greater, indicating pronounced consumption of raw materials.

Byproduct Coke Output in March Reaches Unprecedented Total of 3,256,000 Tons

Production of byproduct coke in March, according to the U. S. Geological Survey, reached the unprecedented total of 3,256,000 net tons, which was 16 per cent greater than the February output and 5 per cent more than production in January. This total is based on early returns from all but one active plant and includes an estimate for one plant not heard from. The estimated present capacity of byproduct ovens is 3,725,000 tons per month of 31 days. Thus the output indicates production at the rate of 87.4 per cent of total capacity and an average of 105,042 tons per day, which is an increase of 4,692 tons, or 4.7 per cent, over the daily rate of production in February. Of the 71 plants in existence 64 were active and 7 idle.

Production of beehive coke continued on the increase in March and for the month totaled 2,759,000 net tons, an increase over February of 18 per cent. The March rate of beehive coke production was more than twice the monthly average for 1922, nearly four times the monthly average for 1921, and the same as the monthly average for 1920.

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE IN THE UNITED STATES (*a*)
(Net tons)

	Byproduct Coke	Beehive Coke	Total
1917 Monthly average	1,870,000	2,764,000	4,634,000
1918 Monthly average	2,166,000	2,540,000	4,706,000
1919 Monthly average	2,095,000	1,638,000	3,733,000
1920 Monthly average	2,565,000	1,748,000	4,313,000
1921 Monthly average	1,646,000	462,000	2,108,000
1922 Monthly average	2,374,000	669,000	3,043,000
January, 1923	3,100,000	1,478,000	4,578,000
February, 1923	2,810,000	1,482,000	4,292,000
March, 1923	3,256,000	1,749,000	5,005,000

(*a*) Excludes screenings and breeze.

The coal required for coke production in March is estimated at 7,438,000 net tons, which is more than was consumed by the coke industry in the War years 1917-1918 and is 17 per cent more than the average in the active business year 1920.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE (*a*)
(In Net Tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average	2,625,000	4,354,000	6,979,000
1918 Monthly average	3,072,000	4,014,000	7,086,000
1919 Monthly average	2,988,000	2,478,000	5,466,000
1920 Monthly average	3,684,000	2,665,000	6,349,000
1921 Monthly average	2,401,000	706,000	3,107,000
1922 Monthly average	3,411,000	1,056,000	4,467,000
January, 1923	4,454,000	2,331,000	6,785,000
February, 1923	4,037,000	2,339,000	6,376,000
March, 1923	4,679,000	2,759,000	7,438,000

(*a*) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged in byproduct ovens, and 63.4 per cent in beehive ovens.

A Report on Corporate Relationships in the anthracite industry is to be made for the U. S. Coal Commission by Prof. George E. Barnett, of Johns Hopkins University. Professor Barnett is an economist, who has made a careful study of many matters of finance and is the author of various books on banking and on labor relationships.

Keeney, Mooney and Blizzard Trials to Be Held at Lewisburg May 9

Although Harold W. Houston, counsel for C. Frank Keeney, president of District 17, United Mine Workers; Fred Mooney, secretary-treasurer of District 17, and William Blizzard, vice president of subdistrict 2 of District 17, opposed it, Judge Woods in granting the request of counsel for the defense for a change of venue, designated Lewisburg, the county seat of Greenbrier County, as the place where the trio of officials should be tried, beginning May 9. All three are charged with complicity in the Logan armed march. Lewisburg is a city of about 1,200. Houston opposed Greenbrier County, contending that it was a non-union stronghold, although it is the center of an agricultural county. There are approximately 100 other defendants against whom charges are pending in connection with the Logan march whose status was not affected by the order of the court entered on April 18.

An effort was made to have the charges against Keeney dismissed on the ground that the time when Keeney might legally be tried had elapsed. Judge Woods overruled such a motion.

Confirms Payment of Damages by Union to Willis Branch Coal Co.

Judge George M. McClintic, of the U. S. District Court for the southern district of West Virginia, confirmed the report of the payment of a sum of money variously estimated at between $400,000 and $500,000, by the United Mine Workers to William McKell and others interested in the Willis Branch Coal Co. when in dismissing the suit against the miners' union in federal court on April 16 he stated that the union had paid an enormous sum in order to keep its activities from becoming a matter of public knowledge.

The suit instituted by the Willis Branch company against the union was for $1,000,000. An agreement was reached last February under the terms of which the union paid over a large sum of money to the company for the damage the union admitted had been done to the Willis Branch plant. This is said to be the first instance in which the union ever settled for overt acts of its members.

More than sixty union miners were indicted in connection with the shooting up of the town, eight of whom were convicted, and indictments are still hanging over many others. Among those implicated was David Robb, international financial agent of the United Mine Workers, who is said to have furnished $80,000 to the local near Willis Branch for furthering the reign of terror.

Dull Market in Southwest Nearly Shuts Down the Field

An idea of the extent to which mines of Kansas, Arkansas, Oklahoma and Missouri were being closed because of lack of market as early as April 1 may be obtained from reports submitted by the Southwest Interstate Operators' Association to the U. S. Geological Survey.

The banner week of the winter for Kansas was that ending Jan. 13. In that week twenty-three companies reported that 82,876 tons of coal were produced in forty-six mines. For the week ending March 31 thirteen companies reported 43,509 tons from thirty-four mines. Reports from Missouri show the same week to have been the best of the winter in that state. Fourteen companies reported a production of 42,262 tons from twenty-five mines. The week ending March 31, reports were filed by eleven companies for seventeen mines. The production was 35,169 tons.

In Arkansas 14,630 tons of coal were taken by seventeen companies from twenty-three mines the week ending Oct. 7, 1922. In one week in December twenty-one companies reported 10,206 tons from twenty-eight mines. During the week ending March 31 only three companies filed reports, these for nine mines, with a production of 3,120 tons.

Eleven companies, operating fifteen mines in Oklahoma, reported a production of 23,652 tons for the week ending Nov. 4, 1922. For the weeks ending Feb. 17 and Feb. 24, this year, twelve companies reported on sixteen mines. The tonnage was 23,288 and 17,316 for the respective weeks. Eight companies were operating nine mines the week ending March 31, and that week produced 7,493 tons.

The week of March 31 was chosen for comparison as representing the last week of normally maximum production. The reports show that even before the usual spring shutdown, lack of market was forcing a big proportion of the mines of the southwestern district to close. The same report to the Geological Survey shows that 55 per cent of mining time was lost in the Kansas field that week. Twenty-nine per cent of this was lost because of no market. Missouri mines lost 26 per cent time. Of this total, 92 per cent was because of no market. Four-fifths of the 59 per cent of time lost in Arkansas that week was because of no market. And of 89 per cent time lost in Arkansas, 89 per cent was attributed to the same cause.

Wadleigh to Issue May 1 Stock Report

F. R. Wadleigh, Federal Fuel Distributor, is preparing to bring out another stock report, as of May 1. It had been his intention to wait until June 1 before taking another census of stocks, but developments of the last week are such that he believes that the public will be benefited by showing the situation at the beginning of May.

Due to the difficulty at this time in obtaining the attendance of a number of very busy coal operators at a meeting in Washington, Mr. Wadleigh is having each member of his advisory committee write him in detail his views as to procedure in his study of storage, transportation and collective selling. This survey which Mr. Wadleigh is conducting in his capacity as Federal Fuel Distributor is going forward rapidly.

So that the public utilities may be encouraged to continue the practice of last year in providing storage, Mr. Wadleigh has called upon J. W. Lieb, of the New York Edison Co., for suggestions as to the encouragement of this practice this year.

During the study of railway transportation which has been undertaken by the Department of Commerce, Mr. Wadleigh will act as liaison officer between the department and the car-service section of the American Railway Association.

Denies Coal Commission Found Basis for Gouging Charge Against Operators

The Bituminous Operators' Special Committee on April 18, gave out the following statement:

"A recently published press report stating that the U. S. Coal Commission had made a finding to the effect that bituminous-coal prices had been increased without any corresponding increase to the operators in the costs of coal production and that the operators were gouging the public, was today officially denied by the commission.

"E. E. Hunt, secretary of the commission, in a letter to Harry L. Gandy, executive secretary of the National Coal Association, official organization of the bituminous operators, stated that he had been instructed by the commission, in the absence of John Hays Hammond, its chairman, to advise the National Coal Association that the commission had made no statement or report 'upon which such recent press statements could be based.'"

DR. GEORGE S. RICE, chief coal technologist of the U. S. Bureau of Mines, has been authorized by Secretary of the Interior Work to visit Europe during the coming summer to make a study of European mine-safety methods and to gather information as to more efficient methods of operating coal mines. Dr. Rice will leave about May 1 and will visit all the leading European countries where coal mines are operated, including England, France, Germany, Czechoslovakia and Poland.

THE BITUMINOUS OPERATORS' SPECIAL COMMITTEE began moving its offices April 18 to Room 805, Southern Building, Washington, D. C., which hereafter will be the committee's headquarters.



Germany Buys British Coal

When the French occupied the Ruhr they cut off Germany's chief source of coal. The Germans turned to Great Britain for immediate supplies. By April 1 more than 250,000 tons of British coal had been bought by Germany. This photograph shows a cargo being unloaded from the steamer into barges at Hamburg. Any time in the past three months one looking from the upper floors of the Whitehall Building, on the lower tip of Manhattan Island, could have seen a similar sight, a cargo of British coal being unloaded into harbor lighters. The difference would have been that instead of a grab bucket, as at Hamburg, he would have seen a wheelbarrow at the Battery—so unaccustomed and unprepared are we for unloading cargo coal in New York Harbor.

British Columbia Tightens Safety Rules

As a result of recent fatal accidents in the Cassidy mine of the Granby Consolidated Mining, Smelting & Power Co., and the Wakesiah mine, of the Western Fuel Corporation of Canada, regulations under the Coal Mines Regulation Act have been announced by William Sloan, Minister of Mines of British Columbia.

They provide that "every percussive air drill used for the drilling of holes in coal shall be equipped with a water jet or spray, or other appliance equally efficient, to prevent the escape of coal dust. This jet or spray to be of a type approved by the inspector of mines"; that "the use of a compressed-air jet for forcibly removing accumulations of gas is strictly prohibited"; that "when accumulation of gas is being removed, the official in charge shall see that no person or persons or lights of any description are allowed on the return side of the gas being removed, except at such a distance that the gas thus removed shall have been so completely diffused that its percentage is at that point lower than that requiring withdrawal."

They further provide that "the term 'properly fenced,' as quoted in General Rule No. 6, shall mean a fence 4 ft. high built of not less than three boards, 1x6, spaced so as not to obstruct the ventilation and nailed securely to posts. Where there are no posts on the ribs, then the ends of the boards shall be hitched into the coal at least 3 in. and securely wedged." The rules also order that "all places fenced off as required under the terms of general and special rules shall have securely attached to such a fence in a conspicuous place a danger signal properly worded, with the lettering at least 4 in. high; the lettering to be stenciled in white on dark background, both to be of durable material that will not easily become obliterated."

In one of the accidents to which reference has been made the miner lost his life through disregarding a fence and entering a prohibited working. When he was found the boards were scattered and there appeared to be some doubt as to whether they had been in place when the workman, subsequently overcome by gas, left his partner. In the other fatality loss of life resulted in the course of removing gas by means of compressed air. The regulations, therefore, are designed to meet these two sets of conditions and to avert accidents having such origin.

E. B. CHASE, vice-president of the Berwind-White Coal Co., has suffered a nervous breakdown and will be compelled to drop all business affairs for several months.

DuBois Convention Votes Against Paying Officers' Salaries During Strike

It cost District No. 2, United Mine Workers, approximately $45,000 to determine whether or not to pay the officers and field workers of the union $15,000 for services rendered during the strike beginning April 1, 1922. A convention of delegates representing the 45,000 miners of the district was called at DuBois, Pa., on April 17. After almost four days of debate on the proposition the delegates almost unanimously went on record as opposed to paying for the period. This settles the controversy so far as the last strike is concerned and the matter of making a change in the constitution depriving officers of pay during strikes was left over until the next regular convention. In the matter of officers' expenses, an amendment to the constitution carried which provides that expenses of officials, organizers and board members shall be itemized each month and that a detailed printed form of such expenses be sent to each local in the district by the fifteenth of each month.

The trouble which led to the calling of this convention had its origin at the close of the strike late last year. During the strike, officers and field workers were said to be working without pay. Following the strike and the election of officers for the district it was charged that the officers and field workers collected their entire back pay. The constitution does not provide that officers' wages shall cease during a strike but it was the hope of the opponents of the administration that the constitution might be amended at this session to make provision for such cases in the future.

The crisis in the convention came when Delegate George Bassett, of South Fork, made a motion that the officers "not receive back pay for the two and one-half months at present." The wording of the motion raised the further question of bringing the matter to a head again, regardless of how it would be decided on a vote of the convention.

Richard Gilbert, district secretary of the union, declared against the motion on the ground that it would injure the credit of the union in that it specifically stated that the union refused to pay back salaries due officers. This aroused a bitter debate among officers and delegates. Officers generally agreed to abide by the vote of the convention. Vice-President James Mark made one of the strongest speeches of the convention, arguing that the officers are entitled to the pay as a matter of constitutional right.

Mr. Mark told why the salaries were suspended and the effect in the Somerset County field. He declared the refusal to pay the salaries would put the union in a peculiar position with the public and bitterly denounced the *Penn Central News*, published at Cresson, for agitating the matter and being responsible for the calling of the convention.

When motives were questioned, President Brophy defended the officers. "Personally," he said, "I have given my services for six years as president not for the pay which is in it but because I believe firmly in the principles of unionism and your organization. The others have done this too, and it is unfair to impugn their motives."

Shots Shatter Calm of West Kentucky Strike

A fusillade of shots fired April 19 at a small party of men coming out of the Pontiac Coal Co.'s mine near Madisonville, Ky., marked the first sign of violence in the strike of about 5,000 miners in three counties of the western Kentucky coal field. Nobody was injured though an automobile carrying the little party of mine men was struck. The riflemen kept out of sight. The strike, which began April 1 after the operators of Christian, Hopkins and Webster counties insisted upon a two years' continuance of the existing wage agreement instead of a one-year term, has run smoothly up to the present. The Circle City Coal Co.'s mine at Nebo surrendered two weeks ago and signed for one year and has been working regularly. One other mine, of the Hart Coal Corporation, has gone on an open-shop basis and has been getting out a few tons each day by the labor of officials and a handful of laborers, but generally speaking the three counties have been idle.

Anthracite Operators File Brief with Coal Commission On Handling of Recent Hard-Coal Emergency

The anthracite operators on April 21 filed with the U. S. Coal Commission a brief on the anthracite emergency of 1922-1923 and how it was handled. By statement, table and text the situation with respect to production and distribution is fully set forth. Supporting documents in the form of letters from state authorities with whom the Anthracite Distribution Committee came in contact testify to the good faith and helpfulness of the hard-coal operators.

Commenting on prices the report says:

"The Pennsylvania Fuel Commission and the state and federal distributors did not stop with their efforts to secure equal distribution but also undertook with the co-operation of the operators to protect the public against exorbitant prices and unfair practices. The Pennsylvania Fuel Commission fixed a price of $8.50 per gross ton at the mines as a maximum price for so-called domestic sizes of anthracite coal and, realizing that certain operators could not produce coal at this figure, designated a Fair Practices Committee to consider individual cases and determine what should be a fair maximum price for operators who could not produce at the $8.50 price. Over 98½ per cent of the industry co-operated with the committee and accepted the prices approved by this committee.

"The State Fuel Commission also effected an arrangement with retailers that the margin of cost for handling and delivering anthracite coal should not be above that prevailing in March, 1922, and the efforts to have this policy observed met with a large measure of success. The Governor of Pennsylvania subsequently ratified and adopted these activities of the Fuel Commission and the Fair Practices Committee, at the same time declaring the existence of 'a serious public emergency.'

"Subsequently the Pennsylvania Fuel Commission circulated among the State Fuel Administrators a list of producers comprehending 98½ per cent of the production of anthracite, which were co-operating with the commission, and the prices that each was to charge, together with a warning as follows:

> We wish to bring again to your attention that certain irresponsible individuals and firms are taking advantage of the existing shortage of anthracite coal to sell to the trade inferior qualities of coal consisting of a considerable extent of bone, slate and other impurities, in many cases requiring payment in advance of shipment, or sight draft against shipping documents, and disclaiming responsibility for the quality of coal supplied, and thus protecting themselves against claims, etc.
>
> In view of these facts, the Pennsylvania Fuel Commission urges and advises all distributors and retailers of anthracite coal to purchase their coal supplies exclusively from the producers named in the list issued by the commission or from such responsible agents as will give proper guarantees that the coal sold by them comes from such listed producers. Lists of these producers will be furnished on application to the Pennsylvania Fuel Commission.
>
> Distributors and retailers are most strongly urged to follow this advice and thus protect themselves and the consuming public against the fraudulent practices referred to.

"The commission thus attempted to confine trade to legitimate producers and dealers who were co-operating with it, in order that the public might be protected against the so-called outlaw and bootlegger. The willingness of some consumers and dealers to disregard this warning in order to secure coal of any quality at any price, was the cause of the few irregularities which were so greatly magnified, but even under these circumstances the regular operator kept his record clean."

The Committee on Distribution had the co-operation of 85 per cent of the total production and was able to furnish an accurate check and supervision on the weekly distribution of this production to some 20,000 communities. Reports were furnished to each state administrator, showing the amount of coal shipped to each community under his jurisdiction the previous year, the 60 per cent allotment for the pending season, and the amount shipped during the week covered by the report, so that he could determine the total amount shipped for the season to the end of the week covered by the report.

With the exceptions noted, the co-operation of the anthracite producing companies in the work of the committee has been unique, if not without parallel in industrial history, and the work of distribution, it is believed by the operations, has been as nearly 100 per cent perfect as it was possible to make it, labor, transportation and weather conditions being considered.

Concluding, the statement says:

"As a record of self-restraint and moderation on the part of an unregulated industry, we submit this is unsurpassed. In the face of a buyers' panic and considerable hysteria which made the supply of coal and not the price of coal the first consideration of most consumers, with few exceptions this vast tonnage was produced and sold at prices which in the public interest defied the law of supply and demand.

"The opportunities for graft, profiteering, adulteration and corruption in many forms offered temptations to which too large a percentage of people often yield, but the record of this industry, so far as the legitimate producers of 98 per cent of the nation's supply is concerned, is remarkably clear.

"These operators have also co-operated in efforts to stop the shipment of so-called 'fireproof' coal. The Fuel Distributor stationed an engineer of the Bureau of Mines in the anthracite fields to secure evidence as to shipments of unmerchantable coal and it is noteworthy that the list of thirty-three different names found by him to have been guilty of this reprehensible practice does not contain the name of a real coal operator. They are merely dishonest speculators, who came temporarily into action for the purpose of fattening on public misfortune. A number of the names are but different disguises for a single headquarters. We doubt if the entire group of legitimate operators ever heard of any one of these concerns as engaged in the coal industry. For all normal purposes they are non-existent in the coal trade.

"It is submitted that even government is not proof against some corruption and favoritism and has been notoriously incapable of overriding economic laws. We contend, therefore, that no form of government control would have served the public better during the recent emergency than did the voluntary co-operation of the operators.

"The general strike described by the United Mine Workers as 'the greatest industrial dislocation in the history of the world' and which brought about the emergency with its train of economic derangements and opportunities for exploitation, may well call for regulation which will prevent repetition, but the minor evils which grew out of that derangement will disappear when the major problem of industrial warfare is brought under control."

D. & H. Celebrates 100th Birthday

Dim lights, Old Glory waving in the spotlight, a huge "birthday cake" with 100 candles, music, 500 guests and some speeches, too, marked the Delaware & Hudson R.R. centennial celebration at the Hotel Astor, in New York City, on April 23, 1923. E. H. Outerbridge, chairman of the Port Authority of New York and a member of the board of managers of the D. & H., presided. L. F. Loree, president of the Delaware & Hudson, the first speaker, attacked regulation of railroads and commissions in general as forms of "sham legislation." He was followed by James S. Alexander, president of the National Bank of Commerce, who in the course of his address defended regulation as a necessity, although he decried the direction it had taken in certain quarters.

H. W. Dickinson, of the Science Museum of London and secretary of the Newcomer Society, the guest in this country of the D. & H., was the last speaker. He traced the development of steam power from the earliest time to the first practical locomotive and Robert Fulton's steamboat.



British Coal Awaiting Shipment Inland from Hamburg

British coal is helping save the day in Germany, since France is taking all the Ruhr output. This picture of a corner in Hamburg harbor shows some of the British coal Germany is getting. So active has the demand for British coal become that the prices have risen 40 per cent in three months.

Navy Department Awards Contracts for 653,000 Tons of Coal

The Navy Department has awarded contracts for 653,000 tons of bituminous coal. Accepting tenders for coal for Hampton Roads when the quotation did not exceed $7 a ton, the Navy was not quite able to fill all of its anticipated requirements. Officials announced, however, that the remaining 100,000 tons would be bought on the open market during the next fiscal year, as it was believed that savings could be effected by purchasing "distress" coal when the opportunity presented itself.

Coleman & Co. was awarded the New York contract for 12,000 tons, the prices for the three classes being $7.27, $7.52 and $8.22 a ton.

W. L. Irish & Co. was awarded the Philadelphia contract, its prices for coal in barges under chutes being $7.33 and $7.51 for delivery in lighters free alongside.

The coal contract at Hampton Roads was distributed between four companies. Castner, Curran & Bullitt was awarded contract for 100,000 tons of coal to be delivered into storage at Sewalls Point, the price being $6.68, while the Fayette Smokeless Fuel Co. will supply 30,000 tons at $6.72.

For delivery at Lamberts Point piers, the Navy contracted to buy 408,000 tons. The Pocahontas Fuel Co. will supply 200,000 tons at $6.72, the Fayette Smokeless Fuel Co. 108 000 tons at $6.72 and the Crozer-Pocahontas Coal Co. 100,000 tons at $6.50.

The Navy desired to buy 200,000 tons of coal for storage at Sewalls Point.

Eleven proposals were submitted, as follows:

Twelve thousand tons, for delivery at New York between May 1, 1923, and June 30, 1924—Coleman & Co., Inc., Philadelphia, delivered f.o.b. vessels under chutes at piers, $7.27 per ton; delivered f.o.b. barges alongside vessels in New York harbor or at Brooklyn, Navy Yard, $7.52; delivered in lighters in New York harbor, $8.22; additional charge for coaling in regular bunkers 70c. per ton; in side bunkers, 80c. per ton; furnished f.a.s. government vessels, $8.72 in lots of less than 100 tons; $7.82 in lots between 101 and 200 tons; $7.62 in lots between 201 and 300 tons; $7.57 in lots between 301 and 400 tons; $7.52 in lots of over 400 tons; additional charge for delivery, $40 per lighter at all North River points. Imperial Coal Corporation, New York, $6.69 delivered f.o.b. vessels under chutes at piers.

Three thousand tons, for delivery at Philadelphia from July 1, 1923, to June 30, 1924—Imperial Coal Corporation: Delivered f.o.b. vessels under chutes at piers, $6.22 per ton; alternate bid, $6.49. W. L. Irish & Co., Inc., Philadelphia, delivered f.o.b. vessels under chutes at piers, $7.33 per ton; delivered in lighters, f.a.s. wharf at Navy Yard, $7.51 per ton.

Four hundred and twenty-five thousand tons, for delivery at Hampton Roads, Va., between July 1, 1923, and June 30, 1924—Crozer-Pocahontas Co., Philadelphia, 100,000 tons at $6.50. Fayette Smokeless Fuel Co., Mount Hope, W. Va., 108,000 tons at $6.72. Low Volatile Consolidated Coal Co., Beckley, W. Va.: 200,000 tons in all, 100,000 at $7.28 and 100,000 at $7. Pocahontas Fuel Co., Inc., New York, 200,000 tons at $6.72. White Oak Coal Co., Macdonald, W. Va., 72,000 tons at $7.

Two hundred thousand tons for delivery f.o.b. cars into storage at Sewalls Point, Va. Castner, Curran & Bullitt Co., Inc., New York, 100,000 tons at $6.68. Chesapeake & Ohio Coal & Coke Co., New York, 10,000 tons at $4.48. Fayette Smokeless Fuel Co., 30,000 tons at $6.72.

Lewis Confers with British Mine Leaders

John L. Lewis, president of the United Mine Workers of America, had a conference April 24 with Frank Hodges, secretary of the Coal Miners Federation of Great Britain. Details of the parley were withheld. The secrecy that has surrounded Lewis' conferences with British miners' leaders has led to the conclusion that some understanding is under consideration. Lewis arrived in London by airplane from Paris, April 23, following a miners' conference in Brussels, where the allied countries and Germany were represented. Lewis would not confirm or deny the report of a move to bring about a closer affiliation of the several miners' organizations, particularly between the American and British.

Southern Indiana Coal Fields Developing

Development of the coal fields in the southern part of Indiana is progressing at a rapid rate and just now it seems that that section lying between Terre Haute and Evansville, on the Evansville, Indianapolis & Terre Haute R.R., has prospects of becoming one of the most productive sections in the state. Improvements being made on this railroad, which is now operated by the Big Four, is going hand in hand with the development of the coal fields.

Between Petersburg and Evansville activity is greatest. The new Gray stripping operations at Oakland City with a capacity of 90 cars a day will start loading coal before long. The Enos strip mine at Oakland City recently added another shovel, which will raise its capacity from 65 cars per day to 100 cars. The Pike County Coal Co.'s new mine at Petersburg has reached a capacity of 25 cars a day and has tipple capacity of 75 cars daily, which it expects to reach by July 1. Pike County mine No. 1, at Petersburg, which has been in operation several months, recently spent about $75,000 in increasing its tipple capacity, which gives it a capacity of 75 cars a day.

The General Fuel Corporation mine No. 1, which started operations about Sept. 1, is hoisting about 22 cars daily and it is expected that this mine will be loading 50 cars a day by July 1. The No. 2 mine, which started hoisting Nov. 15, has a tipple capacity of 75 cars daily, which it expects to reach the latter part of this year. This mine, however, is loading, while under development, five cars a day. The Francisco mine, near Oakland City, started Sept. 1 and is loading 20 cars a day. It expects to reach its tipple capacity of 75 cars a day by autumn.

Negotiations are under way, it is reported, for trackage to a large operation at Buckskin, which will open 5,000 acres of new coal at an output rate of 120 cars a day. Practically all of the coal land between Petersburg and Evansville has been taken over by various companies, all of which will be opened in the near future.

A number of smaller operations are being started between Terre Haute and Petersburg. The capacity of the mines on this road now in operation is 550 cars a day as compared with 125 when the Big Four took over the properties on March 1, 1920. Car supply on the Evansville, Indianapolis & Terre Haute R.R. for February was about 70 per cent of the demand, which is the best supply for several months. The line is being improved as to trackage and power.

Governor Marshall Decries "Holier Than Thou" Attitude Of Both Sides in Probe of Coal Industry

By Paul Wooton
Washington Correspondent of *Coal Age*

So much energy is being consumed by the separate branches of the coal industry in hurling brickbats at each other that it is apparent that there is apprehension on the part of at least certain members of the Coal Commission lest in the mêlée sight will be lost of the constructive suggestions which each factor in the industry is pledged to bring forward.

Hurling and dodging missiles require such close and constant attention that it tends to preclude study and research, each of which must be undertaken intensively if the intricate problems before the industry are to be solved. Each is held to be necessary to the exercise of the requisite amount of vision to meet the situation.

There is a feeling among many federal officials who may be described as disinterested but intelligent onlookers that advantage has been taken of the commission's invitations for information to submit much material for the benefit of the gallery. No one will be surprised if the commission should consider whether or not the request for future reports should be coupled with the suggestion that they be withheld from publication.

It is obvious that the commission is tiring of the ceaseless attempts to put the other fellow in the hole. It recognizes that each side has done things that cannot be justified. It wants to know more than anything else what the parties to these controversies intend to do to prevent the recurrence of unlawful acts and of acts which cause the public to suffer. Is the conflict irrepressible? Must it go on with increasing violence? These are questions which the commission would like to have answered.

Shows Pressing Need for Harmony

The commission evidently recognizes that there can be no solution if all one side does is to say that no one may work in a mine if he does not belong to the United Mine Workers of America. By the same token, the members recognize that it is no solution to advocate severance of all relations with the United Mine Workers. It is suggested that more constructive things must be forthcoming in the next ten years than has been the case during the last decade. During that period one side has striven to get rid of the miners' organization while the other has bent every energy to unionize all mines. It is believed to be the thought of the commission that some suggestions should be brought out by those most at interest for a relationship promising a much greater degree of harmony. If they have no such suggestions and if they can offer no solution for the existing intolerable relationship, it is certain that the commission would welcome a frank acknowledgment to that effect. In such an *impasse* the government, as a representative of the public, will have to try its hand in an effort to bring about a better functioning of the industry.

It is the plan of the commission not to make public at this time the material obtained in the report made by W. Jett Lauck in connection with the anthracite situation. Governor Marshall stated on Saturday that he has made digests of records of courts and of the reports of government agencies, such as the Federal Trade Commission, the Interstate Commerce Commission and the Geological Survey. Mr. Lauck's report, setting forth what he says are deductions of fact from these documents, is being submitted to the anthracite operators. They will be given an opportunity to take issue with any statement made in the report. The commission is not accepting as facts any statements, government or otherwise. If anything purporting to be a fact is questioned, it is only common justice, Governor Marshall pointed out, to hear testimony on it.

During Saturday's hearing Governor Marshall urged the representatives of the press to be constructive in their articles on the coal situation. It is a question in which the public is vitally interested, he said, and this interest should be rewarded by an opportunity to get the real facts as to the situation in the coal industry. He stated that he is not annoyed by articles that reflect adversely on the commission. Throughout his own career, he said, his chief concern had not been with the untruthful things that newspapers said about him but fear that they might learn, and print, the truth about him. He described the newspaper of today as "the moving picture of a restless age," and fault should not be found with what the camera catches. In the course of his conversation with the newspaper men Governor Marshall said:

"When this investigation began, we were assured by everyone who had a right to speak, or who said they had a right to speak, that they would bend their energies toward assisting the commission with constructive suggestions looking to peace in the industry, justice to all concerned, and to the continuity of employment, output and distribution.

"I have no reason to believe there is any change in that purpose but I am a little bit alarmed as to whether or not the recent efforts to disclose the past history of the industry has not resolved itself into attempts to show that one side is without reproach and the other without virtue. Of course, no criticism can be offered justly against the pleading of a man's cause. The past has to be determined to reach any conclusion as to how past conduct should be changed in order to help the future, but I hope their promise to the commission is to be kept. After they have cussed each other out, I hope they then will be willing, during the life of the commission, to meet in a friendly way and assist in the formulation of such changes as will bring about not only better understanding and better feeling but which will be conducive to the good of the American people."

New Questionnaire Goes to Wholesalers

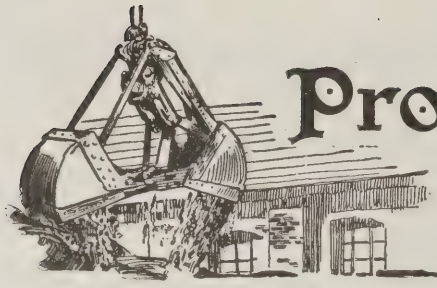
The wholesale section of the U. S. Coal Commission has prepared and sent out to wholesale coal dealers a new questionnaire designated as Form R-40 dealing with investments, profits, etc., of sales agents and wholesalers of coal. The questionnaire is quite elaborate, consisting of seven pages, in which information for the past ten years is requested as follows:

(1) Detailed information for classification of company.
(2) Data as to organization.
(3 & 4) Profit and loss statement.
(5) Analysis of wholesale coal and coke operating expenses.
(6) Balance sheet.
(7) Reconciliation of surplus account and statement of notes outstanding.

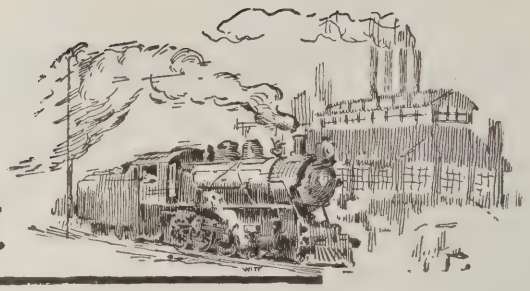
The report on Form R-40 is required by the commission only from such operators as conduct a sales agency or wholesale business involving the sale of coal other than tonnage produced by their own mines.

The Bituminous Operators' Special Committee will send speakers to the farming sections of the country during the next few months to tell the farmers why the production of coal has been seriously hampered and why this cost has mounted higher and higher since the war.

Viscountess Rhondda, the only woman director of large coal fields in Wales and also the owner of vast estates in the Principality, is disposing of part of her Monmouthshire properties. The occupying tenants were given the first opportunity to purchase and already have bought their holdings to the value of £90,000.



Production and the Market



Weekly Review

Spot prices in general continue their declining tendency. Current prices are below contract figures in some areas, as Pittsburgh, by as much as 50c., thus reflecting a normal situation for this time of year. *Coal Age* Index of spot prices of bituminous coal declined 4 points from 235 to 231 on April 23. The corresponding average price was $2.79. Buyers as well as producers appraise the outlook similarly, both calculating that as the summer passes into autumn, demand and price will mount. For the time being some buyers elect to enter the market and find steam coal available at around $2. At this price, on present wage scales, shippers are for the most part taking a loss and those who have no other outlet than the spot market are closing down their mines.

Typical of what is happening is the experience of one large company that during the severe car shortage period was obliged to prorate contract shipments. Adjoining operators without contracts were running, taking a share of the cars and selling on the spot market to the contract customers of the large producer. The spot market having fallen off, the intermittent mine is closed down, with cars of coal on demurrage, and the contract buyer is again getting all his coal where he originally bought it. Meanwhile the production in the district is practically unchanged.

Lake Movement Slowly Gaining

Present indications are that southern West Virginia non-union coal will maintain a commanding position for some time. Prices on the whole list are being well maintained and are such as will permit competition from all-rail central Pennsylvania steam coal, thus relieving, on the important New England market, a repetition of the strife of 1921.

The Lake season is slowly gathering momentum. Apparently, whatever tonnage of soft coal is wanted will be forthcoming, but on price there is no agreement generally between buyer and seller. Unless the unforeseen comes to pass, 1923 will be a comparatively light year for Eastern Lake shippers. Business is active in the Northwest, but so are coal shippers from the Middle West even as far south as Kentucky. All-rail competition has the Eastern coal-dock and coal-mine operator worried.

There is no disposition in the Middle West to run mines with prices below cost of production and many large properties and a host of small ones are already closed down. Steam-coal prices are below $2. Railroad fuel contracts have been closed at little above $2 on coals that commanded $2.50@$3 when the year began.

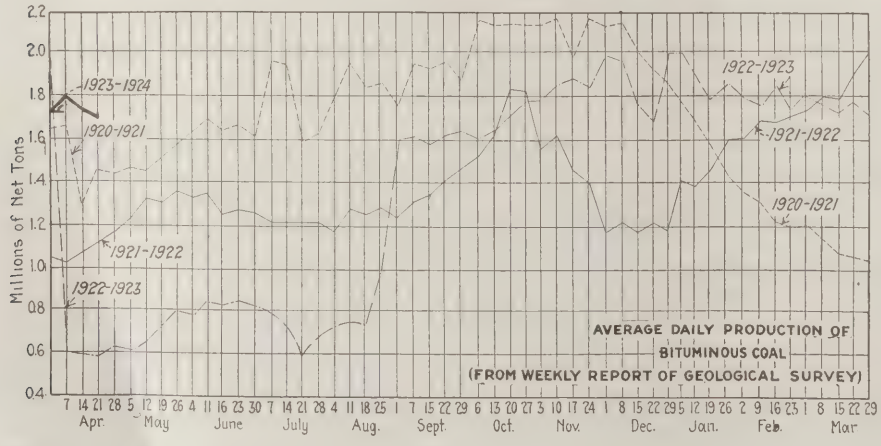
Export Market Quietly Expanding

The export market is quietly developing. France placed an order for high-volatile coal for delivery through the summer at $3.35 per net ton. Baltimore has been experiencing a revival in foreign coal trade, 174,283 tons of cargo and bunker having been loaded out in the first three weeks of April.

Final estimates of soft-coal production during the coal year 1922-1923 place the total at 418,734,000 net tons, according to the Geological Survey. This is a decrease of 21,783,000 net tons as compared with 1921-1922 and 115,006,000 net tons under the production of 1920-1921.

"The total soft coal raised in the week April 9-14," says the Geological Survey report, "including coal coked, local sales, and mine fuel, is estimated at 10,393,000 net tons, which is 764,000 tons more than in the short week preceding but is a slight decrease as compared with the week ended March 31. Preliminary reports of cars loaded in the week April 16-21 indicate decrease to between 10,000,000 and 10,200,000 tons."

Demand for anthracite domestic sizes continues brisk. Retail dealers are filling consumers' orders as rapidly



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
March 31	10,469,000	10,430,000
April 7 (*b*)	3,835,000	9,629,000
April 14 (*a*)	3,656,000	10,393,000
Daily average	609,000	1,732,000
Calendar year	136,779,000	159,164,000
Daily av. cal. year	1,545,000	1,794,000
ANTHRACITE		
March 31	1,896,000	2,008,000
April 7	9,000	1,602,000
April 14	6,000	2,067,000
Calendar year	21,792,000	29,537,000
COKE		
April 7 (*b*)	175,000	428,000
April 14 (*a*)	140,000	420,000
Calendar year	2,123,000	5,557,000

(*r*) Subject to revision. (*b*) Revised from last report.

as they receive the coal and have not started to fill their yard bins. Steam sizes are beginning to accumulate, it being reported that some producers are sending part of their tonnage to storage. Production during the week ended April 14 is estimated at 2,067,000 net tons.

Most Midwest Trade Drags

The Midwest market for almost all coals is spongy indeed. Good domestic has been selling fairly well because of continued cold weather but spring appears to have come at last and even this trade is threatening to disappear for awhile until stocking business starts. Practically every middle- and small-size coal is in trouble. Southern Illinois screenings in Chicago have slumped under $2, central Illinois is suffering at $1.60 and there is no price at all on Standard district output. Indiana Fourth Vein is carried along by the fluctuations of southern Illinois. It is confidently expected that when domestic demand grows even softer within a week or two, steam sizes naturally will rescue themselves from these abnormal depths.

Household trade in anthracite and smokeless is fair, for there are a few far-sighted consumers in this region. Stove and furnace sizes of hard coal are offered by retailers at $15.50 and $16 now and Pocahontas mine-run at $9. A little easing up of rail congestion on coal from the East might drop these prices a shade but not much, for the opening of Lake traffic is expected to take enough cars out of long-haul service to make smokeless and Pennsylvania coals hard to get here.

St. Louis Does Little But Railway Business

Warm weather around St. Louis has practically stopped the spontaneous buying of cheap coal in small lots. Some coal is going into storage, however, because of price, which is $2 a ton less than it was thirty days ago. Mt. Olive deliveries are practically nothing, and Standard coal is moving slowly for domestic uses. Wagon-load steam has been good but carload steam shows a slowing up. Anthracite movement is fair. Coke and smokeless are dragging.

Railroad tonnage through this gateway has been easy for some time past. A little coal moves to the Northwest and some to Chicago.

West Kentucky Market Is Fair

Demand for western Kentucky coal while not heavy is fair, and prices are well maintained. Screenings are a little firmer and quotations for May delivery higher. Car

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

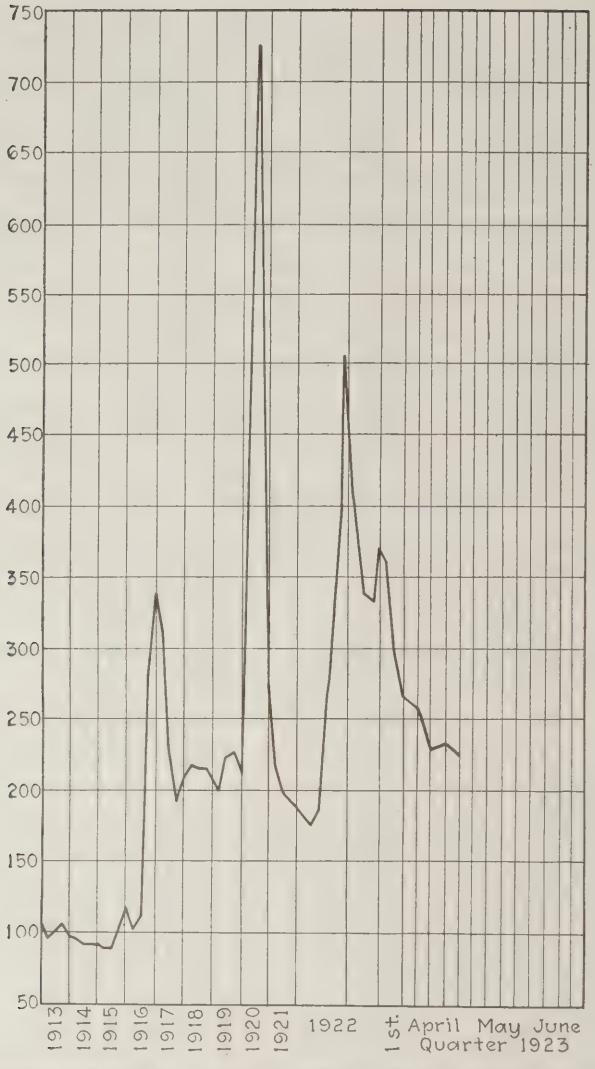
Low-Volatile, Eastern	Market Quoted	Apr. 24 1922	Apr. 9 1923	Apr. 16 1923	Apr. 23 1923†
Smokeless lump	Columbus	$2.85	$6.25	$6.10	**$6.00@$6.35**
Smokeless mine run	Columbus	2.00	4.25	4.25	4.00@ 4.50
Smokeless screenings	Columbus	1.55	3.75	4.00	**3.75@ 4.50**
Smokeless lump	Chicago	2.30	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	1.80	3.75	3.75	**3.75@ 4.00**
Smokeless lump	Cincinnati	2.65	6.00	6.35	6.25@ 6.50
Smokeless mine run	Cincinnati	2.00	3.85	4.25	4.00@ 4.50
Smokeless screenings	Cincinnati	1.90	3.85	4.10	*3.75@ 4.25*
*Smokeless mine run	Boston	4.80	6.25	6.30	*6.00@ 6.50*
Clearfield mine run	Boston	2.70	2.90	2.95	*2.25@ 3.25*
Cambria mine run	Boston	3.25	3.75	3.65	*3.00@ 3.75*
Somerset mine run	Boston	2.70	3.35	3.35	*2.85@ 3.50*
Pool 1 (Navy Standard)	New York	3.65	4.00	4.00	*3.50@ 4.25*
Pool 1 (Navy Standard)	Philadelphia	3.45	4.10	4.00	*3.80@ 4.15*
Pool 1 (Navy Standard)	Baltimore	3.75	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.25	3.35	3.25	*2.75@ 3.50*
Pool 9 (Super. Low Vol.)	Philadelphia	3.05	3.30	3.25	*3.00@ 3.45*
Pool 9 (Super. Low Vol.)	Baltimore	3.25	3.25	3.25	*2.90*
Pool 10 (H.Gr.Low Vol.)	New York	3.00	2.85	2.65	*2.25@ 2.75*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.90	2.80	2.65	*2.40@ 2.75*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.95	2.90	2.90	*2.50*
Pool 11 (Low Vol.)	New York	2.75	2.50	2.30	*1.85@ 2.25*
Pool 11 (Low Vol.)	Philadelphia	2.70	2.40	2.25	.....
Pool 11 (Low Vol.)	Baltimore	2.85	2.25	2.25	*2.15*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	2.50	2.30	2.05	*1.65@ 2.10*
Pool 54-64 (Gas and St.)	Philadelphia	.....	.....	2.20	*2.10@ 2.35*
Pool 54-64 (Gas and St.)	Baltimore	.....	2.25	2.25	*1.95*
Pittsburgh sc'd gas	Pittsburgh	.....	3.00	3.10	3.00@ 3.25
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	2.00	2.15	*2.00@ 2.25*
Kanawha lump	Columbus	2.45	4.00	3.75	3.50@ 4.00
Kanawha mine run	Columbus	2.15	2.50	2.25	2.00@ 2.50
Kanawha screenings	Columbus	1.70	2.35	2.30	**2.25@ 2.55**
W. Va. lump	Cincinnati	2.65	3.60	3.50	**3.25@ 4.50**
W. Va. Gas mine run	Cincinnati	2.40	2.60	2.35	**2.25@ 2.75**
W. Va. Steam mine run	Cincinnati	1.95	2.35	2.35	**2.25@ 2.75**
W. Va. screenings	Cincinnati	1.90	2.35	2.15	**2.00@ 2.50**
Hocking lump	Columbus	2.65	3.00	3.00	*2.75@ 3.00*
Hocking mine run	Columbus	2.15	2.10	2.10	*1.85@ 2.20*
Hocking screenings	Columbus	1.75	1.75	1.60	**1.60@ 1.85**
Pitts. No. 8 lump	Cleveland	3.40	2.90	3.00	*2.35@ 3.50*
Pitts. No. 8 mine run	Cleveland	2.55	2.20	2.25	*$2.10@$2.25*
Pitts. No. 8 screenings	Cleveland	2.55	2.00	1.95	1.80@ 2.10
Midwest					
Franklin, Ill. lump	Chicago	3.45	3.85	3.85	*3.50@ 3.85*
Franklin, Ill. mine run	Chicago	2.75	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	2.75	2.05	1.95	1.90@ 2.00
Central, Ill. lump	Chicago	2.65	2.75	2.75	*2.65@ 2.75*
Central, Ill. mine run	Chicago	2.65	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	1.85	1.60	1.55	1.50@ 1.65
Ind. 4th Vein lump	Chicago	3.15	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	2.50	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.25	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	2.60	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	2.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.40	1.55	1.55	1.50@ 1.60
Standard lump	St. Louis	.....	2.50	2.50	2.50
Standard mine run	St. Louis	.....	1.85	1.85	1.75@ 2.00
Standard screenings	St. Louis	.....	1.10	1.10	1.10
West Ky. lump	Louisville	2.20	2.50	2.50	2.25@ 2.75
West Ky. mine run	Louisville	2.00	1.85	2.10	2.00@ 2.25
West Ky. screenings	Louisville	2.25	1.75	2.00	*1.75@ 2.10*
West Ky. lump	Chicago	.....	2.85	2.60	2.50@ 2.75
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.50	2.50	2.50
Big Seam mine run	Birmingham	1.70	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	3.85	3.85	**3.75@ 4.25**
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.40	4.00	3.85	3.50@ 4.25
S. E. Ky. mine run	Louisville	2.40	2.80	2.75	*2.50@ 2.75*
S. E. Ky. screenings	Louisville	1.70	2.50	2.45	*2.15@ 2.25*
S. E. Ky. lump	Cincinnati	2.40	3.50	3.50	**3.75@ 4.25**
S. E. Ky. mine run	Cincinnati	2.00	2.50	2.25	2.00@ 2.50
S. E. Ky. screenings	Cincinnati	1.65	2.35	2.15	*1.75@ 2.50*
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.00	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.50	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	April 16, 1923 Independent	April 16, 1923 Company	April 23, 1923† Independent	April 23, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@10.50	8.00@ 8.35	$8.50@10.50	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@10.50	8.00@ 8.35	8.50@10.50	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@10.50	8.00@ 8.35	8.50@10.50	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.50	6.00@ 6.30	6.30@ 7.50	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.50@ 3.50	3.50@ 4.15	*2.25@ 3.50*	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.50	3.50	*3.00@ 3.50*	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.50	2.50	*2.00@ 2.50*	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	*1.00@ 1.50*	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.50	1.50	*1.15@ 1.50*	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type,** declines in *italics*



Coal Age Index 231, Week of April 23, 1923. Average spot price for same period $2.79. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

supply is 99 per cent on the Illinois Central, 60 per cent on the Henderson division of the Louisville & Nashville, and 37 per cent on the Owensboro division. Much new equipment and many mechanical coal loaders are going into this field to help meet Eastern competition.

Louisville Trade Is Awake

In Louisville trade is fair considering the facts that Lake movement hasn't opened much and that retail demand is slowing down. Prices are much higher than they were at this time last year. There is good demand from utilities, railroads scattered industries, steel and metal working plants and building-material producers. The brick and cement interests were never busier than they are now. Gas coal is in fair demand, as byproduct companies are busier and gas companies have worked down their stocks and are in the market again. River movement is awakening.

The price situation is practically at a deadlock. Operators assert that they are down to bedrock as a result of high union scales, and the fact that they are restricted to three days a week or less by car shortage and slow market.

Northwest in Lull Preceding Lake Season

The quiet before the storm would be an apt characterization of the market at the Head-of-the-Lakes at present. The market has dropped off with the advent of temperature above the freezing mark and everyone seems to be waiting to see which way the cat will jump after the opening of navigation. There are not more than 600,000 tons of bituminous coal on the docks now. Anthracite is exhausted, of course, and has begun to come in by rail to meet special needs. Hard coal by Lake is expected to start at $2 under last year.

Prices are firm. Screenings, of which there is a large amount, sell at $4.75, lump at $8.50 and run of pile at $7.50. Pocahontas mine-run is quoted at $8.75 and screenings, mostly dust, at $7. There is a fair supply of coke and briquets, the former at $12 and the latter at $10.50.

Some Kentucky coal, traveling all rail, has reached the Duluth market and is competing. The differential in freight rates makes this possible.

Extreme dullness prevails in Milwaukee coal circles. Cheaper coal is expected when navigation opens. There is a steady influx of anthracite and soft coal by rail and car ferry, but not any more than enough to keep dealers supplied promptly. Prices continue unchanged. A revision of prices probably will be forthcoming May 1. Coke is due for a substantial drop.

Western Business Is Light to "Rotten!"

In Kansas City and the region supplied by the Kansas, Oklahoma and Arkansas coal fields coal trade for the past week has been light but some coal has been moving most of the time from operating mines because the number of mines constantly dwindles and retail prices are dropping. Governor Davis' investigation to determine whether the shutdowns are necessary or just for fun is still going on.

Coal business in Utah is described feelingly as "Rotten!" Mines are working less than two days a week. There is no contracting and dealers report domestic consumption at a low ebb. There is no business from the Coast. As a result of the low production the slack market is tightening up. Smelters are using more of this grade than they did, but in most cases they have large stocks on hand.

Columbus Market Develops Strength

Slightly more strength has developed in the Columbus market due to the falling off in supplies as a result of the closing down of mines and reduced car supply. Contracting for steam tonnage shows more activity. Buyers are showing some anxiety as to future stocks and are placing contracts around $2.35@$2.50 for mine-run. Railroad, municipal and school contracting is going on to some extent.

In the Cincinnati market more talk of quality coals was heard and coals with established reputations brought good money. Better grades of steam coals are in better demand because large buyers believe that at current prices this coal is a good "buy." The Cleveland market is dull. Buyers want to contract at current prices while sellers are not disposed to tie up their output at such figures as now prevail.

Mines in Pittsburgh District Close

There is a continuance of the tendency in the Pittsburgh district to close mines particularly dependent on the spot market for an outlet, as that market has meant a loss for several weeks. The market is suffering from the failure of the Lake market to open extensively. Both industrial and railroad consumption of coal is excellent, while the steel industry continues its best showing for steady and sustained production.

Some of the shippers in the Buffalo market say buying continues to fall off.

New England Price Tendency Higher This Year

The only developments of the week in New England disclose a purpose on the part of producers to maintain a higher level of prices than prevailed during 1922. Recent bids for Navy supply, particularly at Hampton Roads, have been closely analyzed by the trade, and the basis is practically a dollar a ton more than quotations were being made a year ago.

At Hampton Roads accumulations continue to about the same extent as for a month past, but quotations are not enough easier to justify predictions of a soft market later on. The agencies are proceeding on a month-to-month

basis as to price, and, for the present, notwithstanding the Navy bids, buyer and seller are not likely to agree on a season base price. For distribution inland from Boston, Providence and Portland $8.25 per gross ton on cars is about the current figure. There are still delays at railroad berths, but they are by no means as serious as during March.

Buying is cautious and there are few intimations of any comprehensive purchases the next fortnight or so. Railroads have made purchases but along much restricted lines, and to the trade it was no surprise to see a large order placed in the usual channels. Less is heard from Scotch and Welsh high volatiles, and arrivals from British ports are likely to be few and far between during the balance of the season.

Sales agents for coals in the Pennsylvania districts are under more and more pressure to get business either spot or contract, and in consequence prices have reached a low ebb. It is nothing unusual now to have fair grades of Clearfield offered at around $2.25 per net ton at the mines, with better grades running up to $3 and $3.25. The really choice coals are still in position to command $3.25@$4 but most of these are specialties, and in some cases operators are finding it difficult to move current output. A small tonnage found its way to shoal points along the cost, where freight rates from Philadelphia as compared with Hampton Roads are slightly in favor of Philadelphia loading, but in the aggregate the tonnage was not large and not especially significant.

For the bulk of their market Pennsylvania operators must still look to the all-rail route, as far as New England is concerned, and if Pocahontas and New River are to be maintained a dollar or so above last year it is quite possible there will be an enlarged outlet for the better grades from Pennsylvania later in the season. It was the $6 or less price on cars at Boston a year ago that put all-rail coals into the discard for large sections of this territory.

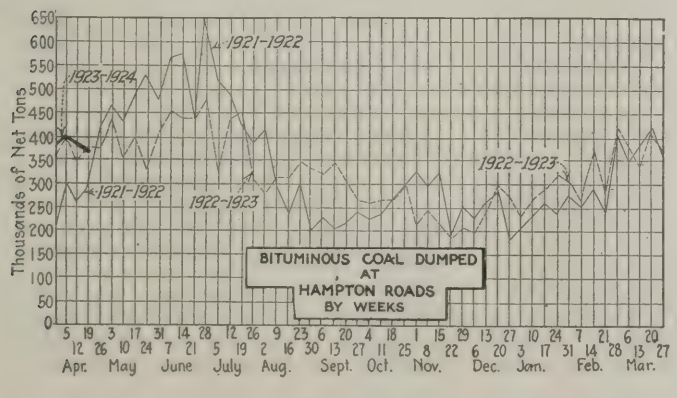
New York Dealers See Bottom of Market

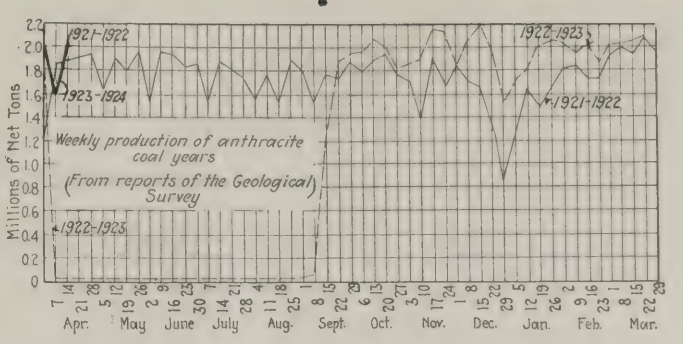
Some dealers in the New York market believe the bottom has been reached in prices and while demand continued slow last week there were numerous inquiries. It is said that a few large consumers had made heavy purchases. Philadelphia buyers on the other hand, do not seem to think the bottom has yet been reached. There is a general intention on their part to stock up when they consider the low point has been reached. The soft-coal market at Baltimore was soft, the export movement being the feature of the situation.

Steam Inquiry at Birmingham Disappoints

Inquiry for steam coal at Birmingham, Ala., was not as brisk as was desired. Railroads which use upward of one-third of the total annual production of the field are preparing to negotiate new contracts.

While there has been some buying for Lake shipment, the market has not opened extensively. Heavy ice is reported from various points and unhampered traffic is not expected until the end of the first week in May. During the week ended April 23 soft coal dumped at Lake Erie piers totaled 236,611 tons of cargo coal and 9,791 tons of fuel coal, making a total of 640,118 tons of cargo coal and 26,897 tons of fuel coal dumped this month.





Domestic Anthracite Active; Steam Dull

The demand for domestic sizes of anthracite is active. Retail dealers books are filled with orders. Steam sizes are causing some trouble because of the lack of demand.

"Production of anthracite recovered promptly from the depression due to holidays and again passed the 2,000,000-ton mark," says the Geological Survey. "The total output in the week ended April 14, including mine fuel, dredge and washery coal, and sales to the local trade, is estimated at 2,067,000 net tons. This was an increase of 465,000 tons over production in the holiday week preceding and was 59,000 tons more than the output in the week ended March 31. The cumulative output during the present calendar year to date stands at 29,537,000 tons, an increase of 7,745,000 tons, or 36 per cent, over the corresponding period in 1922."

Beehive Coke Output Declines Slightly

"The production of beehive coke declined slightly during the second week of April," the Geological Survey reports. "Using as a basis the number of cars loaded by the principal coke carriers the total output was estimated at 420,000 net tons, against 428,000 tons in the week preceding. The decrease was general except in West Virginia, where there was an increase of approximately 3,000 tons."

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Apr. 7, 1923 Inclusive	Week Ended Apr. 7, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	30.0	58.2
Panhandle, W. Va.	51.3	57.3	55.6	59.4
Westmoreland	58.8	65.8	54.5	64.9
Virginia	59.9	55.7	54.4	50.8
Harlan	54.8	22.1	22.7	28.1
Hazard	58.4	16.4	21.5	29.0
Pocahontas	60.0	36.6	37.7	34.9
Tug River	63.7	28.8	34.3	28.4
Logan	61.1	26.2	31.0	29.1
Cumberland-Piedmont	50.6	31.7	47.1	53.0
Winding Gulf	64.3	30.4	34.1	35.9
Kenova-Thacker	54.3	42.4	34.2	50.0
N. E. Kentucky	47.7	28.4	28.2	(a)
New River	37.9	31.6	36.0	40.7
Oklahoma	59.6	59.1	43.0	27.4
Iowa	78.4	75.9	80.4	84.4
Ohio, Eastern	46.6	40.8	35.2	40.8
Missouri	66.8	76.3	77.3	67.3
Illinois	54.5	49.9	47.7	40.8
Kansas	54.9	55.9	48.1	51.7
Indiana	53.8	37.7	52.1	44.4
Pittsburgh†	39.8	41.2	33.8	41.7
Central Pennsylvania	50.2	53.4	46.3	56.9
Fairmont	44.0	35.5	34.1	46.8
Western Kentucky	37.7	32.4	32.7	(a)
Pittsburgh*	31.9	56.1	58.9	55.7
Kanawha	13.0	15.6	23.1	28.8
Ohio, Southern	24.3	38.1	32.6	33.8

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended April 7, 1923	895,767	164,089
Previous week	938,725	182,668
Same week in 1922	706,013	69,106

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	Car Shortage
April 4, 1923	15,168	4,305	58,237	24,539
Same date in 1922	259,605	122,359	.....	.....
March 28, 1923	14,196	3,785	68,986	29,281

Foreign Market And Export News

British Mines Heavily Booked with Orders—Production Shows Further Cut

Output of Great Britain's coal mines during the week ended April 7 was 3,940,000 tons, says a cable to *Coal Age*. This is a decrease of 934,000 tons, when compared with the production of the previous week which was 4,874,000 tons. The week of April 7 included a national holiday, Easter Monday. The cutting of production made the scarcity of Welsh coal more pronounced.

About 46,000 men, or one-fifth of the men employed in the Welsh coal fields were involved in the recent strike, the object of which was to force the surface men, who have their own union, into the Miners' Federation. The men are now back at work, and the surface men continue to be independent of the Federation.

Over one-half of the present Welsh exports are going to France and Italy, but the exports to South America, coaling depots, the Far East, Belgium, and Germany are on a satisfactory scale.

Mines are booked with orders to the limit of their capacity. It is believed that if increased supplies were available the export coal trade would now be able to surpass the high level attained in former record years. Scarcity of supplies, however, acts as a deterrent to further export expansion. Mines in the Newcastle district are sold up well into **May.**

Coal exports officially reported from London for the weeks ended April 13 and April 20, in tons, follows:

	April 13	April 20
South Wales district	.....	2,647
Newcastle (Tyne) district	1,140	1,020
Clyde	4,700	.....

French Mine Strike Settled

The strike that was in progress in the Lorraine coal fields for several weeks was settled early this month, work being entirely resumed in the mines on April 6. The settlement it was hoped would hasten similar action in the Saar region where the workers have been on strike for some time.

Demand for industrial coals continues heavy and consumers' supplies are low. The transportation difficulties which were mostly due to congestion at French sea ports owing to heavy imports of British coals have been much relieved. In the Loire and Center coal fields, the shortage of coals is none the less acute than in the north of France, and small collieries which usually have difficulty in selling their product are sold up.

The following bids for supplying coal to the Prefecture de la Seine have recently been accepted:

Eighteen thousand four hundred tons of half-fat run-of-mine, tendered by the Cie des Mines d'Aniche at 102 fr. 50 f.o.b. mines;

Ten thousand tons of anthracite (lean) cobbles, tendered by the Cie des Mines d'Anzin at 148 fr. f.o.b. mines.

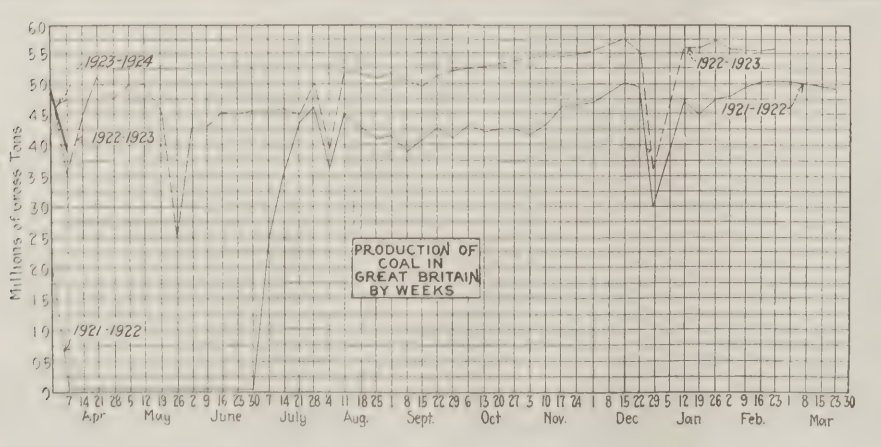
Shipments of coke amounting to about 2,700 tons were made daily to France from the Ruhr toward the end of the first week in April. It was expected that this tonnage would gradually increase.

Business at Hampton Roads Brisk

Business was brisk at Hampton Roads last week, with prices stronger and inquiries and demand on the upgrade. Export business fell off but bunkers held good and coastwise shipments were fair.

Accumulations at the piers increased, as a result of an improvement in the car situation, which was about 60 to 70 per cent of normal. The demand, however, was sufficient to guarantee against demurrage.

Domestic dealers watched their business drop, because of the advent of summer, but were devoting their energies to launching the summer's ice business. The general tone of the market was firm, and the outlook for a good business during the spring and summer was favorable. Shipments to France continue in small quantities, with prospect of increasing.



Saar Production, 1922

During 1922 the Saar collieries produced 11,240,000 tons of coal and 253,120 tons of coke. The coal produced was distributed as follows:

	Tons
Mines' consumption (with annexed works)	813,837
Supplies to mine workers	347,762
Delivered to coke ovens	317,702
Shipments on sales	10,207,773
Total	11,687,074
Less: decrease of stocks during the year	447,071
Output	11,240,003

Export Clearances, Week Ended April 14, 1923

FROM HAMPTON ROADS

	Tons
For Brazil:	
Braz. SS. Iguassu, for Rio de Janeiro	4,989
For Cuba:	
Nor. Christian Michelson, for Havana	5,321
Dan. SS. Phonix, for Havana	2,725
For France:	
Br. SS. Mongolian Prince, for Havre	8,713
For Italy:	
Ital. SS. Valdarno, for Porto Ferrajo	6,967
For Porto Rico:	
Amer. Schr. Herbert L. Rawding, for Manati	1,500
For West Indies:	
Nor. SS. Kjellbergen, for Curacao	2,778

FROM PHILADELPHIA

For Belgium:	
Br. SS. Glenluss, for Antwerp (coke)	...
Nor. SS. Gro, for Antwerp (coke)	2,589
Belg. SS. Caucasier, for Antwerp (coke)	...
Br. SS. Chalister, for Antwerp (coke)	...
For Cuba:	
Dan. SS. Niels R. Finsen, for Havana	...
For France:	
Br. SS. Whateley Hall, for Dunkirk (coke)	...
Belg. SS. Brazilier, for Dunkirk (coke)	...
For Germany:	
Ital. SS. Piave, for Hamburg	...
Br. SS. Galtymore, for Hamburg (coke)	...

Hampton Roads Pier Situation

N. & W. piers—Lamberts Pt.:	April 12	April 19
Cars on hand	1,530	1,191
Tons on hand	99,747	77,981
Tons dumped for week	138,901	136,941
Tonnage waiting	30,000	5,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,646	1,743
Tons on hand	94,940	98,950
Tons dumped for week	94,582	126,114
Tonnage waiting	2,312	17,619
C. & O. piers, Newport News:		
Cars on hand	2,570	2,603
Tons on hand	135,335	136,315
Tons dumped for week	118,168	74,033
Tonnage waiting	1,050	9,250

Pier and Bunker Prices, Gross Tons

PIERS

	April 14	April 21†
Pool 9, New York	$6.25@$6.65	*$6.00@$6.35*
Pool 10, New York	5.50@ 6.00	*5.40@ 5.75*
Pool 11, New York	4.50@ 5.50	*4.50@ 5.00*
Pool 9, Philadelphia	6.35@ 6.80	*6.30@ 6.75*
Pool 10, Philadelphia	5.45@ 5.85	*5.40@ 5.80*
Pool 11, Philadelphia	4.50@ 4.90	*4.40@ 4.80*
Pool 1, Hamp. Roads	6.00@ 6.25	**6.25@ 6.50**
Pools 5-6-7 Hamp. Rds.	5.50	*5.25*
Pool 2, Hamp. Roads	6.00@ 6.25	**6.25@ 6.50**

BUNKERS

Pool 9, New York	6.55@ 6.95	*6.30@ 6.65*
Pool 10, New York	5.80@ 6.30	*5.70@ 6.05*
Pool 11, New York	4.80@ 5.80	*4.80@ 5.30*
Pool 9, Philadelphia	6.65@ 6.90	*6.60@ 6.85*
Pool 10, Philadelhia	5.70@ 6.25	*5.65@*†**6.20**
Pool 11, Philadelphia	4.75@ 5.20	*4.70@ 5.15*
Pool 1, Hamp. Roads	6.25	**6.50**
Pool 2, Hamp. Roads	6.25	**6.50**

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	April 14	April 21†
Admiralty, large	40s.	**40**s.@ **45**s.
Steam, smalls	30s.	**30**s.@ **23**s.**6**d.
Newcastle:		
Best steams	35s.	*34s.6d.@35s.*
Best gas	33s.@35s.	*32s.6d.@35s.*
Best bunkers	32s.6d.@35s.	**35s.**

†Advances over previous week shown in **heavy type**; declines in *italics.*

News Items From Field and Trade

ALABAMA

At a recent meeting of the stockholders of the **Burnwell Coal Mining Co., the capital stock was increased from $200,000 to $250,000.** The company operates commercial mines in Walker County, with principal offices in Birmingham.

The Porter Coal Co. has been incorporated with a capital stock of $10,000 and will take over the operation of the Porter Mine in Walker County, near Palos. K. E. Cooper, Sumner E. Thomas and Brewer Dixon, of Birmingham, are the incorporators, Mr. Cooper being president of the company.

The Alabama Company will soon be producing coal from its No. 2 mine at Lewisburg, Ala. This mine has been developed for several years but has not been operated for some time, but due to the company's pressing need for coal it has been decided to place the mine in operation.

J. J. Forbes, mining engineer in charge of the Birmingham station of the Bureau of Mines, **has been detailed with the U. S. Coal Commission to collect data** on coal losses in mines in the southern district. Dr. F. B. Meriwether, surgeon, Bureau of Mines, also is in the district assembling data on camp sanitation for the use of the Coal Commission.

ALASKA

So as to make more available the coal resources of the Moose Creek field, the Alaskan Engineering Commission has cabled the Secretary of the Interior, recommending the **immediate construction of a spur into the Moose Creek field.** W. P. T. Hill, of the Bureau of Mines' staff, who has been studying the situation in this coal field, reports that development has reached a point where the building of this spur is justified by the prospective tonnage.

COLORADO

Judge T. Blake Kennedy, of the U. S. District Court at Denver, on April 6, **issued a temporary injunction setting forth in detail the policy to be adopted by the Denver & Salt Lake R.R. in allocating cars to coal mines.** The injunction was issued on the application of the Interstate Commerce Commission in proceedings instituted on behalf of several other coal mines on the route which alleged that in assigning cars to the mines the railroad company had not taken into consideration those cars supplied to mines for the transportation of coal destined for the use of the railroad itself.

ILLINOIS

The No. 4 mine of the **Gartside Coal Co.,** at Murphysboro; the Tilden **mine** of the **Madison Coal Corporation** and the mine operated by the **Union Fuel Co. at Auburn** have been temporarily closed.

Pumps have been started at **the mine of the Kanawha Fuel Co. at Duquoin.** While no reports have been given out, **it is generally supposed that the mine is to be opened soon** either by the owners or under lease by another concern. The mine has been operated until about a year and a half ago by the Old Abe Mining Co., which is controlled by the same officials as the Kanawha Fuel Co., of Milwaukee, Wis. If the mine is opened much new machinery and equipment will have to be installed to take the place of that removed or destroyed by water since the plant was shut down.

The Coal Operators' Association of the Fifth and Ninth Districts of Illinois, including the operators of 99 mines in southern Illinois adjacent to St. Louis, has decided to **protest against the passage of a bill** pending before the Legislature **which provides for a tax of 8c. a ton on coal** as it comes from the mine. The tax, if placed, would be an additional cost to the consumer and besides would handicap the industry in Illinois in competition with other coal fields, according to Dr. C. H. Krause, president of the association and vice-president of the Willis Coal & Mining Co. The association will also oppose a bill which will put the regulation of the coal mines under the jurisdiction of the Commerce Commission.

The mines of the **Superior Coal Co. broke all its own weekly** records in the last week of March when the four mines hoisted a total of 117,242 tons of coal for the six days. Thursday of that week the four mines hoisted 20,191 tons of coal, the greatest tonnage ever hoisted in a day of eight hours by the four mines. The average daily hoist for the week was 19,540 tons. On Thursday, March 22, mine No. 2 broke its old record for tonnage and also established a new company record for mine cars hoisted in eight hours, by hoisting 1,648 mine cars with a tonnage of 5,625. T. T. Ferguson is the manager of the mine and William Harlow and Emil Viehweg are the engineers who made the hoist, working alternately one hour apiece.

On Thursday, April 12, **No. 6 mine of the Peabody Coal Co. made a record hoist** of 2,830 tons with a time loss of 23 minutes. The previous record at this mine was made on Feb. 24, 1919, when the tonnage raised was 2,667. The mine is in charge of P. W. MacMurdo, superintendent, and Owen Melkush, manager.

The following **mines in the Belleville district have been temporarily closed:** Columbia Colliery Co., Famous Mine at Freeburg and Royal Mine, Belleville; Star Coal Co. at Freeburg; B. & B. Coal Co. at Belleville; Signal Hill Coal Co. at Belleville; Summitt Coal Co., at Belleville; Fullerton Coal Co., at Belleville. Other mines closed recently are the Consolidated Coal Co.'s West mine at Breese and two mines operated by the O'Gara Coal Co. in Saline County.

There are two coal companies prospecting in Fulton County, one of which, the **Tiger Coal Co., is laying a switch** for a strip proposition.

The Colonial Collieries Co., 38 South Dearborn Street, Chicago, has incorporated with a capital stock of $500,000. Incorporators are Thomas J. Mylet, Edward G. Sternberg and Herbert Lanigan. The purpose is to mine, transport and sell coal.

F. W. J. Sextro, formerly officer and director of Rutledge & Taylor Coal Co. and Security Coal & Mining Co., **has acquired the Paramount Fuel Co.,** Chicago. Effective at once, Mr. Sextro will be actively associated with this company at 607 Fisher Building.

Charles C. Fitzmorris, recently Chief of Police of Chicago, who retired with the Thompson administration at the last election, **has been made president of the Eureka Coal & Dock Co. of Chicago.**

Paul Weir, for the past two years chief engineer of the Bell & Zoller Mining Co. properties at Zeigler, has just been appointed to the position of general superintendent over the same property. The promotion was a surprise to all, including Mr. Weir himself.

INDIANA

The Conveyors Corporation of America, Chicago, announces the appointment of **Irvin C. De Haven Engineering Corporation,** State Life Building, Indianapolis, as district representative. The new agency will handle the sale of the American steam jet ash conveyor in Indianapolis and surrounding territory.

Indiana miners will pay the lowest price for their powder for the next year of any district in the country and will save approximately $80,000 during that period, as a result of a contract signed by committees from the Indiana Bituminous Coal Operators' Association and United Mine Workers. Last year's price of $2.10 a keg is reduced to $2. According to the Terre Haute agreement, the coal operators of this state are to furnish black powder to the miner at cost, plus the expense of handling, transportation and insurance. These expenses were fixed at 25c. a keg and a reduction in the cost of the black powder from $1.85 to $1.75 brought the reduction in the price to miner. The contract dates from April 1, 1923, to April 1, 1924.

The Akin-Burton Coal Co., of Terre Haute, has incorporated to produce and sell coal. Charles T. Akin, Sedgwick R. Akin and Charles E. Burton are the incorporators. The capital stock is $50,000.

Retail coal prices in Indianapolis have declined about $1.50 a ton on all grades the last few weeks, a survey of prices shows. Summer schedules usually are issued after the middle of April, and a further decline is expected when these schedules are fixed. Pocahontas lump, which hit the high mark of $13 to $13.25 a ton in the winter, can be bought now at prices generally ranging from $11 to $11.50 a ton, though some firms are charging $12. Indiana fourth vein lump is quoted as low as $5.95 a ton. In the winter it was as high as $7.50 to $8. West Virginia and Kentucky domestic sizes are $9 to $10 a ton, a decline of about $1.50. The break in prices began about three weeks ago.

Work in the Atlas mines, at Petersburg, has been resumed following a brief strike of the machine operators which was settled by arbitration. The machine operators complained that the scale paid did not recompense them for cutting entries in the mine, as the Atlas mine is driving entries only during the summer months and the machine operators cannot make as much as they did formerly by cutting coal in rooms in which it is not necessary to move their machines so often. The Howe Coulter Coal Co., operating the Atlas mines, and the union reached an agreement whereby the coal company will be enabled to drive entries all summer and when the coal business is resumed next autumn 750 men can be placed in the mine, instead of the 500 now employed. Coal mines in Pike County are operating less than 40 per cent. Only the stripping mines are operating full time.

KANSAS

Governor Davis has been asked by the district miners' union at Pittsburg, **to require the Jackson-Walker Coal & Mining Co. to resume operations** at its No. 16 mine. It was asserted by the officials of the company that the mine had been shut down since March 28 because of inactive market

KENTUCKY

General offices for the development of the new Henry Ford properties in Kentucky will be at Stone, nine miles north of Williamson, in Pike County, on the Kentucky-West Virginia border. Stone has a population of 503 persons. This announcement was received by the Lexington Board of Commerce, which had been endeavoring to have the state offices located at Lexington.

The Elkhorn Coleman Coal Co., whose mine at Millard, Pike County, on the C. & O. Ry., was closed in May, 1921, reopened that operation in December last.

Elkhorn Marrowbone Coal Co., of Wolfpit, Pike County, on the C. & O. Ry., reopened their mine at that place in November last after being closed since May, 1921.

A report from Whitesburg, is to the effect that the **Consolidated Fuel Co.,** Pittsburgh, Pa., operating at Dalna, **has bought a large coal land acreage** near Livingston, in Rockcastle County, and is planning development.

The United Mine Workers, in a legal battle to collect $32,000 from the Mahan Jellico Coal Co. for alleged violation of contract, appealed April 18 at Frankfort from a decision of the Whitely Circuit Court that declared the wage agreement invalid. The miners contend that they signed in April, 1920, and that the company, after trying to get them to give up their union charter, closed the mine down in December, 1921, and refused to pay the miners the $2 a day provided in the agreement in case the mines were closed on account of any dispute and the company either failed to appear before an arbitration board or to abide by such a board's decision.

Terminal improvements under way or planned **in Louisville** for increasing car handling facilities of local yards **will cost about $8,000,000.** The Kentucky & Indiana Terminal R.R. has placed orders for several additional switch engines and has announced plans for a large increase in trackage. The C.C.C. & St.L. is planning to double track the Big Four bridge at Louisville. The Louisville & Nashville is building additional yards south of the city. Contracts for heavy car repairs have been placed in outside shops by some of the roads that operate into Louisville.

Tapping the water supply of a coal mining company after the city reservoir was exhausted **saved the coal mining town of Clay** in the western field from destruction on April 5. Six buildings were destroyed and others damaged, the loss being about $100,000.

The Burclut Coal Co., of Middlesboro, capital $30,000, has been chartered by John W. Burnett, W. L. Burnett and George A. Clutts.

R. M. Watt, district manager for the Kentucky Utilities Co., at Pineville, recently obtained an option on well-located property as a site for a new $1,500,000 power plant.

The Reams Hardware Co., of Middlesboro, has taken over the mine supply business of Rogan Brothers Co., a branch of the Kentucky Mine Supply Co.

MASSACHUSETTS

Allan M. Macleod has been appointed New England representative of Dickson & Eddy, of New York City, effective May 1. He will have offices at 60 Congress Street, Boston, and will look after the interest of the company in that territory, including the development of its bituminous-coal business. Mr. Macleod is well known in the coal trade, having been associated with it since Dec. 1, 1904. In January, 1915, he became connected with the Northern Coal Co., remaining with that concern until Nov. 1,



ALLAN M. MACLEOD

1917, when he joined the Fuel Administration at Washington, becoming manager of the Zone Coal Permit Bureau when it was formed. In May, 1918, he became director of anthracite distribution under James J. Storrow, New England Fuel Administrator in Boston. During the 1919 coal strike he served as a member of the New England Sub-Committee of the Eastern Regional Coal Committee. In February of 1920 Mr. Macleod became associated with C. H. Sprague & Son Co., and as a representative of that concern made a tour of the United Kingdom, Holland, Belgium, Switzerland, Italy and France, remaining abroad until October of that year. On Sept. 15, 1921, Mr. Macleod was appointed executive secretary of the Massachusetts Emergency Fuel Committee.

The F. W. Pray Coal Co., Boston, was recently incorporated to engage in the coal business. The capital stock is $50,000 and the incorporators are Henry N. Berry, president; Ralph Crocker, Swampscott, Mass., treasurer.

The Central Coal Co., Lowell, is a recent incorporation, to engage in the coal business, with a capital stock of $100,000. The firm will conduct yards at Lowell. The president is John F. Cunha, and the treasurer, Edward F. Cunha, of Lincoln Park, Somerville, Mass.

MINNESOTA

A representative of the Combustion Engineering Co., of New York, addressed a joint meeting of the St. Paul and Minneapolis chapters of the American Society of Mechanical Engineers last week on **pulverized fuel and lignites.** He predicted that pulverized fuel would be the coming fuel for industry, and said that lignite might cut a considerable figure in fuel in this market if certain processes under experiment were perfected. **Three carloads of North Dakota lignite are to be tested out in two stations of the St. Paul Gas Light Co.** on underfeed stokers and traveling grates, to determine its effectiveness. The tests will be carefully watched by many who hope that lignite will prove to be an available fuel for the Twin Cities. The gas-light company has a new plant under construction which will go into service next season that will use pulverized fuel. It can use lignite or peat, if tests shall prove either of these to be satisfactory as a commercial proposition. Both will be tried in the new plant, when it is completed and in operation.

MISSOURI

Coal mines in Randolph, Lafayette, Henry, Johnson and Morgan counties, where some of the largest pits of the state are located, **will be benefited by the decision of the Missouri Public Service Commission, which has ordered a reduction of 17c. a ton in intrastate rates on coal.** The present rate of 97c. a ton is reduced to 80c. The decision was returned in the appeal of Edward Aull Coal Co., of Lafayette County, which charged that the present rates were excessive and discriminatory in favor of interstate traffic. The action for reduction was brought against the Atchison, Topeka & Santa Fe, The Frisco, Burlington, Chicago & Alton and Missouri Pacific Railroads.

MONTANA

The Northern Pacific RR. announces that it will build a new line from the Rosebud district to Forsyth, Mont., a distance of 34 miles, at a cost of $2,000,000. It will make semi-bituminous coal deposits available for open-pit mining.

NEW YORK

Former Congressman Charles B. Smith, as one of the receivers of the L. R. Steel Co., on returning to Buffalo from Montgomery County, Virginia, where he went to inspect the mines of the **Merrimac Anthracite Coal Co.,** which is a Steel Company promotion, expressed himself as favorably impressed with conditions there and thinks the company may prove to be solvent and capable of achieving final success.

Foote Bros. Gear & Machine Co., Chicago, **have moved** their New York office from 145 Greenwich St. to **larger quarters at 100 Greenwich St.** J. R. Shays, who has represented the company for many years, remains in charge of the New York office.

Senator Downing, of New York city, has introduced in the New York State Legislature **a bill** (Senate Print No. 2,134) **appropriating $10,500 for plans and specifications for constructing tipples** for coal at Ithaca and Watkins with a view to facilitating transportation and delivery of coal within the state and utilizing the barge canal for that purpose.

OHIO

The Kearns Coal Co., Cincinnati, has been incorporated with a capital of $200,000 for the purpose of mining and selling coal and coke both at wholesale and retail. Incorporators are G. M. Kearns, U. B. Buskirk, Howard N. Ragland, R. H. McCormick and Carl T. Foley.

The Joan Collieries Co., Marietta, has been chartered with a capital of 500 shares, no par value, designated to mine coal. Incorporators are E. H. Wigginton, H. G. Healop, R. M. Noll, Benjamin E. Jones and John Jones.

The Euga Coal Co., New Lexington, has been chartered with a capital of $5,000 to mine coal in the Hocking Valley. Incorporators are: J. A. Curtis, R. F. Roberts, M. Herstam, and E. Holwick.

The Landson Coal Co., of Hopedale, has contracted with the Roberts & Schaefer Co., for the complete erection of a new tipple at its stripping operation at Hopedale.

The Cincinnati Chamber of Commerce **will conduct a trade excursion** to points on the Norfolk & Western in West Virginia, down the Big Sandy and into the Hazard and Harlan coal fields as a means of strengthening the bonds between the city's merchants and distributors and the coal fields to the south and east.

C. D. Boyd, traffic manager for the Hazard Coal Operators Association and the Southern Appalachian Operators Association addressed the traffic committees of both associations at a meeting held at the Hotel Gibson, Cincinnati, on April 17. Many matters were gone over relating to tariffs, traffic and rates, but the matter that received the most attention was the controversy on rates between the Illinois shippers and the dock operators at the head of the lakes over Minnesota tariffs. Both associations decided to keep out of the discussion on the ground that this was "not their fight."

PENNSYLVANIA

The Diamond No. 3 Mine, located at Grove City, on the Bessemer & Lake Erie R.R., has been purchased by the Bixler Coal & Coke Co., of Pittsburgh, which company intends to install modern equipment and operate the mine to its full capacity.

The Central Cambria Coal Mining Institute was organized April 12 in the public school building at Portage. The purpose and aim of the organization was discussed and the following officers elected: President, Dennis J. Keenan, of the Portage Wilmore Coal Co.; First Vice-President, Thorne Murphy, of the Sonman Shaft Coal Co.; Second Vice-President, James R. Cunningham, of the Forge Coal Mining Co.; Third Vice-President, Frank J. Burke, of the Sonman Shaft Coal Co.; Secretary, Jerome C. White; Treasurer, Leo M. Cronaur. The election of a Board of Directors was left until the next meeting. A committee on bylaws and constitution was elected and ordered to report at the next meeting. The institute has for its purpose to foster a better fellowship among those interested in the mining industry, to study and discuss the problems of the industry with a view toward their practical solution; to assist in accident prevention, to help collectively and individually to make a safe industry for those whose lives are given to this work, and to assist in educational work both for its members and mining men in general.

Schuylkill County Commissioners on April 13, forced an immediate issue with coal companies who have refused to pay a 1,000-per cent increase in coal-land taxation, by ordering the tax collectors to levy immediately upon and sell breakers, horses, coal, mules and coal cars, and even railroad cars where the tax increase has not been paid.

The Colonial Coal & Coke Co., Pittsburgh, has been appointed sole **selling representative of the Maple Furnace Coal Mine,** owned by the Argentine Coal Mining Co. The combined output of the North East Coal Mining Co., the Standard Coal Mining Co. and the Argentine Coal Mining Co., makes the Colonial company the largest shipper in Group 1 on the Bessemer. The company's coal is produced under the personal supervision of Harris T. Booker, formerly general manager for the Berwind White Coal Mining Co.

The Board of Education of Philadelphia on April 10 **approved the awarding of contracts for furnishing coal** for the school buildings for the ensuing year, at the following prices: Egg, stove and chestnut, $10.67 per ton; pea coal, $8.14, and buckwheat No. 1, $5.44. Hauling of anthracite is to cost from 90c. to $1.47 per ton. For furnishing bituminous coal the prices range from $8.36 to $8.40 per ton.

A well-defined break has appeared in the ranks of the United Mine Workers in the Ninth district, of which C. J. Golden, of Shamokin, is president, according to the *Wilkes-Barre Leader.* Representative of forty-five locals met at Ashland recently and went on record as opposing the institution of the colliery local plan, which is being put in force by the district officers. A committee representing these insurgent locals, issued a statement April 14 in which they declared their intention to resist every effort to change the present system. The insurgents admit that the colliery local plan passed the Shamokin convention by an aye and nay vote, but contend that when the plan was submitted to a referendum vote, it was defeated by at least 800 votes. Action of the District officers in throwing out votes sent in by locals opposed to the plan because returns were not made within the time specified, lost that number of votes to the antis, they claim.

The House on April 16 passed the O'Boyle bill requiring owners and operators of coal mines and operations to furnish and sell coal at current or market prices to hospitals, poor houses, schools, churches and municipal buildings. Representative Edmonds, Philadelphia, asked the sponsor of the bill the purpose of the measure and was told that during the coal shortage of the past winter the Delaware & Hudson Coal Co. would not sell coal at any price to a hospital and a school building near its operations in Lackawanna County. There was no opposition voiced on the floor of the House to the measure.

A bill authorizing the Chief of the Department of Mines to appoint a Mine Inspectors' Examining Board was introduced in the Senate April 17 by Senator George Woodward, Philadelphia. The board is to be composed of two mining engineers who have had experience in the anthracite district and two who have had similar experience in the bituminous mines, two who shall have passed examinations qualifying them as inspectors or mine foremen in the anthracite mines and two who have been qualified for similar positions in the bituminous mines. The minimum age limit of members of the board is thirty years. Mine inspectors are now named by the Governor.

Senator Buckman, Bucks County, offered a bill in the Senate April 16, amending an act of 1881 to provide that all domestic corporations and all foreign corporations which have at any time been registered in the Commonwealth, organized for mining, manufacturing or trading purposes, whether created by general or special laws, whose charters have expired or may hereafter expire or may be dissolved, which at the time of the expiration of the charter or dissolution are owners or holders of record of property in Pennsylvania, **may sell the property and make title as effectually as if their charters had not expired.**

The House on April 12 passed finally the first of the series of bills affecting the coal industry of Pennsylvania. It was the Post measure, which is intended to **relieve life tenants of land from the payment of taxes on the underlying veins of coal which they have no right to operate.** The bill provides that such coal shall be assessed to and the taxes on it paid by the owner of the coal. The bill was sent to the Senate this week.

Joseph J. Walsh, Chief of the Bureau of Mines and Mining, announces that but **eight examinations of candidates for certificates as mine foremen and assistant mine foremen will be held** in the anthracite region this spring because of lack of funds. In other years twenty-two boards sat in various parts of the region. The examinations will be held on April 30 and May 1 at the following places, and with the following acting as chairman of each board, consisting of the inspector, a mining engineer and two experienced miners: Carbondale—P. J. Moore, districts 1 and 2. Scranton—David T. Williams, districts 3, 4, 5, 6, 7. Wilkes-Barre—David T. Davis, districts 8, 9, 10, 11, 12, 13, 14. Hazleton—D. J. Roderick, districts 15 and 16. Coaldale—E. G. Evans, 17 and 18 districts. Pottsville—M. J. Brennan, districts 19, 20 and 21. Shamokin—P. J. Friel, 22, 23 and 24th districts. Lykens—Charles J. Price, 25th district. Instead of taking the examinations in their respective mine inspection districts candidates will have to appear before the boards as per the above schedule.

Joseph J. Walsh, of Wilkes-Barre, who has been serving as chief of the Bureau of Mines and Mining since Governor Pinchot took office, was **named by the Governor for a full term of four years** commencing April 17. The appointment was immediately confirmed by the Senate, the action being unanimous.

Fire, the origin of which has not been determined, on April 13, **gutted the entire upper half of the washery of the Lackawanna Valley Fuel Co.,** in the Pine Brook section of Scranton. Destruction of the entire wooden frame structure was prevented only by effective work on the part of the firemen. The loss is estimated at between $12,000 and $15,000.

Berne H. Evans, of Harrisburg, was the only speaker at the Senate judiciary general subcommittee hearing on the Joyce compensation bill at Harrisburg, on April 17. He represented the Pittsburgh Coal Producers' Association, the Central Pennsylvania Coal Producers' Association, most of the large producers of anthracite and many other large employers of labor. **These interests, he said, are unqualifiedly opposed to the bill, which will raise the maximum compensation to $20 a week** and base the compensation on 66⅔ per cent of the weekly wage. The present law has resulted satisfactorily, he said, for it has been humane to both labor and industry. Roger Dever, attorney for the anthracite mine workers; Thomas J. Kennedy, District 7, United Mine Workers, and J. B. Crumrine, District 5, spoke for the measure.

Contract miners at the Jeddo No. 4 and 7 collieries of the Jeddo Highland Coal Co. struck April 14 in a renewed **demand that they receive their wages on pay days at 2 p.m.** when they come from the workings, instead of being obliged to wait until 3:30, when the pay windows open. Both places were tied up and 600 men were idle. The men, it was stated by their leaders, would remain idle every pay day unless the hour for the wage distribution was changed.

RHODE ISLAND

Colonel George H. Webb, Fuel Administrator for Rhode Island, in his report to Governor Flynn **says that in no case has any dealer been found to have charged a customer more than $16 per ton for coal which did not warrant the charge,** and cases were found where coal selling at $19 and $20 per ton showed no profit to the dealer. "If the federal government," said Colonel Webb, "will correct the basic cause of the fuel conditions which periodically threaten the public welfare and health, protective state law can easily correct such unfair practices as may arise from time to time within the state." The report states that retail prices for coal were based on prices paid by the dealers, which ranged from $8 to $14.95 per gross ton f.o.b. at the mines. Sixty-five per cent of the coal was company coal, supposed to be sold from $8 to $8.50, and 35 per cent was independent coal, costing as high as $14.95 and inferior in quality to the $8 coal.

UTAH

The Carbon County R.R., being built for the Columbia Steel Corporation, to open coal deposits in Horse Canyon, **is expected to be ready for service the first week in May.** Work at the mine is under way and it is probable that coal will be produced on a commercial basis by August 1. The coke oven and blast furnaces should be ready early next year. Pig iron ought to be produced by Apr. 1, 1924.

Thomas E. M'Kay has been made president of the Utah State Public Utilities Commission. He was president of the Senate for two terms. He is a resident of Huntsville and a prominent church man in that section.

WEST VIRGINIA

Carrying a provision that it should be considered only as an emergency measure and should be in effect only for the next two years, House Bill 149—**the Zimmerman bill—imposing a privilege tax on the production and sale of coal** and other mineral products as well as on manufacture and sale of tangible property, sales at retail, a tax on the gross profits of wholesalers, a tax on the gross income of banks, railroads and other public utilities and on engaging in business, was reported to the House of Delegates on Tuesday, April 17, by the Finance Committee of the House. The measure as reported provides for an increase in the rate on coal, oil and gas from two-fifths of one per cent under existing law to 1 per cent.

During consideration of the **Helmick bill creating the West Virginia School of Mines which passed the State Senate** April 17, by a vote of twenty-four to two, the only discussion of the bill arose over the question of location, Senator Kidd, of Gilmer, stating that he was in sympathy with the measure but he asked if it should not be located at the University. He was assured by Senator Helmick, patron of the measure, that the bill created a commission of five to decide upon the proper location for the school especially with a view to avoiding duplication.

A bill designed to abolish the state police in West Virginia was removed from further consideration for two years by the Legislature when the House voted definitely April 18, **to postpone action on the measure.** Proponents of the measure declared the act creating the state police set up "a military regime," while its opponents contended the troopers were not a military force.

Clarksburg capitalists have launched the Bailey-Spraker Coal Co. for the purpose of mining coal in the Harrison County field, this company being capitalized at $25,000. The general office of the company will be at Clarksburg. Largely interested in the new concern are K. D. Bailey, C. F. Bailey, E. L. Spraker, Anna May Spraker and Harry W. Sheets, all of Clarksburg.

WISCONSIN

The Valley Coal and Dock Co. has purchased 500 ft. of dock frontage on the Menominee River at Milwaukee, and will proceed to equip it with facilities for unloading vessels and otherwise handling coal. Until the necessary machinery is installed coal will be discharged on the dock by self-unloading steamers. The company contemplates adding to its frontage in the near future.

The State Fuel Administration of Wisconsin is **investigating the sales methods of a Chicago coal company** which advertises that it will save "special agents" in Wisconsin from $1.50 to $2 per ton on coal and pay 75c. per ton commission on all sales. The company advertises that working agents without investment or experience should be able to earn from $100 to $200 per week as its representative. The Fuel Administration demands to know the name of the mine and operating company, and the shipping point.

A bill to increase the occupational tax on coal handled over docks in Wisconsin, now before the Legislature of that state, would increase from 1½c. to 2½c. the tax per ton on bituminous coal, and from 2c. to 3c. per ton the tax on anthracite. The measure is discriminatory in that it does not apply to coal received direct by rail.

WASHINGTON, D. C.

Bids are solicited for the transportation of four cargoes of Navy coal from Hampton Roads, Va., to the destinations specified below, in vessels of American registry. The destinations, guaranteed daily rate of discharge, cargoes required and approximate loading dates at Hampton Roads are as follows: 7,500 tons to Puget Sound Navy Yard; 5,000 tons to Portsmouth (N. H.) Navy Yard; 7,500 tons to San Diego (Cal.) Naval Fuel Depot, and 5,000 tons to Boston Navy Yard. Proposals, which should be submitted to the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., will be opened at noon May 3.

Chambers of Commerce have indorsed trade associations for each important branch of industry in a referendum concluded by the national organization. Eight propositions were voted on, all of which were carried by large majorities, the negative votes being in five cases less than 100, and in 3 cases less than 300. It was voted that trade associations should be free from special forms of government control; that statistics of capacity, production, stocks, and sales should be collected, as well as statistics of acual prices in closed transactions but that any interpretation of statistics or other comment which would induce or facilitate concerted action by members should be omitted. It was also voted that statistics should be made available to the public and to government agencies.

"One of the first things Congress will try to regulate," said Representative Bacharach of New Jersey, "when we return next year, will be the question of coal. It is a well known fact that we had a coal commission that accomplished nothing worth while. I was strongly opposed to the government sending coal to Canada and other ports, while we ourselves were suffering from the shortage of fuel. There is hope, and I sincerely wish that it comes true, that **there will be a commission appointed at the next Congress** that will relieve the situation and do something for the benefit of the suffering public and not worry about other countries. **We should have a sales tax** and I am the sponsor of the movement and one of its heartiest supporters. At the present time, no matter what way you try to get around it, any tax you put on the rich man the poor man pays. Since this tax has been advocated eighteen states throughout the country have passed like taxes, and each has been successful. The tax prevents confusion and worry about the income tax."

J. F. Callbreath, secretary of the American Mining Congress, **will leave about May 1 for a tour of the West.** It is probable that Mr. Callbreath will address the National Foreign Trade Council in New Orleans May 2 or 3 on the silver situation, and the inquiry into that subject by a Senate committee. He will speak at the commencement exercises of the Colorado School of Mines May 18, and will make one or two other addresses before leaving that state; will attend the convention of the Northwestern Mining Association at Spokane, May 22-26, and will attend a meeting of the Board of Governors of the Western Division of the American Mining Congress at San Francisco, June 11-13.

CANADA

Production of coal in the province of Alberta is showing an increase. Last January 245,300 tons more were mined than in the corresponding month last year. The total output for January, 1923, was 845,806 tons, of which 347,673 tons is classified as domestic, 74,457 tons sub-bituminous and 423,676 tons bituminous. In January, 1922, there were produced 312,871 tons of domestic, 30,989 sub-bituminous, 246,788 bituminous and 9,858 anthracite. In January, 1922, some 829 tons of domestic were shipped to Ontario while in January of this year the export to that eastern province totalled 5,239 tons. Shipments to adjacent provinces also are growing so that it is clear that the campaign being carried on by the Alberta Collieries, assisted by the authorities of the provincial and federal governments, already is bringing results.

Minister of Mines Sloan has issued a statement **favoring the use of the new "self-rescue" gas mask** for miners if that little device, recently put on the market in the United States, fulfills expectations. It is a small tin can with a mouthpiece and a nose clip. A miner easily can carry it in his pocket. It is calculated to give 70 minutes protection against a considerable percentage of carbon dioxide but will not, of course, replace oxygen equipment, as it cannot be used in an atmosphere completely robbed of oxygen, as by a serious explosion.

Traffic News

Railroads of the country on April 1, 1923, had 50,107 serviceable locomotives, the largest number the railroads have ever had, according to the American Railway Association. Locomotives in need of repair on that date numbered 14,452, or 22.4 per cent of the total number on line. This was a decrease of 1,179, compared with the total on March 15, at which time there were 15,631, or 24.2 per cent. The total number in need of repair on April 1 was practically equivalent to July 1, 1922.

A total of 8,242 new freight cars of various classes and **208 new locomotives** were installed in service by the railroads during the semi-monthly period from March 15 to April 1 according to reports just filed by the carriers with the American Railway Association. This brought the total number of **new freight cars installed from Jan. 1 to April 1, 1923, to 39,172,** while **935 locomotives** were placed in service during the same period. **New freight cars on order on April 1 totaled 107,453,** or an increase of 1,117 over the total number on order on March 15. There were also 1,974 locomotives on order on April 1 compared with 2,113 on March 15. Of the total number of freight cars put in service during the first three months this year, 14,895 were coal cars.

The membership of the **Board of Directors of the Chesapeake & Ohio Ry. was increased from nine to eleven** at a meeting of the stockholders at Richmond, Va., April 17. A. Colston, Cleveland, and Walter L. Ross, Toledo, were elected to the new places. The other members of the board elected at the meeting are O. P. Van Sweringen, chairman; M. J. Van Sweringen, J. J. Bernett, C. L. Bradley, H. M. Hanna Jr., Otto Miller and J. R. Nutt, all of Cleveland; W. J. Harahan, Richmond, and W. J. Louderback, Chicago.

The Interstate Commerce Commission, on April 21, ordered **Service Order 22 vacated and set aside,** effective at midnight April 22, 1923.

It has been definitely announced that **the Virginian Ry. will be electrified from Mullens, W. Va., to Roanoke** and that contracts for the work will be awarded soon. The road will install motors of the largest capacity and will make every provision for the most modern system of electrification. It will take about a year and a half to complete the work, but by Jan. 1, 1925, officials of the road expect it to be able to handle about 12,000,000 tons of coal annually.

A refund of certain demurrage charges paid by the Republic Coal Co., of Minneapolis, was ordered.

The Interstate Commerce Commission holds that rates on **coal from Willard, Ky., to certain destinations in Kentucky, during February control, were unreasonable,** as was the rate on certain shipments to Cincinnati. The carriers were instructed to pay reparation to the Willard Coal Co. and to the Drayer Coal Co.

The Kanawha Central Ry. is a common carrier, according to a formal opinion rendered by the Interstate Commerce Commission. The line is the property of the Black Band Consolidated Coal Co. Its only connection is with the Chesapeake & Ohio at Brounland. In the same opinion the commission holds that **rates on coal from mines on the Kanawha Central to interstate destinations are unreasonable** to the extent that they exceed the group rates on like traffic from other mines in the Kanawha district which are served by the Chesapeake & Ohio. The commission expresses the opinion, however, that the **Kanawha Central should receive a greater proportion of through rates.** It is suggested that the two lines make an effort to agree on reasonable and proper divisions.

The Sturgeon Grain & Coal Co., of Muncie, Ind., has **attacked the rates on bituminous** coal from Springfield, Ill., to Muncie.

The Valley Camp Coal Co., of Cleveland, has filed a complaint **assailing the rates on coal** from mines in the Moundsville district of West Virginia to Lorraine, Ohio, for transshipment to Superior, Wis.

Consolidation of five Middle Western railroads under the direction of the Van Sweringen interests of Cleveland, was **officially consummated** April 12, when incorporation papers for the consolidated road, which will be known as the New York, Chicago & St. Louis, were filed with the Ohio Secretary of State at Columbus. Railroads which under the merger are brought together into one system are the New York, Chicago & St. Louis, Chicago & State Line, Lake Erie & Western, Fort Wayne, Cincinnati & Louisville and the Toledo, St. Louis & Western. Officers of the company include O. P. Van Sweringen, Cleveland, chairman of the board; J. J. Bernett, Cleveland, president; Walter L. Rees, Toledo, senior vice president; M. J. Van Sweringen, Cleveland, J. R. Nutt, Cleveland; C. L. Bradley, Cleveland, Otto Miller, Cleveland; John Sherwin, Willoughby; C. E. Denney, Cleveland, and W. A. Colston, Cleveland, vice presidents; George A. Ross, Toledo, secretary and L. B. Williams, Cleveland, treasurer.

Obituary

Joseph Meister, prominent coal operator of eastern Ohio and West Virginia, died on April 11, at his temporary residence 45 Zane St., Wheeling Island. He was in his fiftieth year and had resided in Bridgeport practically all of his life. He was president and owner of the Meister Coal Co. and officially connected with other mining operations in Ohio and West Virginia. He also was a director of the Bridgeport National Bank and a member of the Pittsburgh Vein Operators Association of Ohio. At the time of his death he was a member of the Bridgeport Council and had been a candidate for mayor. He was one of the benefactors of the Meister band, one of the best-known and most successful organizations in the Tri-state district. Mr. Meister was himself a talented musician.

R. C. M. Hastings, aged 56, president of the Crab Orchard Mining Co., which operates coal properties at Freeport, in Harrison County, Ohio, died suddenly last week at his home in Columbus, from heart trouble. He had been a resident of Columbus for about 12 years and was also in the telephone business. He leaves a widow and three daughters. Interment was at Athens, his former home.

John S. Hobson, 59 years of age, salesman for the Gulf Refining Co., Louisville, and for twenty years sales manager for the old Central Coal & Iron Co. mines, at Central City, Ky., recently died at his home in Louisville, where he has been living for the past nine years.

James S. Kuhn, 55, president of the Devoy & Kuhn Coal Co., wholesalers, died suddenly at his home in St. Louis of heart failure, April 12. For 31 years he had been connected with the Devoy & Kuhn company, which specialized in railroad fuels. Besides a widow he leaves two married daughters.

Edward Lippincott Bullock, mining engineer and former superintendent of the Dodson and Lehigh & Wilkes-Barre mining operations in Luzerne and Schuylkill Counties, died at his home at Hazelton April 8. He was 79 years old.

Association Activities

Cleveland Wholesales Distributors Association

The Cleveland Wholesale Distributors Association held its annual frolic on Wednesday evening, April 11, at Grove Hill, a popular summer resort just east of Cleveland on the shores of Lake Erie. About 150 of Cleveland's leading coal jobbers were present and addresses were made by the officers. Roy S. Bain, sales manager of the Central Coal Mining Co., is president of the association and Eugene Astel, of the Astel Coal Co., is vice president.

Baltimore Coal Exchange

The banquet of the Baltimore Coal Exchange held last week was addressed by William M. Maloy, chairman of the Public Service Commission and former chairman of the State Fuel Distribution Committee; A. S. Goldsborough, managing director of the Merchants & Manufacturers Associations; Walter R. Hough, Fire Commissioner and publisher, and Charles B. Crockett. J. Harry West was toastmaster. Hugh C. Hill is president of the exchange. Mr. Maloy predicted the coming of a form of regulation to the coal trade by governmental agency, but said that be believed that it would have a stabilizing effect which would be beneficial to the retail dealer rather than destructive to his interests.

Coming Meetings

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting May 23 and 24 at Wilmington, Del. Secretary, W. M. Bertolet, Reading, Pa.

American Association of Mechanical Engineers will hold its spring meeting at Montreal, Quebec, Canada, May 28-31. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

National Association of Purchasing Agents will hold its eighth annual convention and Informashow at Cleveland, Ohio, May 15-18. Convention headquarters, room 219, Hotel Winton, Cleveland.

The National Association of Manufacturers will hold its 27th annual convention at the Waldorf-Astoria, New York City, May 14-16.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24. Secretary-treasurer, J. G. Crawford, Chicago.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Michigan-Ohio-Indiana Coal Association will hold its annual convention at the Hotel Sinton, Cincinnati, Ohio, May 22-24. Secretary, B. F. Nigh, Brunson Bldg., Columbus, Ohio.

West Virginia Coal Mining Institute has tentatively set June 5 and 6 for its annual meeting, to be held at Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

COAL AGE

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C. E. LESHER, *Editor*

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The Massachusetts Pure Coal Law

MASSACHUSETTS is again to the fore. The authorities who procrastinate over an archaic state prison (built in 1801) are prompt and conclusive in dabbling with coal. A governor who deals pettishly with the officer who drove out two corrupt district attorneys now has the credit for forcing through a statute that deserves a place with legislative curiosities. After empowering "the Department of Public Health, local boards of health, the director of standards and local sealers of weights and measures, by themselves or by their authorized agents," to inspect and sample coal wherever "stored or kept for sale," the Pure Coal Law (approved March 23, 1923) includes the following extraordinary provision:

> If, in the opinion of said department or board, upon inspection, analysis or other satisfactory test, said coal is unfit for ordinary use, said department, or said board, with the approval of said department, may condemn, seize and cause the same to be destroyed forthwith or disposed of otherwise than for ordinary use.

The words "anthracite" or "bituminous" occur nowhere in the act; it is "coal" and "opinion," plus confiscation! Like poison is 10 per cent pea in chestnut, and the "health" experts are to determine whether long fracture or rectilinear faces are "fit for ordinary use." And what about drafts and flues? Must the dealer guarantee these also, or suffer seizure and disposal "otherwise than for ordinary use?" Shall he be allowed the comfort of seeing his fellow citizens supply their casual needs from the public dump while he pays the producer? We find ourselves wondering whether in Moscow political genius can match this. "Local sealers of weights and measures" have been modest functionaries, but now is their light hid under a bushel.

But, to continue with this enlightened law:

> Whoever, by himself, or by his servant, agent or employee, sells, exposes or offers for sale, or has in his custody or possession with intent to sell, coal unfit for ordinary use shall be punished by a fine of not more than one thousand dollars or by imprisonment for not more than one year, or both.

There are the teeth. "Quick! To the dump, or we are lost!"

No standards or tests are prescribed. "Opinion" only is to control. The provisions bear dangerous resemblance to decrees of absolutists; they have nothing in common with "due process" or "liberty under law." Like intrastate attempts to regulate trunk lines, such legislation is sophomoric, is based neither on sound principle nor on proper study. But there is still a Constitution, and not to any appreciable degree will neighborhood Rob Roys be permitted to "condemn" and dispossess.

There will be instances of pique and meddlesome interference, doubtless, but the vacation season is coming on. The local sealers and local custodians of the public health will not as a rule persist in "seizure" and "disposal." The act bestows no emoluments save upon hungry laboratories. The volume of really "fireproof" output is egregiously small, and will be precluded from the channels of trade in any case. A few—a very few—operators will blacklist Massachusetts for a time, but anthracite will come forward probably by leaps and bounds during the summer; Massachusetts will have retired her famous Commission on the Necessaries of Life; and in 1924 the electorate will be called upon to give suffrage to eminent statesmen who by once taking thought improved prodigiously the quality of coal for the people.

"It is a great privilege to preside over the destinies of Massachusetts." The rest of the nation must be made aware that pure coal and pure coal only will be received within her borders. Petty annoyances to retail dealers, yes; but dealers are inimical to the public good, anyway, and who cares? And around the whole proceeding, much as in 1903, will gradually fold the mantle of forgetfulness, if only there is no publicist lurking about with an axe to grind!

Publicity, Accusation or Information?

THERE are several reasons why information and statements from the mine workers, the coal operators, the railroads and groups of consumers, as the public utilities, prepared and submitted to the U. S. Coal Commission from time to time should be given to the public. The commission represents the public, and when all the evidence is in it has the responsibility of rendering decisions based on the facts. It is in a measure both judge and jury, with the public in the end passing judgment both on the facts as presented and on the wisdom of the commission. Public opinion therefore should be in the making as the matter of investigation proceeds. Publicity for the high points in the arguments of either side may well be depended upon to prepare the public mind in advance for the final conclusions.

The mine workers, the bituminous-coal operators and the anthracite operators have each been issuing statements to the press as well as to the commission. It is interesting to note the general tenor of these documents. In point of frequency of issue and of prolixity those from Ellis Searles, of the United Mine Workers, carry off first honors. Being a publicist and an able one, Mr. Searles has had an eye on the headline value of his stuff; he has had less concern over fundamental facts than news value. He opened up six months ago with the field to himself, in an attempt to be constructive by urging complete unionization of the coal fields as a cure for all the ills of the industry. This hope and ambition of the union has not subsequently been lost sight of.

The virtues of the United Mine Workers have been expounded, the hardships and hazards, the patriotism and loyalty of the miners set forth. The "Reds" have been denounced and trounced, nationalization of the industry decried. Local strikes have been ascribed to overbearing mine foremen, major strikes described as lockouts by the employers. On the other hand the spokesman for the miners does not hesitate to lay high prices for coal to the conscienceless greed of operators, middlemen and speculators; to charge taking of undue profits. In short, the fault for all that is wrong, both as viewed by the consumer and the digger of coal, is laid at the door of the producer and distributor of coal. Serious enough at the beginning, the "press releases" of the United Mine Workers have descended to mere childish talk. Serious or facetious, the whole effect is that of *publicity*, not of helpful suggestions for the Coal Commission or the public on the very important matter of circumventing strikes.

The anthracite operators have had little to say to the commission. What they have put before it and the public is their record, first with respect to the strike of 1922 and second with respect to their participation in distribution of a short supply of hard coal last winter. In both their performance is clearly shown to have been overwhelmingly exemplary. They do not launch an attack at the miners' union; on the contrary they show the steps taken by the operators to prevent and later to terminate the strike. Mere recital of the things they were ready to do in that direction that the miners refused to consider is sufficient condemnation of the union. They offered the miners last year every possible form of conciliation and arbitration. It seems that they may be excused if the Coal Commission or the miners be now asked to suggest some other avenue of approach to strike prevention. There remain some very important topics for the anthracite industry to discuss, however.

The bituminous-coal operators, on the other hand, have not been telling people how good they are but how very awful the other fellow—the United Mine Workers—is. The soft-coal people have not attempted to prove that they are without reproach, but they have robbed the union of any claim to virtue. The attack has been forceful, direct, condemnatory. The running story of murder and arson by which the United Mine Workers has sought to maintain and extend its monopoly of coal-mine labor is conclusive in its grewsome details. Where does it lead? What does Colonel Stimson think is the answer? Is the union to be torn out root and branch? For its arrogant attitude and high-handed tactics since the war the United Mine Workers is deserving of the two-fisted pummeling the soft-coal operators are handing it but the fact should not be lost sight of that the stronger the case of union power is built, the greater is the evidence of weakness on the part of the operators.

Gloomy indeed will be the picture if all that is painted on the canvas is a hairy giant defying alike the President of the United States and the coal operators while battering at the portals of the non-union fields. The non-union operators may well be expected to resist to their utmost that entrance, but what about the union operators, of whom the majority most certainly would not abolish unionism if they could?

On the whole, as pointed out by Commissioner Marshall recently, this sort of publicity and report to the Coal Commission will get no one anywhere.

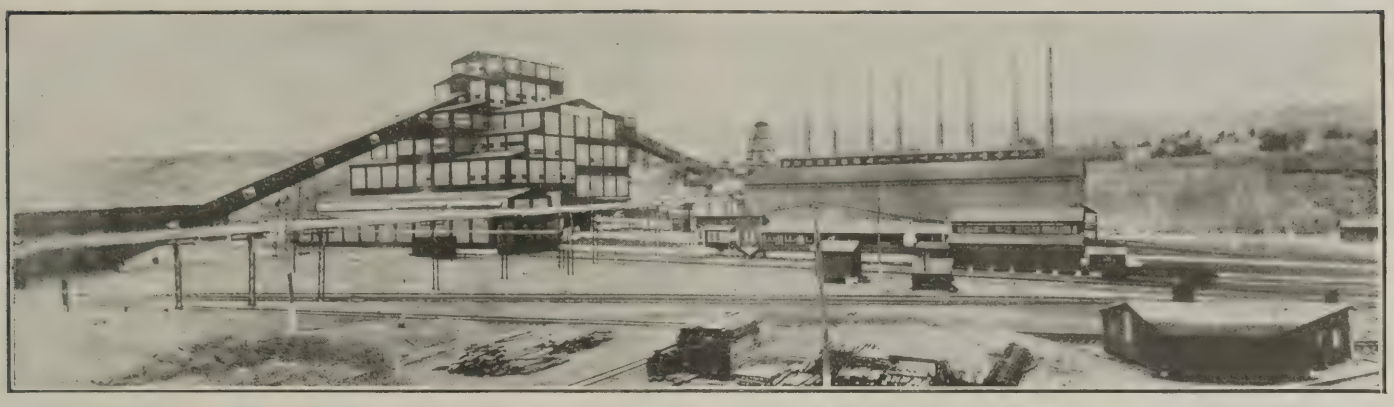
Dock Operators on Defensive

HEARINGS begin this week at the Twin Cities before the Interstate Commerce Commission on the complaint of the Northwest Coal Dock Operators' Association in the matter of the differential between the rail-lake-rail cost of hauling coal from the Appalachian fields and the all-rail rate from the Illinois and Indiana fields. It is the contention of the dock operators, as set forth in their brief to the Coal Commission in February of this year, that the "penalties, restrictions and discriminations against the use of the Great Lakes as a coal route have accumulated since 1916 in such number and in such manner that it can no longer claim the economic relation it has borne to our national transportation system." The specific complaint that is now under consideration concerns only the relation of rates from the upper docks to inland points as compared with the all-rail rates to those same points from Illinois and Indiana, but it is a part of the general campaign to reinstate the pre-war advantage held by Eastern coal in the Northwest.

These same dock operators have just been cited to appear before the Federal Trade Commission and answer to the allegation that they have been maintaining unlawful trade practices in the distribution of their coal. It is alleged, for instance, that the distributors of dock coal have "discriminated in price between different purchasers" and that the effect of this discrimination has been substantially to lessen competition and that it has tended to create a monopoly in the sale of coal. Thus while they are seeking to have restored a differential in freight rates comparable to that enjoyed when the dock coal business was built up, they are called upon to defend the trade practices that have been a factor in building up that business.

Specifically what has happened in the matter of rates is that the Interstate Commerce Commission in the course of advances from 1917 to date, and the Railroad Administration, during the war, have added $1.74 to the pre-war charge on rail transportation for the two short hauls for Eastern coal to destinations in the Northwest and have added $1.17 to the one long haul on coal from the mines in southern Illinois to the same destinations. That is to say, the price advantage for a buyer is now 57c. in favor of Illinois coal as compared to what it was six years ago. This has come to pass because the Interstate Commerce Commission has considered the movement from the mines in the East to a destination in North Dakota, for instance, as two unrelated hauls and has applied each advance in rates to each portion of the haul.

Shippers of Illinois and Indiana coal would like a larger share in the summer business offered by the Northwestern market. Lack of summer trade has always put a deep dent in the production curve of the mines in those fields and the Lake trade has for years put a hump in the production curve of the lake shippers during the summer months. Railroads serving Illinois and Indiana, likewise eager for coal traffic during the summer, have put in effect low rates favoring this long-haul business, as to the Twin Cities. Doubtless it will be contended that if the Western roads have equipment that would otherwise be idle during the summer months there should be no objection to permitting the long haul at the low rate and thus to enable Western shippers to even out their operating curve.



Delaware & Hudson, Chartered a Hundred Years Ago, Opens Mines and Builds Road and Canal to Hudson

Philadelphia Clothiers Prospect Around Carbondale—Try to Enter Philadelphia Market and Lose Heavily—Consequently Build Engine and Gravity Planes to Honesdale and Canal to Rondout—English Engines Purchased and Scrapped

TO THE efforts of the Wurts brothers, members of a prosperous firm of clothing manufacturers in Philadelphia, the Delaware & Hudson Co. owes its existence. They desired to market in New York City the anthracite, or "stone coal," as it was then termed, which they had prospected in the upper valley of the Lackawanna River. The company was incorporated by an act of the Legislature of the State of New York on April 23, 1823, just about one hundred years ago.

The preamble to the act of incorporation explains the general purpose behind the formation of the company. It reads:

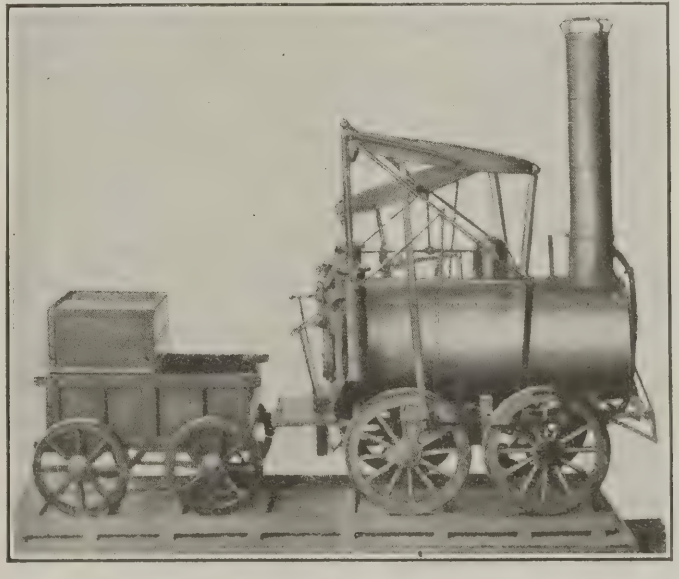
"Whereas, it is desirable that a channel should be opened, through which the City of New York and other parts of this state may receive a supply of stone coal, which is found in the interior of the State of Pennsylvania. And whereas, there is a large body of this valuable article, belonging to Maurice Wurts, in the said State of Pennsylvania, situated near the head waters of the river Lackawaxen, which empties into the river Delaware, opposite the county of Sullivan; and the Legislature of that state has recently passed an act authorizing the above-named individual to improve the navigation of the said river; and whereas, it is represented that a water communication can be formed between the rivers Delaware and Hudson, through the counties of Orange, Sullivan and Ulster, or some one or more of them, so that a supply of this coal may be had from the source aforesaid; and a number of citizens of the state have petitioned the Legislature to incorporate a company for the purpose of making such a communication between the said rivers: Therefore . . . "

This preamble shows both the original purpose behind the forming of the company and the purpose which shaped its course for many years, namely, to mine and distribute anthracite from northeastern Pennsylvania to the State of New York; and, as a natural development, to large portions of New England and Canada lying to the east and northeast of New York.

Until 1867 the Delaware & Hudson continued strictly a canal company so far as its transportation functions were concerned. Actually the canal soon began to operate as a common carrier for freight and, to some extent, for passengers. The records for 1830 show that it carried, among other commodities, 6,012 tons of merchandise, 3,383 tons of water cement, 1,255 tons of manufactured lumber, 75,022 cords of wood and 3,793,000 ft. of lumber.

The company transported this freight in addition to 43,200 tons of its own coal, comprising 1,706 boat loads. With this coal "388 sail of vessels" were loaded for cities and towns on the Hudson, in New Jersey, and the Eastern states.

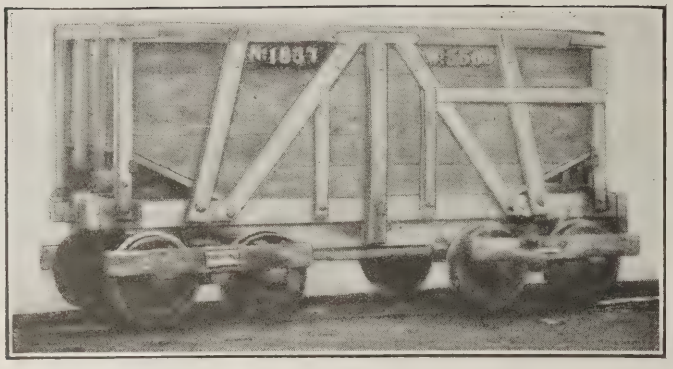
The railroad part of the company's development began in 1867. On May 9, 1867, the Legislature of New



FIRST LOCOMOTIVE TO RUN ON TRACKS IN AMERICA

This, the "Stourbridge Lion," with its long pistons and walking beams, was brought over from England and run two or three times, on Aug. 8, 1829, over a short piece of track. The weight of the locomotive crushed the strap-iron rails into the hemlock timbers on which they were fastened to such a degree that the owners were afraid to put the engine into regular service. Its weight and rigidity made its operation on poor track dangerous. Note the exhaust pipe in the stack and the ineffectual cinder catcher. The locomotive now may be found in the Smithsonian Institution, in Washington.

NOTE—Headpiece shows the Loree breaker of the Delaware & Hudson near Scranton, Pa.



EARLY COAL CAR ON DELAWARE & HUDSON R.R.
No bigger than a large mine car. The gage was 4 ft. 3 in. but every feature of it seems designed to waste available space. The body does not overhang the wheels. The capacity of the car is 2.75 tons. It will be noted that it was provided with a bottom dump.

York amended its charter by empowering it "to construct, own and maintain railroads within this state, to contract with any railroad corporation now existing or hereafter to be created, for the use of its road, for the transportation of coal, to lease the railroad or any part thereof to any incorporated company now or hereafter to be created, upon which said canal company may desire to transport coal, and also to subscribe for and take stock or bonds of, and in, any railroad company which they may lease, or with which they may contract, now existing or hereafter to be incorporated. . . . " The new powers were to be used subject to the General Railroad Law of 1850.

By this act the Delaware & Hudson assumed the additional legal character of a railroad company, and from this beginning dates its interest in railroad construction but more especially in the leases by which it has acquired and now operates its line, running from a point a little south of Wilkes-Barre in Pennsylvania through to New York State, which it enters a little east of Binghamton, and thence continuing with sundry branch lines to Albany, Troy, Rutland and along the west side of Lake Champlain to the Canadian border, from which latter point the affiliated Canadian road extends as far north along the St. Lawrence as Quebec. As a natural consequence of its operation of this railroad line its primitive function as merely a coal carrier has been enlarged to include general freight transportation and a comparatively large passenger business.

When Anthracite Was Not Wanted

In these days, when the chief complaint about anthracite is that there is not enough of it to satisfy the needs of the consuming public, it is not easy to imagine the state of affairs when anthracite, first known as "stone coal," had no standing at all as a fuel and had to be urged upon a skeptical public with almost the same ingenuity and persistence employed now in marketing a safety razor. Only 115 years ago anthracite was, for all commercial purposes, unknown. Earlier than this, however, it was believed that Pennsylvania coal had merits, for at a meeting of the Susquehanna Co. in Windham, Conn., in 1763, the company reserved for itself, to be later disposed of, all beds or mines of coal in all towns which are assumed to be in the State of Pennsylvania, which the company then ordered to be settled.

In Pennsylvania records apparently the earliest reference to anthracite is the original draft of the survey of Sunbury Manor, made by Charles Stewart in 1768. On this draft "stone coal" is noted as having been found on Ross Hill. The earliest use of anthracite for which there is plausible authority seems to have been in 1792. In that year coal pits were opened at Weissport by the Lehigh Coal & Mine Co., and the "brittle compound" was then distributed free of charge to blacksmith shops willing to use it. For sixteen years afterward blacksmiths seem to have been the only users of anthracite, and then only when their shops were near the source of supply.

But on Feb. 11, 1808, Jesse Fell, in Wilkes-Barre, made the experiment of burning common stone coal in the Lackawanna Valley in a grate and found that it would burn. It was not until after the War of 1812, however, that the value of anthracite began to be appreciated seriously. Up to the beginning of that war bituminous coal had been imported from England, and this English coal together with wood and charcoal was the only fuel used for such manufacturing plants as were then in the United States. Not only did the War of 1812 interrupt for a time the importation of soft coal, but when importations were partly renewed the prices were excessively high.

Market Is Induced to Take a Ton a Day

It was about this time that a little anthracite was brought into Philadelphia from the nearer deposits, from which it could be floated down the Schuylkill River. The scantiness of the early production of anthracite is shown by an entry in the diary of Philip Hone, first president of the Delaware & Hudson, who noted, in November, 1839, that only 365 tons of anthracite was sent to the market in 1820. This came from the Lehigh region. He gave the total production in 1839 as over 1,000,000 tons. The fuel shortage in Philadelphia in 1814 was the initiating cause of the creation of the Delaware & Hudson Co., in 1823.

Beginning their search for anthracite apparently about 1814, the Wurts brothers had to undergo nearly ten years of arduous and sometimes rather costly pioneering before their scheme took on the actual promise of fulfillment. The rugged country of the upper Lackawanna was heavily forested and sparsely settled, and in their search for outcroppings of anthracite and their attempt to locate areas promising to supply large quantities of it they put up with what well might be called frontier hardships.

As early as 1816 they seem to have mined a small quantity of anthracite which they were unable to get to market. About 1822 they reached the site of the present town of Carbondale, gave it that name and made their settlement there, their party building the rough log house which was the first building in the town, later known as the Old Log Tavern. They had bought some coal lands, and at Carbondale in 1822 they opened a rude drift which later became the nucleus of the first mines of the Delaware & Hudson Co. By the autumn of that year they had mined at Carbondale nearly a thousand tons of anthracite.

The following winter, that of 1822-23, they succeeded in getting some of this coal to Philadelphia, carrying it part of the way on sleds and the rest of the way by rafts on the Lackawaxen and Delaware rivers—about one hundred tons in all. They managed to sell their coal, but seem to have found that the market was already more efficiently supplied with Lehigh coal, the first shipments of which had come to the city in 1820. This first transportation of their coal to Philadelphia

was accomplished only after great difficulties. They tried several different watercourses, and even in their final rafting down the Delaware some of their rafts went to pieces on rocks and much of the coal that they had loaded was lost.

Apparently the Wurts brothers had realized even before this attempt that the Philadelphia market would be difficult to reach and also that even when there they would meet the competition of the Lehigh and Schuylkill coal at a great disadvantage to their own product. In consequence, before the year 1823 they began to consider how they could reach the New York market.

Hill That Ramparted Wyoming Valley on East

To the east of Carbondale is a ridge 858 ft. above the present site of that city and 550 ft. above that of Honesdale, on the Lackawaxen River, which flows into the Delaware. In casting their eyes toward New York, the Wurts brothers discovered that New York was little more than a hundred miles away, and sundry explorations and map studies led to their developing the idea of taking their coal from Carbondale over the ridge to the Lackawaxen, canalizing not only that river to its junction with the Delaware but a short stretch of the larger river also, and then building from the Delaware a canal to the Hudson River.

Realizing that any such undertaking as this would be too much for their own resources, the Wurts brothers prepared maps of their coal properties around Carbondale and the relation of those fields to the Hudson River, and circulated these in influential business circles in New York City, hoping by this means to enlist support for their project. They also obtained from the Pennsylvania Legislature, on March 13, 1823, the passage of an act which authorized Maurice Wurts and others to canalize the Lackawaxen River.

This right to improve the Lackawaxen, together with possession of their coal lands, gave them something with which to approach New York financial interests. Although their plan to build a canal to bring their coal to New York was much criticized, the public was nevertheless strongly in favor of canal building. In consequence they obtained enough support that they were able to find signers to a petition urging their claims before the New York Legislature and to move that body to grant, in 1823, the charter of the Delaware & Hudson Co.

Engineer Plans Inclines and a Canal

That same year they engaged Benjamin Wright, who had been chief engineer of the Erie Canal, to make a survey of the line of the proposed canal from the Hudson River to the Delaware. Mr. Wright recommended a route, together with details of construction, and estimated the cost at about $1,300,000. Under Mr. Wright's plans a canal was to be used to furnish a highway from the Hudson to Honesdale on the Lackawaxen, and a railway was to be built to cross the ridge between Honesdale and Carbondale. This latter, when built, formed the famous gravity railroad.

Further legislation by the State of Pennsylvania authorized the Delaware & Hudson Co. to acquire the rights of the Wurts brothers in the canalizing of the Lackawaxen River, and the whole project was then in a state to present to investors.

It was not until January, 1825, that subscription books to the company's stock were opened, in the Tontine Coffee House, at the northwest corner of Wall and Water Streets, and at two other places. The capital stock of $1,500,000 was quickly oversubscribed. On March 8, 1825, again at the Tontine Coffee House, in New York, the first board of managers of the Delaware & Hudson Co., consisting of thirteen members, was elected. On March 9 these managers organized and on March 11 elected Philip Hone as president of the company and John Bolton as treasurer.

The election of Mr. Hone gave the new Delaware & Hudson Co. much prestige, for he already was prominent in the business of the city and had acquired what was for those days, a comfortable fortune. He had wide and influential connections both socially and politically. He had retired from active business in 1820 at the age of 40. At that time he lived in a house at No. 235 Broadway, near the corner of Park Place, where now stands the Woolworth Building. In 1824 Mr. Hone was elected as Assistant Alderman of the City of New York, and in 1826 Mayor of the city, which office he held for one year. In 1816 he had been appointed by the Legislature a trustee of the first savings bank established in this country, and he was officially prominent in many other institutions. Politically he was a strong Federalist, and later a Whig, being credited with having given that name to the party. Work began on the canal July 13, 1825.



SUMMER COACHES ON GRAVITY RAILROAD

These coaches have the look of American street cars with their open side and long seats. They were fitted for use only during the warm summer months, when pleasure rather than business was the reason for travel.

Until March, 1825, the Delaware & Hudson Co. had no office in New York, but having been authorized by the Legislature in the preceding November to use $500,000 of its capital in transacting a banking business, it bought No. 13 Wall Street and there opened the Delaware & Hudson Canal Company Bank, which was conducted at that spot until 1844, when the twenty-year period set by the charter of the Legislature came to an end. The new bank stood on the north side of Wall Street just east of Nassau on ground now covered by the United States Sub-treasury. It was directly across the street from the present site of the banking house of J. P. Morgan & Co.

By the winter of 1826-1827 it began to be clear to the managers of the Delaware & Hudson Co. that Wright's estimates of cost for the canal were too low, and it was then determined to ask the State of New York for aid. As the result of the company's appeal the act of March 10, 1827, authorized the issue of $300,000 of state stock in the canal company, for which loan the company was to pay interest at the rate of 5 per cent. A second state aid, of $200,000, was authorized by the act of May 2, 1829, to carry interest at 4½ per cent. These two loans were repaid by the Delaware & Hudson

Co. at their respective maturities, Jan. 1, 1848, and Jan. 1, 1850.

Following this grant, the first financial assistance of the State of New York to projects of this character, contracts for the entire length of the canal were let, in April, 1827, and construction was energetically resumed. The canal was completed in the autumn of 1828 and the first squadron of canal boats, from Honesdale, passed through the canal and arrived at Rondout, the Hudson River terminus, on Dec. 5, 1828.

The *Albany Argus* of Dec. 13 of that year gives this description of the canal, remarking that fifty tons of the first shipment of coal "had been consigned to the Messrs. Townsend, which will afford our citizens an opportunity of testing its quality."

"This canal," continues the *Argus*, "is 32 to 36 ft. wide upon the water line and is 4 ft. deep. The locks are 76 ft. in length between the gates and 9 ft. wide, and the coal boats are estimated to carry 25 to 30 tons.

"From the mouth of the Rondout, where it connects with the Hudson, to Port Jervis, near the Delaware River, is a distance of 59 miles; on this section are 60 lift locks and one guard lock of hammered stone laid chiefly in hydraulic cement. There also are one aqueduct over the Neversink River, 234 ft. in length, upon stone piers and abutments; one over the Rondout entirely of stone, upon two arches, one of 60 and the other of 50 ft. chord, and ten others of various dimensions, upon stone piers and abuttments over lateral streams; 15 culverts of stone, and 95 bridges having stone abuttments and wing walls.

"Port Jervis is less than a mile from Carpenter's Point, formed by the junction of the Neversink and Delaware rivers, and at which point the States of New York and New Jersey corner upon Pennsylvania. Port Jervis presents a view of the territory of three states, and also of the Delaware River and the fertile valley of the Neversink. From this point the line of the canal is carried along the east side of the Delaware to a point opposite the mouth of the Lackawaxen River. At this place a dam has been erected across the Delaware, by means of which the canal is fed and boats cross the river. From McCarthy's Point, which is formed by the junction of the Lackawaxen with the Delaware, the canal follows up the valley of the Lackawaxen, 25 miles to the forks of the Dyberry, at which point the canal terminates and where a thriving village is already established called Honesdale.

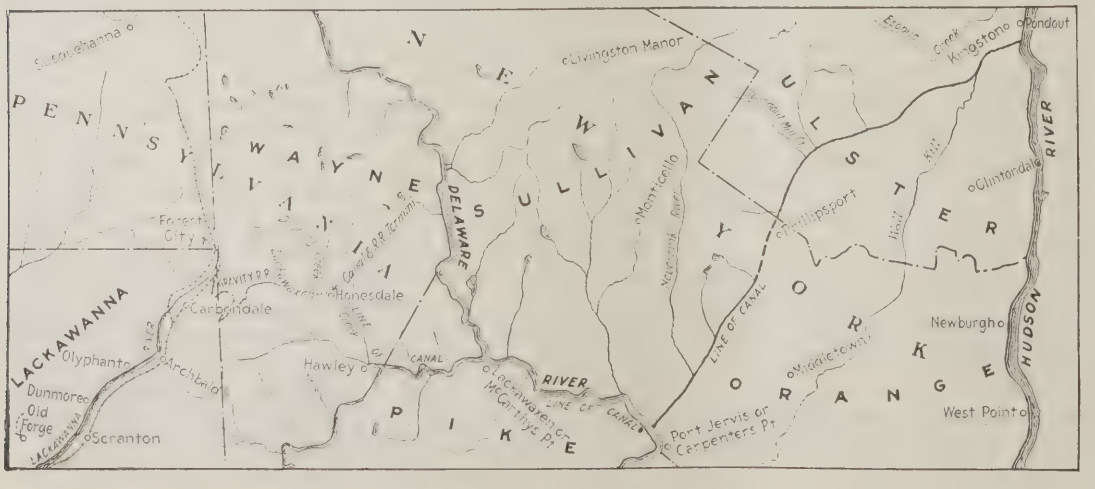
"On the Delaware section of 22 miles there are 15 wooden locks, and on the Lackawaxen section of 25 miles are 37 locks of the same description. These locks are secured by a substantial dry stone wall, and so constructed that the wooden lining can be taken out and replaced without disturbing the rest of the lock."

Though the canal afterward was greatly enlarged in capacity and the depth of water increased so that boats of nearly 200 tons capacity finally were used, to the public of this day the most interesting item in these changes probably is the four suspension aqueducts which were constructed in 1849 as the culmination of the improvements made during the forties. John A. Roebling, whose name has since become inseparably linked with the construction of the first Brooklyn Bridge, suggested the plans for these aqueducts, constructed them, and supplied the cables. By these aqueducts the canal was carried across the four rivers, those crossed from east to west being the Rondout, the Neversink, the Delaware and the Lackawaxen. The Delaware aqueduct was carried on wire cables 8½ in. in diameter.

Provision was made for passenger traffic on the canal by the building of two packetboats with accommodations for twenty passengers, meals being supplied on board. An advertisement of this service, which began Oct. 7, 1829, as published in the *New York Morning Courier and Inquirer*, shows that the fare from the eastern terminus, near Kingston, to Honesdale, was $4. The charge for way passengers was 5c. a mile. The westbound boat left the eastern terminus at 7 a.m. and the eastbound boat left Honesdale at 6 a.m. on Mondays, Wednesdays and Fridays, making the whole trip in 36 hours. Mr. Hone's diary gives the details of some trips he made over the canal in this fashion.

The gravity railroad, by which coal was taken from Carbondale over the 858-ft. ridge to the east and thence down to Honesdale on the Lackawaxen, where the coal was put aboard canal boats, consisted of a series of fairly steep inclines, alternating with level or slightly descending sections operated by horses. The inclined planes were first constructed with a single track and turnouts, but in the middle of each plane was a stretch of 100 to 150 ft. of double track, so as to permit of cars passing in opposite directions.

These turnouts were provided with self-acting switches, so that whenever a car passed out of the turnout in either direction the switch was left in such a position as to turn the next car moving in the opposite direction into the side of the turnout thus vacated. On the west side were five long ascending planes with a stationary steam engine at the head of each plane. By means of a long chain extending the entire length of the



Gravity Railroad and Canal

From Carbondale engine planes raised the cars to the summit and gravity planes lowered them to Honesdale. There the coal, dumped into a boat, was floated by canals along the Lackawaxen and Delaware to Port Jervis and thence by another canal to Rondout on the Hudson.



MARVINE BREAKER, WHERE THE COAL IS BROUGHT FROM TWO ROCKHOUSES FOR FINAL PREPARATION
This breaker, which prepares 5,000 tons per day, was started in 1920. Interesting features are the concentrating tables, thickeners and separators and the long conveyor lines connecting the breaker with the two shafts, which are 2,000 ft. apart. The coal receives its preliminary treatment before being taken to the breaker itself.

plane these engines hauled up from three to five loaded cars (each car carrying about 1,500 lb. of coal) and at the same time let down the same number of empty cars which were attached to the other end of the chain.

On the eastern side of the ridge, for the descent toward Honesdale the three descending planes were worked by the force of gravity, without the use of steam; the descending loaded cars drawing up the ascending empty cars attached to the other end of the chain, the speed of their descent being controlled by the use of friction brakes on the shaft of a large upright fan-wheel, which thus furnished braking power by working against the resistance of the air. This original and simple scheme later was much modified, the number of planes from Carbondale to the canal subsequently being increased to eight.

In later years, as the company's mining operations were extended south to Carbondale, the gravity railroad was extended southward as far as Olyphant, and the eastbound, or loaded, and the westbound, or light, tracks were separated, so that in the later arrangement the loaded track had on the east side a single inclined plane into Honesdale somewhat more than ten miles in length. The light, or westbound, track for empties was relocated, taking advantage of the topography, so as to give a nearly uniform line of descent, on which the cars ran by gravity alone from the summit nearly to Archbald, south of Carbondale, in the Lackawanna Valley, a distance of about 13 miles.

Beginning in the summer of 1860 passenger traffic over the gravity railroad in the Lackawanna Valley made a small beginning, and in later years this developed largely, the trip over the ridge being considered quite an excursion. Later John B. Jervis succeeded Benjamin Wright, the planner and engineer of the canal, as chief engineer. He planned to use steam locomotives, then unknown in America, to haul loaded cars down and empty cars up the easy descending planes, as had been suggested when the gravity railroad was first designed.

It was Jervis' recommendations that led the company to send to England in January, 1828, Horatio Allen, a young man of twenty-six, to arrange for the building of four locomotives and also to obtain iron for capping the wooden rails of the roadway. In terms of locomotives, the results of Allen's mission were the locomotive America, designed and built by George Stephenson, the builder of the famous Rocket, and three locomotives of a different type built by Foster Rostrick & Co., of Stourbridge, England.

Stephenson's engine, the America, was the first steam locomotive to be seen in the Western Hemisphere. It arrived at the port of New York on the ship Columbia on Jan. 15, 1829. The engine was taken to the yard of Abeel & Dunscomb, at 365 Water Street, where it was put together, supported on blocks so that the wheels ran free, and then demonstrated under steam from time to time during some three months, many visitors coming to see the wheels go round. Later in the season the America, together with the first of the Foster Rostrick locomotives, was shipped by way of the canal to Honesdale, and from that point all authentic trace of it has been lost until within the past few months.

The second locomotive, which arrived on May 14, 1829, was the Stourbridge Lion, the first steam locomotive to run on rails in America. Like the earlier arrival, the Lion was assembled and set up on blocks in the machinery works of William Kemble and was demonstrated under steam, as the America previously had been. The two locomotives remained in New York until about July 1, when they were sent by sloop up the Hudson to the eastern terminal of the canal, then called Eddyville but in recent years known as Rondout. There they arrived on July 4, reaching Honesdale a few days later.

For some reason not now clear Horatio Allen, who had ordered the two locomotives in England and who was in charge of making the first test on the rails of the gravity railroad, selected the Stourbridge Lion, and early in the forenoon of Aug. 8, 1829, that locomotive was drawn up an inclined plane which had been laid from the side of the canalboat to the railroad track. A fire was built in the firebox with Lackawanna coal, and the steam pressure soon moved to a point sufficient for the trial.

It had been the intention of Mr. Jervis that the locomotive should not put more than 1½ tons of weight on each of the four wheels, but when the Lion's boiler was filled with water the locomotive was found to weigh over seven tons, two-thirds of which rested on the forward wheels, with the result that the weight on these two wheels was about double that which Mr. Jervis had expected. Some critical observers on learning of this excess of weight predicted that the engine would break down the track on the curved portions of the trestle work by which the road was in places supported, while others, noting that the four wheels were rigidly set on the frame, declared that on curves the driving wheels would climb the outer rail and jump the track.

As these gloomy predictions seemed plausible, Mr. Allen declared he would risk his own neck on the trial, and he, thereupon, acted as engineer, driving the Lion two or three times back and forth over a section composed of straight track and of a curve of 700-ft. radius,

crossing the Lackawanna Creek on a trestle 30 ft. high. The track did not break down and the engine did not climb the rails and jump off, but the result of the test as read afterward in the condition of the wooden rails and the trestles convinced the engineers that the structure would not withstand either the weight of the Lion or the sidethrust of the wheels on curves.

A little later the engineers considered whether it would be possible to rebuild the supported parts of the railroad and the curves in a more solid fashion to withstand the load, but for various reasons this was decided to be impracticable. The Lion was then taken off the tracks, set to one side, and for some fifteen years neglected, and, there is reason to think, partly dismembered, until many years later nearly all its parts were recovered in various places and assembled in the National Museum at Washington. The two sister locomotives of the Lion were received in New York, but owing to the difficulties encountered in the test of the Lion, no attempt apparently was made to use them.

The "Gravity Road" was relocated and improved in 1832 and in 1846 it was practically rebuilt, the location of the inclines being revised and a second track added, this being an independent line with the necessary inclines, one road being known as the "Loaded Track" and the other as the "Light Track." Other modifications were made from time to time, but the "Gravity Road" continued in existence as such and was used for both freight and passenger business until 1899, when it was largely rebuilt and the gage widened to 4 ft. 8½ in., the former gage being 4 ft. 3 in.

At that time regular operation by steam locomotives commenced. The company extended its "Gravity Road" southward from Carbondale along the Lackawanna Valley in 1846 to a point near Archbald, Pa., where the company had purchased additional coal lands, and in 1858 it was extended to a point known as Valley Junction, near Olyphant, Pa. The road was further extended to Providence in 1861 and to Green Ridge in 1863, these last two extensions being operated by locomotives. A portion of the final extension is now the Vine Street Branch in the City of Scranton. The Poplar Street Branch, in the same city, was partly built in 1867 and completed some time prior to 1877.

In 1871 a steam-operated railroad was constructed from Valley Junction northward to Carbondale, practically paralleling a portion of the Gravity R.R. The Jefferson R.R. between Carbondale and Jefferson Junction, built by the Erie, was operated under a trackage agreement, the Delaware & Hudson Co. building its own line from Jefferson Junction to Nineveh in 1871. At the latter point connection was made with the Albany & Susquehanna R.R., which had been constructed between Binghamton and Albany between the years 1863 and 1869.

This latter railroad was leased by the Delaware & Hudson Co. on Feb. 24, 1870, giving the company an entrance into Albany. The Cherry Valley Branch, between Cherry Valley and Cobleskill, came into possession of the company on June 1, 1870. These two lines added 164 miles. By a lease dated May 1, 1871, the Rensselaer & Saratoga R.R. and a number of lines that company had leased came into possession of the Delaware & Hudson Co., which extended its line from Albany and Troy to Whitehall, to a connection with steamers on Lake Champlain, with branches from Fort Edward to Glens Falls, from Schenectady to Ballston, from Whitehall to Rutland and from Eagle Bridge to Castleton. These lines were built beginning as early as 1832 and gradually extended and enlarged between that date and 1869. These lines added about 190 miles to the system. A connection with the leased property acquired from the Rensselaer & Saratoga was constructed between Delanson and Schenectady in 1872 and upon completion was acquired by this company by lease, and was merged into the Delaware & Hudson Co. in 1903.

In 1867 a railroad had been constructed southerly from Green Ridge, now a part of the city of Scranton, to a point near Wilkes-Barre by the Union Coal Co. which afterwards, in 1873, was leased to this company. This line was further extended in 1886 to Wilkes-Barre, and in the intervening years branches were acquired in the Plymouth district, where extensive mines of the company were located.



CARBONDALE YARDS WHERE THE COAL IS ASSEMBLED BEFORE BEING DISPATCHED OVER THE HILL TO MARKET

Chance has much to do with early development. The Wurts brothers, seeking to get coal for Philadelphia, looked too far north and found themselves in a territory better suited to supply New York and Albany than the city to which they expected to deliver coal. They soon realized their mistake and directed their efforts to reaching the cities on the Hudson River. After all, the northern end of the Shickshinny-Forest City basin was perhaps about as well situated as any point in the anthracite region for that purpose. Out of their venture came Carbondale and the thriving boroughs to the south.



General Availability and Excellent Quality of Hazard Coals in Eleven Years Make Field Large Producer

Extent and Geological Features of Region—Main Output Comes from Seams Nos. 6 and 4—Coal Is Low in Ash and Sulphur—Ash Fuses Only at High Temperature—Leasing System Aids Rapid Development of Field

By W. Norris Cole
Mining Engineer, Kentucky River Coal Corporation, Hazard, Ky.

As a result of the strike of the coal miners last summer the importance of the Hazard coal field to the nation at last was clearly demonstrated, for it is one of the leading non-union coal areas of southeastern Kentucky. It derives its name from the town of Hazard, the county seat of Perry County, that municipality being situated in about the center of the long southwestern line of the field.

The coal area comprises about 350 square miles and is situated in Perry, Knott and Letcher counties. It is bounded on the north by Lost and Troublesome creeks, on the east by Sandlick Creek and on the south and west by the North Fork of the Kentucky River. (See Fig. 12.)

A mountainous country, having narrow valleys, steep hillsides and innumerable creeks and streams, the field could not be developed properly without the construction of long spur railroad tracks which run up the largest of these creeks from the main line which winds its way on the edge of the field, following the Kentucky River. There are now seven of these main spur lines, which follow First Creek, Lotts Creek, Buffalo Creek, Carrs Fork, Rockhouse Creek, Smoot Creek and Sandlick respectively. The last mentioned of these seven streams forms the boundary between the Hazard and Elkhorn fields, but both the Hazard and Elkhorn coals are mined along the course of this stream. From these main spurs radiate the individual sidetracks of some eighty different operations, each producing from three to sixty cars of coal per day.

The lowest seam is known locally as No. 4 bed. It underlies the entire territory, being quite low in the series. In the state geological report it is known as the "Fireclay" seam, because it contains a persistent parting of from 3 to 6 in. of flint clay called the "jackrock." This readily distinguishes it from the other beds. Some of the operators correlate it with the well-known No. 2 Gas seam of West Virginia.

Its thickness varies from 30 in. to 6 ft. and averages throughout the field about 42 in. Where the seam thins down to 36 in. or lower the "jackrock" forms the bottom, but where the coal is thick the upper bench is



FIG. 1—TIPPLE OF BLUE DIAMOND COAL
This structure spans First Creek. The mine is working the No. 6 seam. The dump-house can be seen in the upper left-hand corner of the illustration.

Note—Headpiece shows tipple of Dudley Coal Co., Blackey, Ky. This tipple spans Caudills Branch. At the left can be seen a steel pipe which is used for lowering coal down the mountain to the tipple. The latter is securely braced between the opposing hillside.



FIG. 2

Tipple of First Creek Coal Co.

This tipple is located at Dowlais, Ky. The coal is brought down an even trestled grade from the dump-house high on the hill, so high in fact that the area mined must be of the many-fingered shape frequently found in this field.

about 42 in. thick and the lower bench is below the "jack."

This No. 4 seam produces an excellent steam and domestic coal that is hard enough to stand shipping well and has a bright luster of a bluish cast. Consequently it makes an excellent appearance. It is low in ash and sulphur, and the ash melts only at a high temperature; consequently it is practically clinkerless even when the furnace fires operate under forced draft. Furthermore it is a good byproduct and gas coal, and in composition it closely resembles the coal of the famous Elkhorn seam, as the following analysis of the product from the two fields will show:

PROXIMATE ANALYSIS OF NO. 4 ELKHORN SEAMS

	No. 4 Hazard Per Cent	Elkhorn Per Cent
Fixed carbon	58.37	60.53
Volatile matter	36.97	35.02
Moisture	1.42	1.53
Ash	3.24	2.90
Sulphur	0.61	0.44
British thermal units	14,482	14,421

About 235 ft. above the No. 4 seam is the No. 5, or Haddix, bed, which apparently is not as persistent as No. 4. It lies immediately below a massive sandstone ledge from 30 to 40 ft. thick. I know of only two openings in this seam where the coal has been worked and there only to a small extent. One is near Yerkes and one on the north side of Troublesome Creek. In both these openings the seam is 36 in. thick, free of partings and of excellent quality. Immediately above the sandstone ledge is the 5A, or Young, seam, which varies in thickness from 36 to 54 in. Like No. 5 seam it has not been much prospected. At Domino, on the Kentucky River, a pair of entries were driven on the Himyar Coal Co.'s property for the purpose of testing the bed and for obtaining house coal. It varied from 36 to 48 in. in thickness and had a small parting which did not appear to be persistent. The coal was of excellent quality, resembling that of the No. 4 seam. On First and on Lotts Creek and also on Hensons Branch the bed is about 50 in. thick with from 8 to 10 in. of fireclay parting near the center of the seam.

About 60 ft. above the No. 5A, or 350 ft. above the No. 4 seam, is the No. 6, or Hazard, seam. At the present stage of development this is commercially the most important seam in the Hazard field, as from it is produced by far the greater quantity of coal coming from this region. It varies in thickness from 4 to 7 ft. and has an average thickness of about 5 ft. over the larger part of the field. The principal operations in this seam are on First Creek and Lotts Creek, where the



FIG. 3

No. 6 Seam at Dowlais

This is the principal bed in the Hazard field, that from which most of the coal comes. Its thickness varies from 4 to 7 ft., and here it is not much less than the higher figure. Yet despite its thickness it is a clean seam from the bottom to the slightly rolling top. The illustration shows the end of a room in the First Creek Coal Co.'s mine at Dowlais, the underground workings subsidiary to the tipple shown in Fig. 3.



FIG. 4

Surface Works at Staub, Ky.

Plant of the Hazard-Jellico Coal Co. on First Creek. No. 6 seam, which is at tipple height, is mined on both sides of the valley, the coal being brought in cars to dumps near the center of the tipple. The chute and supply track in the rear-ground and to the right of the tipple descend from the level of No. 8 seam. This bed is of minable thickness in the high hills of Lotts Creek and Carrs Fork. The two seams are about 150 ft. apart.

bed is at its best, its thickest manifestation being on the stream first mentioned.

The seam varies in character as much as it does in thickness, being different at nearly every operation. It has a persistent bone parting from 1 to 3 in. thick and located from 3 to 15 in. from the bottom, being thickest where the seam is thick. In certain localities other partings of bone come and go but do not persist over any large area.

The coal in this seam is hard and blocky and has made an excellent reputation as a domestic coal wherever it has been introduced. It will stand frequent rehandling without much deterioration. It also stocks well. A lump of this coal taken from an old country pit after it had been lying out on the ground more than six years was sawn in two and, except for the weather stains on the outside, was found to be as black, hard and solid as a piece just taken from the mine. Furthermore the lowness of its sulphur content, about 0.56 per cent, aids in reducing the danger of spontaneous combustion.

A characteristic analysis of this seam is as follows:

PROXIMATE ANALYSIS OF NO. 6 OR HAZARD, SEAM

Fixed carbon	56.32
Volatile matter	37.16
Moisture	1.92
Ash	4.60
	100.00
Sulphur	0.56
British thermal units	13,823

From 60 to 70 ft. above the No. 6 seam is the No. 7, or Flagg, seam, averaging 52 in. in thickness with a 1-in. bone parting about 15 in. from the bottom. Though this parting is high in ash it is combustible. It is now thrown out in the shipment of the coal, but under normal market conditions it has been accepted by the trade without complaint.

The No. 6 and No. 7 seams are quite similar in character, and the fact that the two seams are seldom found workable in the same locality has led some engi-



FIG. 5

Dudley Coal Co.'s Plant

No. 1 headhouse with tipple for Mines Nos. 1 and 2. This mine is located at Blackey, Letcher County, Ky., at the mouth of Rockhouse Creek. It will be noted that it also has a steel tube for letting the coal down the hill. The road up the hill to the right of the illustration is the supply track. The tipple crosses the creek and serves the coal areas on either side.

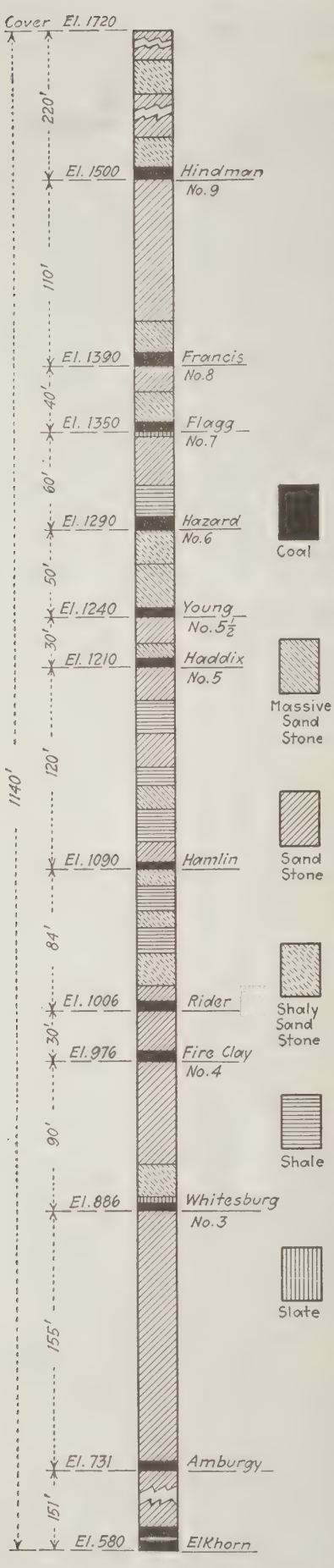


FIG. 6—HAZARD SERIES

The principal beds are No. 6 and No. 4, the "Hazard" and the "Fireclay" seams respectively.

neers to believe that they are the same seam. However, insufficient investigation has been given to the matter to determine finally which view accords with the fact. As the two are only 60 ft. apart and as local dips and rolls make their levels inconsistent in any given direction, it is easy to account for the belief that the two seams are identical. It is still possible that the assumption is justified. There is another seam of coal above the No. 6 seam on both First Creek and Lotts Creek. The thickness of this bed varies from 40 to 60 in. but it is so split up by numerous partings as to render it unminable. At Harveyton, on First Creek, and at Domino, on the North Fork of the Kentucky River, this seam has the cross-section shown in a table in the succeeding column. At Lothair and Glomawr, where seam No. 7 is workable, a bed of coal lies about the same distance above that seam as in First Creek and Lotts Creek. It has about the same characteristics as seam No. 8. At these points also a seam appears with about the same interval below seam No. 7 as is found between that bed and No. 5A on First and Lotts creeks although neither of these two seams has been sufficiently prospected to determine definitely their nature and sections. About 150 ft. above the No. 6 seam is the No. 8 seam. This is of minable thickness only in the high hills on Lotts Creek and Carrs Fork. On Lotts Creek its thickness ranges from 50 in. to 6 ft. It has



FIG. 7—LOADING BOOM, FIRST CREEK COAL CO.

A sample of the coal from the seam shown in Fig. 3 after it has been broken up and the fines screened out. The ability of the coal to withstand hard usage is quite evident.

been worked by the Hardy-Burlingham Mining Co. for the last three years. At this company's mines the seam is about 6 ft. thick. It also is operated by the Wisconsin

CROSS-SECTION OF SEAM ABOVE NO. 7 BED

Harveyton		Domino	
Strata	Inches	*Strata*	Inches
Sandstone		Sandstone	
Coal streaked with mother coal	3	Drawslate	5
Slate	3	Coal	2
Coal	16	Bone	2
Blue slate	2	Coal	9
Coal	7	Slate	10
Blue slate	2	Coal	20
Coal and rash	11		
Total	44	Total excluding slate	43

Coal Corporation and the Knott Coal Corporation on Yellow Creek of Carrs Fork. At these mines the coal is 6 to 8 ft. thick and practically free from binders.



FIG. 8—COMBINED CONVEYOR AND PICKING TABLE

This is in operation at the mine of the Dudley Coal Co. Some of the refuse can be seen in the foreground.

FIG. 9

No. 4 Seam at Caudills Branch

This bed shows two characteristics that differentiate it from seam No. 6 in Fig. 3. The roof is as smooth as if polished, and the well-known "jackrock" shows at about pick-handle length above the floor. This "jackrock" is a persistent parting measuring from 3 to ¼ in. and is of flint clay. Scene is from the Dudley Coal Co.'s operation, David near Blackey, Ky.



The development of the Hazard field has been rapid. The first coal was shipped from the village of Hazard and was mined from the No. 4 seam. This was in the autumn of 1912. In 1919 the tonnage had risen to 2,400,000, and during the month of June, 1922, shipment was made of 686,500 tons of coal by the mines having railroad connections. This output would be equivalent to 8,238,000 tons annually. There are now some eighty different operations, exclusive of wagon mines, ranging in capacity from 3 to 60 cars per day.

Most of these mines have modern and up-to-date equipment, both inside the mine and above ground, for cutting, loading and cleaning the coal. They are equipped with retarding conveyors, shaking screens, picking tables and loading booms and are prepared to turn out a first-class product.

The mines are all electrically equipped and power is being supplied by the Kentucky & West Virginia Power Co., located at Lothair, which is about in the center of one side of the field. This company has had to enlarge the capacity of its plant several times since its installation but as a rule has anticipated its needs so as to give comparatively litttle trouble to its consumers. The present capacity of the local plant is 16,000 kw. It is planned to couple this plant with those at Logan and Williamson, in West Virginia, in such a manner as to make practically one plant of the three units so that in case of a breakdown at any one of the plants another can be thrown into the circuit until the trouble is corrected.

The field was aided in its development by the fact that most of the area is owned by land companies and leased to operators on a royalty basis. This enables the small financier to start his mine with only sufficient capital to put up the plant. The lessors also have assisted in financing the construction of the railroad spurs up the main creek, the operator, of course, putting in the sidetrack for his own mine.

Among the largest of these companies is the Kentucky River Coal Corporation, which owns about 140,000 acres of land in Perry and adjoining counties. This company has been particularly aggressive in advertising



FIG. 10—PUMP STATION, KENTUCKY RIVER POWER CO.

The long conveyor of the Algoma Mine, of the Algoma Block Coal Co., can be seen in the rearground. This station is at Lothair, Perry County, Ky., and was under construction when photographed.

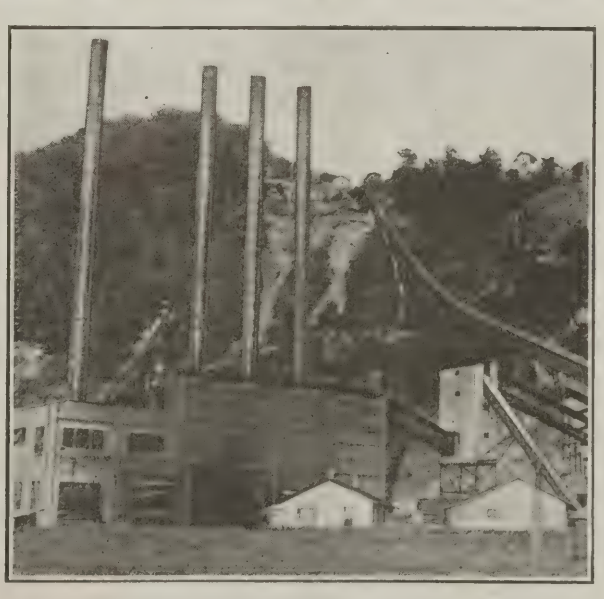


FIG. 11—POWER HOUSE OF THE KENTUCKY-WEST VIRGINIA POWER CO., LOTHAIR, KY.

Here also may be seen the conveyor of the Algoma Mine. Power plant has four alternators of 20,000 kva. total capacity, generating 3-phase 60-cycle current at 2,300 volts. This is stepped up to 11,000 volts. The boiler horsepower is 2,500.

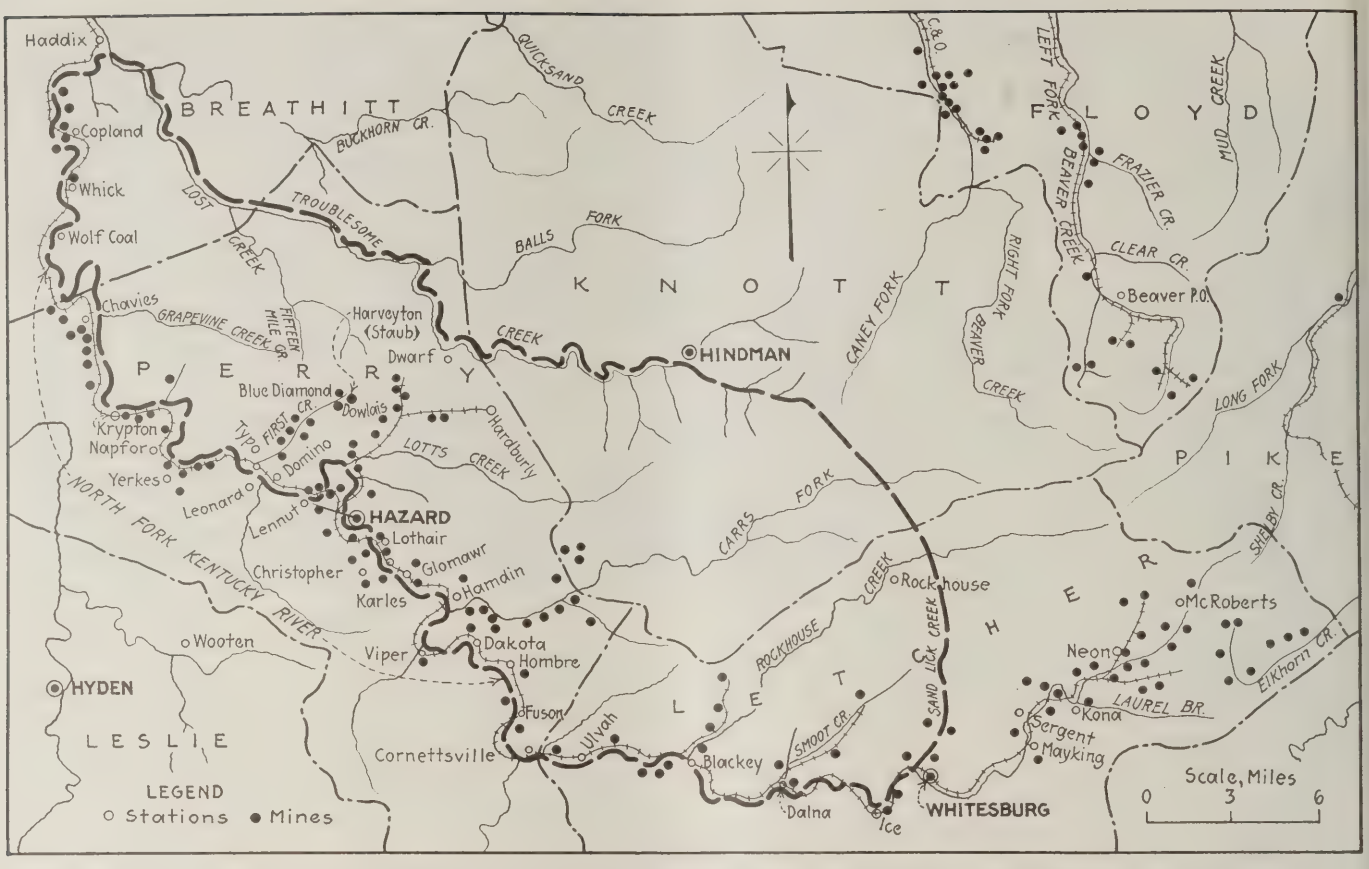


FIG. 12—HAZARD COAL FIELD LYING TO THE NORTH OF KENTUCKY RIVER FROM WHITESBURG TO HADDIX
The field lies in Perry Knott, Letcher and Breathitt Counties, in Kentucky. It has been attacked from the Kentucky River and from the affluents of that river south of Haddix. No railroad has been constructed up Lost and Troublesome Creeks, which bound the coal area to the north. The map extends into the Floyd County, or Paintsville, and the Elkhorn fields, without however, recording their boundaries.

the qualities of the coal and in bringing in outside capital, and as a result of this policy thirty-three of the operations are on the land of that company and about 60 per cent of all the coal shipped from the Hazard field is from these operations.

This company also maintains an engineering and inspection department and though the primary object of this force is to see that the coal is so mined from the company's leased land as to recover the greatest possible quantity of coal per acre mined, it has been of valuable assistance to the individual operators in planning with them the system that will be best suited to the conditions found at their mines.

As soon as the operators recognized the fact that this department was to be conducted on a policy of helpfulness as well as of criticism they gladly co-operated with it, and, as a result, the mines will compare favorably with any like group of operations in the country.

The town of Hazard also has shared in the rapid growth of the field. Starting in 1912 from a little village of 500 people, it is now a flourishing city of 8,000 population with paved streets and good schools.

Sales of Explosives in 1922 16 per Cent Greater Than in Preceding Year

Sales of explosives in the United States during the calendar year 1922 was greater by more than 16 per cent than the amount sold in 1921, according to reports received by the Bureau of Mines, which show that the total sales amounted to 431,772,077 lb. as compared with 372,107,503 lb. the year before. Of the total amount sold 178,866,225 lb. was black blasting powder, 209,476,084 lb. high explosives other than permissible explosives, and 43,429,768 lb. permissible explosives.

In 1922 the coal mines used 6,190,478 kegs, or 154,761,950 lb. of black powder, as compared with 5,613,435 kegs, or 140,335,875 lb. in 1921. In 1922 the coal mines used 25,497,758 lb. of high explosives other than permissibles, as against 34,231,542 lb. used in 1921. The coal-mining industry in 1922 used 43,429,768 lb. of permissible explosives compared with 38,055,650 lb. of permissibles used in 1921.

Pennsylvania, as usual, was by far the leading state in the consumption of explosives, having used 18,669,539 lb. of permissible explosives, 31,509,040 lb. of high explosives other than permissible, and 1,169,690 kegs of black blasting powder. West Virginia was second in the use of permissible explosives, with a consumption of 8,552,719 lb.; Alabama was third, with 4,292,969; and Illinois was fourth, with 2,758,300 lb.

Sales of explosives during January, 1923, amounted to 816,693 kegs of black powder, 5,376,370 lb. of permissible explosives, and 16,425,242 lb. of other high explosives.

Sales of black blasting powder in January were 61 per cent more than in January, 1922 and 69 per cent in excess of January, 1921, but were 9 per cent below the sales recorded for January, 1920. Of the quantity of black powder sold in January of the current year, 91.7 per cent was for coal mining.

Sales of permissibles in January were 92 per cent in excess of those for January, 1922, 36 per cent more than in January, 1921, and 20 per cent more than in January, 1920. Of the total quantity of permissibles sold in January, 1923, 94.2 per cent was for coal mining.

The January, 1923, sales of high explosives represent an increase of 47 per cent over January, 1922, 40 per cent over January, 1921, and 6 per cent over January, 1920. Coal mining operations used 19.4 per cent of this class of explosives sold in January, 1923.

Synchronous Motor-Generator Sets May Supplant Rotary Converters for Coal Mines

Comparison of Relative Stability of Both Machines—Ease of Installation and Method of Control—Ability to Correct Lagging Power—Factor an Important Economic Question

By Edgar J. Gealy
Electrical Engineer; Associate Editor, *Coal Age*

FOR evidence of the fact that the question as to whether the synchronous converter, more popularly called rotary converter, or the synchronous motor-generator set is the best machine for use about the coal mines for converting alternating current to direct current one need only make a short survey through the power plants and substations of the coal field or go over the numerous orders recently placed for such equipment. After such a survey one would find that few companies have all synchronous converters and no synchronous motor-generator sets or vice versa, indeed he probably would find at the same operation both synchronous converters and synchronous motor-generator sets and no doubt would find both types of machines among the new equipment being installed.

The latest development in substations is the automatic substation and even here we find both synchronous converters and synchronous motor-generator sets. Since these automatic substations generally are completely engineered by the manufacturer we are almost forced to believe that the manufacturer himself has this big question: namely, synchronous converters versus synchronous motor-generator sets, in his mind.

Advantages of the Two Types of Machine

For the synchronous converter almost anyone will argue as advantages such points as high efficiency, one armature winding, small size for a given capacity where its transformers may be mounted outside a building and availability of a neutral connection for the direct-current end for use in charging storage battery locomotives, thus effecting great economy compared with charging direct from the trolley line.

However, from advantages inherent in the machine itself and the trend of developments about the coal fields from the viewpoint of location of substation, kind of load, more extensive application of induction motors, tendencies toward changes in power contracts, etc., the synchronous motor-generator set seems to be the best type of machine for converting alternating current to direct current.

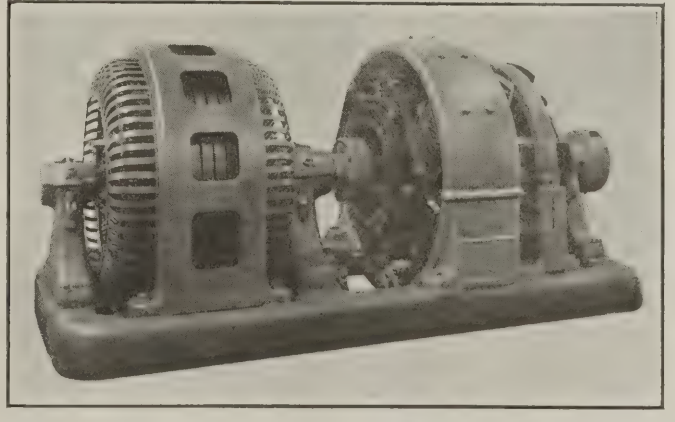
Without attempting an exhaustive comparison between these two types of machines it would be interesting no doubt to list and look into a few of the advantages and disadvantages of both types of machines.

It is a recognized fact that the synchronous converter is less stable in operation than a synchronous motor. Slight changes in the control or methods of operation of the synchronous converter rather easily upset the balance of the machine and may cause serious operating conditions. The construction of the armature is more complicated than either a direct-current armature or an alternating-current motor rotor or exciting field. The additional connections to the winding of the converter armature are both difficult to bring out and usually far from easy to repair. No matter in which direction the ventilation of the converter armature is designed carbon or metallic dust is sure to get into the winding, where it easily lodges and is not readily removed. Owing to this condition, blowing air into either end of the winding probably will more tightly lodge dust and dirt into one end or the other.

Greater care in starting a converter also is important. Depending upon the type, it usually is necessary either to raise the brushes or break up the field in starting. Then, again, the converter may build up in the wrong direction, thus requiring a re-start or a shift of a pole. The double-throw knife-blade switch used for starting the converter and putting it on full voltage always has been a source of danger both in starting and when running. Furthermore, occasions have been known where this switch has been accidentally opened under load in an attempt to take the converter off the line. In such cases the result was especially dangerous to the operator and equipment.

All these difficulties either do not exist with starting a synchronous motor or are far less dangerous. The starting switch of the synchronous motor invariably is an oil switch and can easily be arranged so that the operator need not come anywhere near any live parts.

Another point of advantage that the synchronous motor-generator set has is the fact that it is, as the name implies, a motor and a generator. Both these machines are popular all through the mining properties and therefore are pretty well understood by almost every electrician and electrician's helper. For this reason they will attack a breakdown job on the motor-generator set with far more confidence than they would have in attempting to repair a synchronous converter. This feeling is also borne out all through the life of the



A TYPICAL MOTOR-GENERATOR SET
This machine has become very popular in the coal field, as it readily lends itself to either manual or automatic operation and control. It may be easily knocked down for transportation through the mines to remote places.



AN INSIDE SUBSTATION OF INTEREST

These motor-generator sets were so designed as to be readily accessible in case of breakdown. This is important where equipment has been installed at a point in the mines far distant from the repair shop. The control of this station is not automatic as it is in some of the more recent installations.

machine, as it is quite noticeable that synchronous converter substations are more frequently shunned on inspection trips and whenever tests are to be made to determine the condition of equipment.

Two of the most important factors which determine the location of converting equipment at a coal mine are center of the load and accessibility. Frequently these factors demand that the converting equipment be in places where it is inconvenient to locate step-down transformers for a synchronous converter and also entailing expense, danger and inconvenience in case of a breakdown. Here the synchronous motor-generator set seems to fit in well. The high-tension voltage for the motor in most cases may be taken direct from the supply lines without the use of transformers and even where transformers are required it seldom matters a great deal where they are placed with respect to the location of the motor-generator set. They may even be of sufficient size and be so located as to carry other loads whenever they are required.

When located inside the mine or in a place not readily accessible the synchronous motor-generator set may be housed in a small space and presents less difficulty in setting up than the synchronous converter with its transformers. Where an automatic substation is to be set up it has appeared that the starting and stopping could more readily be controlled from a remote place when a synchronous motor-generator set rather than when a synchronous converter is used, this being particularly true where the machine is installed inside the mine and the control equipment is for the most part outside the mine in a separate control house.

The load on the converting equipment of a coal mine usually consists, in the main, of haulage machines—generally locomotives and hoist. The very nature of the work of these machines makes the load on the converting equipment very irregular. At times these irregularities become extremely severe and sudden, as, for instance, when an attempt is made to start a very heavy trip or to replace a trip of cars on the track after a derailment. On this kind of irregular load the synchronous converter sometimes gives trouble by flashing and burning the commutator and brush rigging. The machine is liable to hunt and become dangerous. The difficulties which arise, if at all, with a synchronous motor-generator set under these same conditions are far less pronounced.

A greater appreciation of the advantages of the induction motor in coal mining, due to its rugged construction and lack of the troublesome commutator will gradually become more generally realized. With this greater appreciation of the induction motor will come the realization of the flexibility of alternating current and the advantages of higher voltages for transmission and distribution systems.

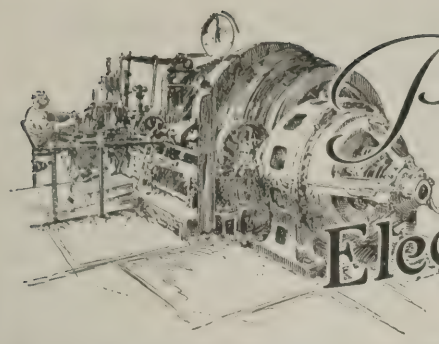
The increased application of the induction motor necessarily brings about a condition whereby the large inductive loads produce a lagging power factor which may become important if the induction motors are applied to a large percentage of varying loads or to loads that are highly overmotored. The excessive lagging current thus produced may become very troublesome, necessitating larger distribution wires, larger transformers and larger generators. Fortunately, this condition of lagging power factor due to the high inductive load produced by the induction motors can be corrected at the coal mine.

Here the synchronous motor-generator set again has a definite advantage over the synchronous converter. The synchronous converter can help the situation to some degree but cannot be called upon to materially correct poor power factor, while the synchronous motor may be called upon to partly correct the poor power factor of the system. With a slightly increased capacity in the synchronous motor over that required for the direct-current load, considerable correction can be made with little difficulty, thus bringing the power factor to a very reasonable operating value.

Consumer to Blame for High Power Bills

Many of the complaints against the power companies by purchasers of power are unjustifiable, because in a great measure they are due to some condition arising from the fact that the consumer has not used good judgment in the selection of his equipment. Many of the grievances complained of could be best remedied not by the power company but by the consumer himself, as most of them are in some way connected with poor power factor. They may be in the form of a complaint about low voltage, poor voltage regulation, fuses opening the lines frequently, circuit-breakers tripping, overheated motors, high magnetizing current in equipment, low torque from motors, high equipment costs, high kva. capacities required throughout the system. After all, the installation of a synchronous motor generator set is one of the best remedies for these difficulties.

With greater demands upon the central stations for more power it is natural to find a continual revision of power schedules by the power companies. The greatest changes in these schedules, although not always immediately enforced, are with reference to penalties for low power-factor loads. Some of these penalties are no doubt unjustifiable, in some cases, because they charge the consumer for out-of-phase kva. at the same rate as for true power, yet properly arranged penalties for poor power factor are justifiable. The conditions which the consumer is apt to complain about are based upon facts which he himself would have to meet if he were making his own power; therefore it behooves the consumer to operate his equipment to the best advantage lest he be penalized for conditions which would handicap his own generating plant if he were making his own power.



Practical Pointers for Electrical and Mechanical Men



Function of and Operation of the Series Field of a Rotary Converter

WILL you be kind enough to explain in your columns the function of the series field on a rotary converter? I understand that on a compound generator the increased load acts to raise the voltage by the increased field established by the series field current. From what I have read about rotary converters this does not seem to be the same case, although the winding is called the same, is located the same and carries the load current in the same manner.

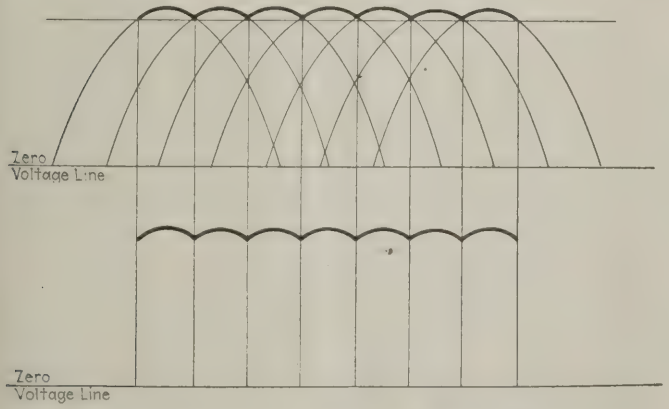
J. R.

It is true that the series field winding on a rotary converter is located the same as on a compound generator. With certain modifications it also does the same work as the series field of a compound generator. However, to best understand the rotary converter we must first of all remember that the ratio between the alternating-current voltage and the direct-current voltage is fixed. The rotary converter in its simplest terms is a machine which takes a given alternating current voltage and picks off the tops of the rapid succession of alternating-current waves and ties them all together and forms a direct-current voltage—in other words, the rotary converter is a commutating machine. In this way we see that if we start off with a low alternating-current voltage this means that the potential of the peaks of these waves is low and when these low peaks are picked off and combined to form a direct-current voltage, then the resulting direct-current voltage must be low.

When the load comes on the direct-current end of a rotary converter this same load, of course, is transmitted back to the alternating-current end and upon the alternating-current supply. When this happens certain conditions arise in the alternating-current system which reduced the alternating-current voltage. Consequently, since there is a definite ratio between the alternating-current voltage and the direct-current voltage, the direct-current voltage from the rotary drops with the alternating-current voltage.

The series field, however, functions under these conditions and causes an effect in the alternating-current system to neutralize the cause of the drop in alternating-current voltage. By thus maintaining the alternating-current voltage the series field indirectly maintains the direct-current voltage. In some cases it may even raise the direct-current voltage, but whatever it may be, in this event, it cannot be a great deal.

Questions calling for special treatment constantly come to electrical and mechanical men at coal mines. These cover equipment and materials for special needs. Every time you find a solution for one of your problems, send it to "Coal Age" and thus pass it along to others. Send your questions in too.



CONVERTING ALTERNATING TO DIRECT CURRENT

The upper section shows the upper halves of a series of alternating-current waves. The heavy section shows the part commutated. The lower section represents the resulting direct-current voltage. Note that the closer the alternating-current waves the less pronounced become the ripples in the direct-current voltage.

The Delta Connection Made Clear

METHODS of connections used with alternating current are sometimes confusing. Many times the connection cannot be definitely ascertained until a close inspection has been made. In three-phase work the general plans of connecting equipment resolve into three general types. One of the most common connections is termed the "delta."

As with all equipment used on electrical circuits it is important to make every connection and each part of a general connection correctly. Strange as it may seem, I have known some very good electricians and electrical helpers who lacked a very clear conception of the delta connection; in fact, some of these men could correctly connect up a bank of transformers in delta and yet were completely lost in connecting three coils, say, on a tripping device, in delta.

The important point to bear in mind when making a delta connection is that each coil involved in the delta connection should be suitable in voltage rating for connection directly across the voltage of the line. For example, a transformer winding or motor winding to be connected in delta with two other similar windings should have the same voltage rating as that measured across any two wires of the line. From this

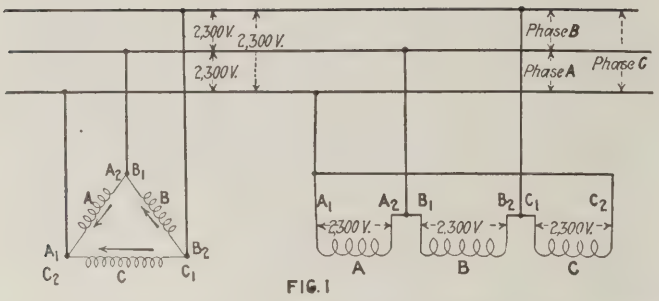


FIG. 1—COIL ARRANGEMENT IN THE DELTA

Each of the three coils is across a phase of the three-phase system and therefore must have the same nominal voltage rating as the line voltage.

we see clearly that the 2,300-volt winding of a transformer may be connected in delta with two other similar transformers to a three-phase 2,300-volt alternating-current line.

The accompanying diagram shows both a schematic delta connection and the usual arrangement of the delta connection applying to transformers or any other group of coils having the same voltage rating as the line—for example, the coils of an induction motor.

In Fig. 1 the arrangement appears as if the different windings were short-circuited, but this is not the case, as the phase differences or times of impulses of the various three-phase voltages prevent such a thing when the connections are properly made. When the voltages on any two coils or windings are in the same direction around the triangle formed by the delta connection, the voltage of the third one is always opposed to them and equal to the instantaneous sum of the two.

This is rendered quite obvious by Fig. 2. At a given instant of time called TT_1, both phase A and B are positive in the amount represented by the distance E. These two values of voltage, since they are in the same direction, may be directly added together and give a total amounting to $2E$.

Again looking at Fig. 2 we notice that at this same instant phase C is working in the opposite direction, represented by a value $2E$, which balances the sum of the voltages of phases A and B. In Fig. 1 the voltage arrows again bring out this point. It will be noticed that the arrow at coil C is twice that at coils A and B and opposite in direction, thus maintaining the balance. In this way the balance always is maintained between the values of the voltages at any one instant.

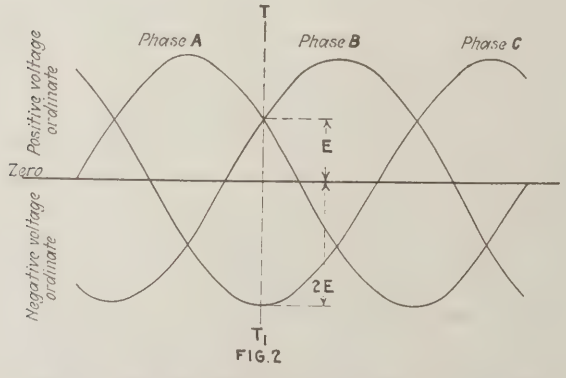


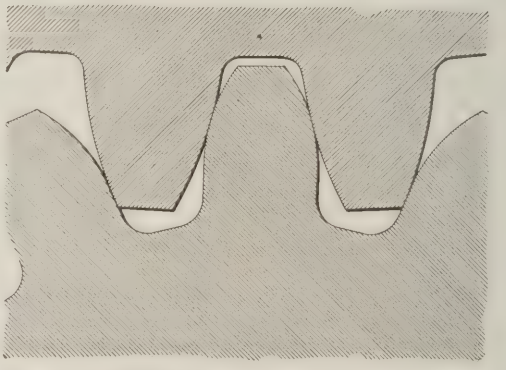
FIG. 2—PHASE VOLTAGES ALWAYS BALANCE

Drawing a line parallel to TT_1 will show that at any instant the voltages balance. Care should be taken to consider both the direction and value of all the instantaneous voltages. At the instant shown voltage of phase A is positive E, phase B is positive E and phase C is negative 2E which balances E + E of phases A and B.

What Is the Maximum Permissible Wear Of Locomotive Motor Bearings?

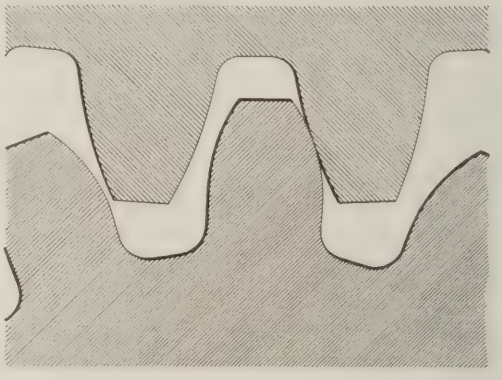
A SERIOUS evil frequently allowed to exist on mine locomotives is excessive wear of the armature and back-axle linings. This is one of the causes that tend most to shorten the life of gears and pinions as well as to cause expensive delays. If maximum life is expected from gears and pinions the maximum wear limits of the armature and back-axle linings should be set at a predetermined limit.

For 3- and 2½-pitch gears it is good practice to set the maximum limits at $\frac{1}{16}$ in. for the armature lining



PROPERLY MESHED GEAR AND PINION

This insures smooth, easy and quiet running; no breaking of teeth and no pounding out of bearings.



GEAR AND PINION IMPROPERLY MESHED

This shows the condition when the shaft centers are $\frac{1}{16}$ in. too great. Note that the top of the tooth is doing the work and the large back lash.

and $\frac{1}{8}$ in. for the back-axle lining; for smaller teeth these limits should be reduced.

In the accompanying illustrations, which show the exact size of a popular new 3-pitch gear and pinion in mesh, one shows the correct mesh when the armature and back-axle linings are in perfect condition, while the other depicts actual conditions with the same new gear and pinion when the armature lining is worn $\frac{1}{16}$ in. and the axle lining $\frac{1}{8}$ in. Note the improper mesh and extreme back lash. This causes noise, broken teeth and a surprising reduction in life.

For checking the wear of the linings a tapered gage can readily be made. If the axle is enclosed in a dust guard which is not provided with an inspection door, by jacking up the bearing housing with a block and pinch bar, a fair estimate of the axle lining wear can be made without removing the guard.

New gears are expensive, especially when the cost of taking the old gear off and putting the new gear on is allowed for.

Book Reviews

Carbon-Dioxide and Methane Outbursts in Coal Region of the Gard, France

By F. C. Cornet

APPOINTED in 1913 by the Southeastern Branch of the "Société de l'Industrie Minérale (Mineral Industry Society), of France, to investigate and report on the outbursts of methane and carbon dioxide occurring so frequently in the mines of the Gard coal field, in central France, the Commission des dégagements instantanés (Gas outbursts commission) has just made its report in a paper-covered volume of 40 pages 8¼ x 10⅝ in.

The Gard coal field is small, its area being less than 200 square miles, but no more disturbed area could well be imagined, the seams pitching at all possible angles and in all directions of the compass. These geological conditions are worst in the southeastern half of the field, where practically all the outbursts have been of carbon dioxide. In the northwestern section of the field, where methane outbursts happen quite frequently, carbon dioxide seldom is found in any troublesome quantity.

Though the seams mined in the northwest are obviously not the same as those mined in the southeast, it is still a question which group of seams is the lower geologically. The first outburst, one of methane, occurred in the northwest area in 1879. Since then, if the field be considered as a whole, more than 1,600 blowouts have been recorded, 1,100 of which are of carbon dioxide. Only a few of the outbursts have discharged a mixture of that gas with methane.

Most Violent Gas Is the Carbon Dioxide

The most violent, by far of the outbursts always have been those of carbon dioxide. Some of the latter have occurred under a cover as light as 400 ft., and, it may be added, no mine in the field is more than 1,000 ft. below the surface. In not a single instance has the opening created by a blowout been large enough to account for more than a fraction of the fine coal and slate thrown out by the manifestation.

Boreholes as advance detectors of danger have proved as illusory as they do in every other place where blowouts occur. Methane blowouts happen only in soft and easily mined seams—that is, in coals which have sustained in past geologic ages such crushing as to deprive them of their cohesion. Blowouts of carbon dioxide generally occur in hard seams the appearance of which little indicates the terrific upheavals to which they have been subjected in the past.

All outbursts, both of carbon dioxide and methane, are preceded by underground thunder, crushing of timbers, wind blasts and dust clouds. The notice of danger thus given may be of a few seconds only, but the premonitory signs sometimes will last hours and have been known to continue intermittently through several days. The longer the warning, the less violent the outburst.

It often has been remarked that shortly before a blowout of carbon dioxide occurs the face becomes appreciably colder than the atmosphere of the workings, especially if the seam be damp. Some of the worst blowouts happen when a seam is reached by a *bouveau*, which the French call a *travers-banc*, or by a shaft or is on the point of being reached by either one.

In a preceding article* has been described the method by which the Gard operators provoke blowouts by so-called "jarring blasts." This method is adopted in shaft sinking, in *travers-banc* driving and in regular mining work. When pillars of comparatively small area have been left standing for a sufficiently long time, however, they sometimes may be recovered without resorting to the jarring blast.

In the case of carbon dioxide a pillar is a long time being purged of its gas. A methane blowout will free the coal of its gaseous contents for some distance ahead, and the seam in consequence, must be penetrated a little further before another such blowout will occur. But one blowout of carbon dioxide, on the other hand, may follow immediately after another—that is, two consecutive jarring blasts may each cause a blowout at the same face.

The commission's report devotes several pages to the rules followed or recommended in connection with jarring blasts. It is urged that all such blasts be fired from the outside exclusively. On account of its high specific gravity, the carbon dioxide after a blowout will fill the mine down to its lowest levels unless prevented from so doing by a strong and voluminous air current. In many instances the gas has reached the surface through both the downcast and the upcast at the same time. It has been known thus to asphyxiate the men working at the top of the hoisting shaft.

In at least one instance, at night, a carbon-dioxide outburst carried up the hoisting shaft a quantity of fine coal and dirt sufficiently large to block a public road, the gas spreading at the same time into houses situated more than a thousand feet away and asphyxiating men, women and children in their beds, some on the second floor of the houses they occupied. The report says nothing concerning the probable causes of either the carbon-dioxide or the methane blowouts.

*"Precautions to Guard Men from Seam Outbursts," *Coal Age*, March 8, 1923, pp. 408-411.

Desulphurization of Coke by Steam

IN THE course of laboratory experiments in the desulphurization of coke by steam being conducted by the Department of the Interior at the Pittsburgh experiment station of the Bureau of Mines, steam tests at atmospheric pressure for the removal of sulphur from lump coke have been finished. In Ohio the combined sulphur as FeS, $FeSO_4$ and free sulphur (not including that in solid solution) was reduced from 1.38 to 0.72 per cent. The solid-solution sulphur was not affected, but it has been shown that this has little effect in contaminating the sponge iron in the blast furnace. In Illinois coke 0.62 per cent sulphur correspondingly was reduced to 0.48. Clairton coke, which is low in sulphur, was reduced from 0.29 to 0.17 per cent. Sulphur in a sample of gas-house coke from Philadelphia was reduced from 0.81 per cent to 0.60. These results were obtained without the application of a vacuum, in the presence of which it may be possible still further to reduce the percentage of sulphur. Little steam is required.



Problems of Operating Men

Edited by James T. Beard



Blame for Explosions in Mines

Analyzing the Situation—The Company, the Superintendent, the Mine Manager—Chief Fault in the Employment of Incapable Men

FOR some time past, it has been a common thing, on picking up a newspaper, to read the account of another mine disaster with the loss of a hundred or more lives. The question naturally comes home to all of us as to where the blame for these dread occurrences should rest.

To reach a more intelligent conclusion in answer to this question, let us analyze the situation in respect to the men who are personally responsible for the management of our mines. These men, in the order of their responsibility, are the mine owners or management, the superintendent employed by the company and the mine manager (mine foreman).

Now, I know of no mine owners or of any management of mines who are indifferent to the possible occurrence of a disaster in one of their mines. If for no other reason than the great loss of life involved they naturally do all in their power to avoid such an occurrence in their mines.

In all my experience in coal mining, I have observed an almost lavish expenditure of money to provide the necessary machinery and other appliances for the adequate ventilation of the mines and making them safe for work. It is foolish to think that these expenditures would be withheld where money is needed for the safe operation of a mine.

It is not in this respect that companies commonly fail in their responsibility for safety. On the other hand, however, it frequently happens that a company will employ a superintendent who is not a practical man in respect to knowing what is needed underground to properly safeguard the work. The employment of such a man as superintendent will always prove a handicap to a practical mine manager (foreman).

Must Obey Orders of His Superintendent

In the operation of a mine, the mine manager is naturally subject to the orders of the mine superintendent who holds the higher office. For this reason, it is all the more important that the man who occupies the position of mine superintendent should have a practical as well as a theoretical knowledge of the mining of coal, and be fully acquainted with the conditions existing in the mine, through his own personal experience underground.

Turning now to the mine manager or foreman, who is in direct charge of the work performed in the mine, any lack of practical knowledge and experience on his part or failure to properly perform his duties may cost him his own life and sacrifice the lives of the men in his charge, as was the case in the last two explosions, at Dawson, New Mexico, where all in the mine were killed in each explosion.

To the practical miner, these happenings are not mysterious. It is hard to make him believe that a single unauthorized shot was the cause of the explosion in a mine classed as a non-gaseous mine. His invariable conclusion would be that gas had accumulated at some point in the old workings, or in some poorly ventilated place that had been driven ahead of the air and stopped.

The practical miner is prone to believe that some fellow, ignorant of his danger, walked into such a place with an open light on his head, or smoking a pipe, and set off the gas that has escaped the notice of the fireboss when making his morning examination of the mine.

In such an instance, the responsibility for the disaster is attributed to the failure of the mine examiner (fireboss) to properly perform his duties in the mine. It is true that, in many cases, it can be shown the territory was too large to permit of a careful examination, within the time allotted for that purpose, and the real responsibility for such a condition is then thrown back on the management or owners of the mine.

Allow me, in closing, to state my opinion that the chief fault, in respect to mine disasters, lies in the employment of incapable men to take charge of the work, rather than any lack of expenditure in making the mine safe. Mine disasters will continue until capable men are placed in charge of the work.

Edwardsville, Ill. DAVID YOUNG.

Clearance on Haulways

Crooked roads driven without sights cause many accidents—Capable foremen insist on all entries and rooms being driven on sights—The foreman on the job.

HAVING missed my *Coal Age*, for a short time past, it was with deep interest that I recently read numerous letters relating to mine accidents and their causes. One writer asks, "What causes so many accidents in the coal mines?"

Every person, of course, has their own way of thinking and each is guided by his own particular experience in accounting for the great number of accidents, both fatal and non-fatal. In a few words, I want to draw attention to one frequent cause of accident, for which there is little or no excuse, if the mine foreman in charge is capable and efficient.

Going into different mines, it is a common thing to observe crooked roads. Naturally, the tracklayer has not kept the track in the center of the entry; but it first brushes one rib and then the other as the entry bends from side to side. With due care on the part of the foreman in charge of the work, all of this could have been avoided.

In my experience, a large number of accidents are due to these crooked roads. There is no wide side

having a good clearance where men can walk with safety. Drivers are in constant danger of being caught between the car and the rib, at points where the track hugs one side of the entry. In many cases, the cars actually rub a post, which is in danger of being knocked out at any time.

Strange as it may seem, hardly one man in ten can keep an entry straight, even when good sights are given. Many certified foremen and assistant foremen fail in this respect. All will agree, however, that safety requires maintaining a good wide clearance continuously on one side of the entry; but this cannot be done unless the road is practically straight.

Every capable mine foreman will insist on sights being given in the driving of all rooms and entries. A foreman who is a foreman in action as well as in name, is the man who is on the job throughout the day. He does not wait for the mine inspector to tell him he must get busy and straighten his roads, slabbing the ribs at points where that is required to give the necessary clearance. Instead, the inspector finds the roads are straight and there is no cause for complaint.

The foreman who is on the job is not the man to depend on his assistants alone. He is there to see for himself. You will not find him sitting in his office when the mine is in operation; and the result of his constant watchfulness and supervision of the work is shown in the daily cost-sheet. He is not the man whom the superintendent must watch nor has he any fear of interference from that source.

Let me say, then, if accidents are to be avoided, the foreman must be on the job, work in harmony with the inspector and feel the responsibility resting on him for the safe operation of the mine, in every detail pertaining thereto.

It is a sad mistake for a mine foreman to think that, having secured his papers, he is in a position to lay down on his job. He should realize that now is the time to show what he is worth as acts go farther than words. Getting his papers does not relieve the man from continued study and reading to keep himself up to date.

JOHN H. WILEY.

Oliphant Furnace, Pa.

Economic Aspect of Mine Disasters

Foreman vainly appeals to superintendent to make mine safer—Accidents increase cost of production—Effect of compensation insurance—Mining of large coal a factor.

READING the excellent editorial entitled "Fundamentally Wrong," *Coal Age*, March 8, p. 398, found me very much in harmony with most of the assertions relating to practices, in our mines, that have a tendency to increase rather than decrease mine accidents. The editorial closes by saying, "Something will and must be done to make our mines safer."

The expression "our mines" led me to feel that the writer of the editorial, like myself, felt and was willing to assume his share of responsibility in the prevention of mine accidents. It awakened in my heart a friendly feeling, as it showed no discrimination; but recognized the obligation that rests on all of us alike to do our part, as far as lies in our power, to eliminate the numerous causes of accidents and make our mines safer.

Recently, some conditions existing in our mines, here, prompted me to request my employer to do something to lessen the hazard to life and limb. In response, I got no satisfaction and was probably thought to be radical in my ideas of safety. However that may be, I only acted according to the dictates of my conscience and in behalf of myself and others. I was speaking both from a humane and an economic standpoint.

Could our mine officials but visit the hospitals, say once each month, what they would see there might convince them that 90 per cent of the suffering and distress resulted from what can be called "avoidable accidents." The sight, I believe, would stimulate them to action for the prevention of accidents, and both they and we would be benefited.

Many operators lose sight of the fact that accidents in their mines are a liability to be covered by the operation of the mine. As we all know, however, the operator passes the burden on to the consumer, who is the ultimate sufferer and must stand the increased cost of production, which is sure to follow. The question is thus seen to be an economic one that should interest the public, at least in their own behalf aside from humane reasons.

The statement may surprise some that a number of our best mines, as far as natural conditions are concerned, make the worse showing in respect to the number of fatal and non-fatal accidents. The reason for this is to be found largely in the effect of the operation of the Compensation Law and the assumption of accident risks by the affiliated insurance companies.

Too Little Supervision of Workers in Mines

My observation leads me to suspect that, in certain cases, companies are paying less attention to the supervision of their mines, allowing the payment of liability insurance to take the place, in a measure, and render unnecessary the employment of safety inspectors. Without a doubt, this has been the direct cause of some accidents. In my opinion, while fire insurance is a great help in most cases, if there were no means of such insurance, there would be a less number of fires.

In my own mind, while admitting that workmen's compensation, as provided by law in many states, is a great benefit to the unfortunate victim of accident, the question has often arisen as to whether the law has had the tendency to reduce the number of accidents that occur in our mines, as was hoped would be the case.

The editorial writer has mentioned the practice of "topping," in the loading of mine cars, as an argument against rock dusting, which he says has not been followed extensively in this country. It must be admitted, however, there is no question but that the practice of topping mine cars has had a tendency to produce large coal in mining, which greatly lessens the dust danger in the mine.

Another incentive to the mining of large coal was lost in the adoption of the mine-run basis of payment. Previously, when lump coal was made the basis of payment, great care was taken by the miners to avoid the production of fine coal and slack, which would go through the screens and afford the miner no return. With the loss of this incentive to mine large coal, are we now to look for doing away with the practice of topping the cars in loading?

Doubtless, the topping practice has some tendency to increase the dust danger, by reason of much coal being lost in transit from the working face to the shaft bottom or the tipple. However, it seems as though there

should be another remedy to overcome that evil. In all of these matters, let us hope that good reasoning will save us, who mine the coal and the public who consume it and, incidentally, reduce the high cost of production and the number of mine accidents.

Linton, Ind. W. H. LUXTON.

Difficult Examination Question

Circulation in a shaft mine increased by adding another airway—Solution first assumes constant quantity and then constant power.

SOME time ago, I recall that the solution of a difficult examination question was asked and answered in *Coal Age* [Vol. 22, p. 1002]. Later, in the issue of March 1, p. 379, a contributor offered a solution of the same question by the equivalent-orifice method. Both of these solutions seemed to me difficult and I want to offer the following:

Briefly stated, the question assumed a circulation of 10,000 cu.ft. of air per min., in a mine ventilated by two shafts, each 6x6 ft., in section, and 500 ft. deep. The air was passing in a single current through an airway having the same section as the shafts and 1,000 ft. long, making the resistance of the airway equal to that of the two shafts combined. The question asked, How much this circulation would be increased by adding another airway of the same size as the first, the power remaining unchanged?

The solution I would suggest is the following: First, assume the quantity of air in circulation to be constant and find the relative power required in the two cases. For example, writing the formula for power (H), in terms of the rubbing surface (s) and the sectional area of the shafts or airway (a), for a given quantity of air in circulation (q), and a coefficient of friction (k),

$$H = \frac{ksq^3}{a^3}$$

But, k and q being constant, it is evident the power varies as s/a^3. Now, since the sectional area of each shaft and that of the airway is the same throughout the length of the airway is equal to the combined depths of the two shafts, it is clear that the addition of a second airway will double both the sectional area and the rubbing surface in the mine. Then, taking the area and rubbing surface of the shafts or single airway as unity or 1, since the power varies as s/a^3, we can write for the power absorbed in the shafts and airways, in each respective case as follows:

1st case,

shafts $1/1^3 = 1$; airway $1/1^3 = 1$; total 2 hp.

2nd case,

shafts $1/1^3 = 1$; airways $2/2^3 = \frac{1}{4}$; total $1\frac{1}{4}$ hp.

This shows that to pass a constant quantity of air in these two cases, the power is reduced from 2 hp. in the first case, to $1\frac{1}{4}$ hp. in the second case, or as 8:5.

Then, finally, since the quantity varies as the cube root of the power in a given airway, and calling x the required quantity in circulation in the second case when the power is increased from $1\frac{1}{4}$ to 2, or in the ratio 5:8, we have,

$$\frac{x}{10{,}000} = \sqrt[3]{\frac{8}{5}} = \sqrt[3]{1.6} = 1.1696$$

$$x = 10{,}000 \times 1.1696 = 11{,}696 \text{ cu.ft. per min.}$$

I submit this as being the simplest possible solution of such a problem. MAC.

River Herbert West, N. S.

Inquiries Of General Interest

Depth of Coal Mines in Belgium Often Exceeds 1,000 Meters

Dispute Regarding Depth of Mining Coal in Belgium—Question Referred to Expert Shows Shaft Exceeding 4,000 Ft. in Depth

RECENTLY, I had quite an argument with a mine boss in this locality regarding the depth of Belgian mines. I was speaking of the great depth of some of the coal shafts in the basin of Charleroi, in the Province of Hainaut, Belgium, where I was born.

In the conversation, I referred to one mine in particular that went by the name of "Parrent." While unable to give the exact depth of the shaft, I explained that it was very deep and had a curve, the result of being thrown out of line by changes that had taken place in the strata since the shaft was sunk.

My friend told me that no mine in Belgium lay at a depth of 1,000 yd., which I had said was exceeded in the shaft mentioned. As I have been unable to meet his challenge to prove the correctness of my assertion that there were a number of mines in Belgium having a depth greater than 1,000 yd., I decided to write to *Coal Age*, asking for corroboration of my statement.

My friend is one who is hard to convince. He is the type of man who "knows it all," and should he see the proof of my claim published in the columns of *Coal Age*, it would still be difficult for him to acknowledge that he was wrong. CHARLES TROYE.

West Terre Haute, Ind.

The question of this correspondent was referred to F. C. Cornet, a mining engineer who is thoroughly familiar with the mining of coal in Belgium, and who recently contributed an interesting article on Blowouts in Belgium Coal Seams, which appeared in *Coal Age*, March 1, p. 367. In response to our request, Mr. Cornet writes as follows:

A depth of 1,000 yd. (3,000 ft.) places a shaft in the 900-1,000-meter class, of which there are probably fifty or sixty examples in Belgium. When speaking of their mines, Belgians seldom specify the depth of the shaft, except where this exceeds 1,000 meters (3,280 ft.). For this reason, it is hard to state the exact number of shafts in Belgium belonging to the class mentioned.

Last year, there were seventeen mines whose depths varied from 1,000 to 1,100 meters (3,280-3,609 ft.). There were two mines having depths varying from 1,100 to 1,200 meters (3,609-3,937 ft.). There was one mine whose depth was 1,240 meters (4,068 ft.). To this depth must be added a 40-ft. sump to obtain the depth of sinking.

These figures show that there were twenty mines in Belgium last year worked at a depth exceeding 1,000 meters. Since the mining laws permit no mine to be operated with less than two shafts, we can certainly say there were at least forty shafts whose depths exceeded 1,000 meters.

Examination Questions Answered

Alabama Foremen's Examination, Birmingham, Jan. 22, 1923

(Selected 2nd Class Questions)

QUESTION—*A large percentage of mine accidents are caused by miners persisting in loading coal where the roof is unsafe. What rule would you adopt to prevent this condition and reduce the number of accidents?*

ANSWER—A rule strictly forbidding the loading of coal or doing other work when a miner enters his place in the morning, until he has carefully examined the roof in his place and has set any timbers that may have been dislodged by the shots of the night before, or that may be needed to make the place safe for work. This rule should be strictly enforced and any violation suitably punished.

QUESTION—*What method of ventilation lessens the danger of an explosion and at the same time reduces friction?*

ANSWER—The method known as "splitting the air current," or dividing it into two or more splits, makes it possible to distribute the air according to the need in each section of the mine. The mine is thus divided into separate ventilation districts and a local explosion occurring in one district is not so readily transmitted to another district, thus rendering the mine less liable to a general mine explosion. Again, the velocity of the air is reduced, making it less liable to transport dust and hold it in suspension in the air, which also reduces the liability to an explosion. Moreover, the reduced velocity of the air current creates less friction, as the friction of air varies with the square of the velocity of the current.

QUESTION—*Accidents from blasts and explosions of powder are on the increase. What should be done to reduce them? Answer fully.*

ANSWER—Where black powder is in use, all holes for blasting should be carefully examined before a miner is permitted to charge and fire a hole. The use of black powder should not be permitted in mines generating gas or dust and strict regulations should be made and enforced, limiting the amount of charge to be used in a single hole and the number of shots to be fired at one time, in a single place. Preferably, all shots should be examined, charged and fired by competent shotfirers after the men have left the mine. In mines generating gas and dust in dangerous quantity, only permissible powder should be employed and all shots should be charged and fired by competent shotfirers employed for that purpose.

QUESTION—*If the ventilation of a mine is insufficient, how may it be increased without increasing the power?*

ANSWER—To increase the circulation in a mine without increasing the power on the air, it is necessary to divide the current into two or more splits, so as to reduce the velocity of the passing air and the friction. Also, every obstruction to the free passage of the current should be removed and all breakthroughs and crosscuts enlarged to the full section of the airway. As far as practicable, the length of air travel should be shortened and sharp bends in the air-courses avoided.

QUESTION—*Are there any precautions you could adopt to insure greater safety to the workmen in the mine, other than what is required by law?*

ANSWER—Greater safety in any mine is insured at the expense of constant, close, supervision of the work, not only to see that the mine is operated in compliance with the requirements of the law, but that all unsafe practices are eliminated and that everything is done to meet the special conditions that exist in that particular mine. For example, the practice of solid shooting, while safe in the mining of anthracite and other hard coal, if properly performed, is very unsafe in the mining of a soft friable coal and when performed by an inexperienced miner. Where the conditions require, which is the case in many mines, all shots should be examined, charged and fired by competent shotfirers employed for that purpose, and the work should be done after the men have left the mine.

Greater safety is assured by the use of permissible powders in place of black powder. Where men are hauled in and out of the mine on a special trip as provided by law, safety requires that no explosives or tools be carried by the men in that trip; but these should be sent into the mine on a separate trip. By a careful study of the conditions in his particular mine, every foreman will find the need of special precautions being taken to secure greater safety than what is mentioned in the law.

QUESTION—*What are the requirements of the law in Alabama in regard to handling and storing explosives in the mine? Where should they be kept and in what quantities?*

ANSWER—Regarding the handling of explosives in mine, Sec. 3 of the Alabama law requires a man's lamp to be placed 5 ft. away in the direction in which the air is moving; nor shall any person approach nearer than 10 ft. to an open can of powder, having a lighted lamp or pipe, or other fire with him. The same section forbids the opening of a can of powder with a pick or other tool.

In regard to storage of explosives in the mine, the law (Sec. 84) requires such explosives to be kept in a locked wooden box, placed as far as practicable from other boxes and from the track, and not nearer than 100 ft. to any working place. Black powder or other loose material for blasting must be carried into the mine, by the miner, in a proper receptacle having a securely fastened top. The law (Sec. 85) forbids blasting powder or other explosives being stored in the mine and no workman is permitted to have in his place, at one time, an amount greater than what is specified by the rules and regulations of the mine. More than one kind of explosive must not be placed in the same hole. The law forbids (Sec. 86) a person having in his possession any explosives other than that permitted by the rules of the mine, and permits (Sec. 88) the use of dynamite in the mine, only by the written consent of the foreman or other person in charge, stating the use intended.

QUESTION—*How many cubic feet of air passes along an airway 6 ft. high and 10 ft. wide, the velocity being 450 ft. per min.?*

ANSWER—The sectional area of this airway is $6 \times 10 = 60$ sq.ft. Then, for an average velocity of 450 ft. per min., the quantity of air passing is $60 \times 450 = 27{,}000$ cu.ft. per min.

Labor and Its Handling Make "Astounding" Progress in Efficiency

A report on the efficiency of labor and efficiency in handling labor will be issued soon by the Department of Commerce, Secretary Hoover having caused a special study of these related subjects to be made for some months.

The report, it is said, will show that "astounding" progress has been made in the United States in the last ten years. Labor turnover has been reduced materially by improvement of management, the report will show, while the efficiency of labor also has improved.

In view of the attitude of the administration against material relaxation of the immigration laws, the forthcoming report is considered of especial importance.

In the opinion of Secretary Hoover, industry must look to increased efficiency, not only of labor but in handling labor, to solve its labor problems, rather than to an influx of foreign workers.

M-O-I Coal Convention Program Maturing

The program for the annual convention of the Michigan-Ohio-Indiana Coal Association, to be held in Cincinnati, May 22 to 24, is rapidly taking shape according to an announcement by B. F. Nigh, of Columbus, secretary of the association. Plans for entertainment as well as the business program provide for three full days and the biggest meeting in the history of the association is expected.

The business program has not been completed, but one of the leading speakers will be Tom L. Lewis, advisor to the New River Coal Operators' Association, on "What Is the Matter with the Coal Industry?" J. D. A. Morrow, of the Morrow Callahan Coal Co., also will speak, as will J. A. Morris, chairman of the operating committee of the American Railway Association, whose subject will be "The Railroad Outlook." Headquarters will be at the Sinton Hotel.

Automobiles will be provided for all visiting ladies both for shopping and sightseeing. The entertainment program for the members will include a barbecue and other features. Nothing will be left undone to make the meeting a success.

Coal-Mine Fatalities Drop in March

Fatal accidents to employees at coal mines throughout the United States during March, 1923, according to reports received by the U. S. Bureau of Mines from state mine inspectors, numbered 168, as compared with 296 in February, 1923, and 196 in March, 1922. The fatality rate was 2.99 per million tons, based upon a production of 56,205,000 tons in March, as against a rate of 5.93 for February of the present year and 3.34 for March a year ago.

During the first three months of 1923 661 fatalities have occurred at coal mines, representing a fatality rate of 4.01 per million tons based upon an output of 164,999,000 tons of coal. In the corresponding three months last year the fatality rate per million tons was 3.95, the fatalities numbering 593 and the production of coal being 150,098,000 tons. The fatal-accident rate for March during the ten years 1913-1922 has averaged 4.06 per million tons.

An explosion of coal dust on March 2 at a mine at Arista, W. Va., resulted in the death of ten men. This explosion brought the number of "major disasters" for the present year to 3 with a loss of 135 lives, while the first three months of 1922 showed 6 similar disasters with 71 lives lost.

Comparing the fatalities by causes for the first three months of 1923 with the corresponding period of last year, the figures for 1923 show reductions in the fatality rates per million tons from falls of roof and coal, haulage, and explosives. The rate for electricity has remained practically unchanged, while that for gas and dust explosions has increased about 66 per cent. The comparative fatality rates per million tons for the three-month periods were:

	1922	1923
Falls of roof and coal	1.819	1.703
Haulage	.760	.570
Gas and dust explosions	.600	1.000
Explosives	.193	.121
Electricity	.106	.103

COAL-MINE FATALITIES DURING MARCH, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface								Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	5		1					2					8													8	6
Alaska																										0	0
Arkansas																										0	0
Colorado		1	2										3													3	25
Illinois	5	1	2	2									10													10	12
Indiana			2	1	2								5													5	4
Iowa	1												1													1	3
Kansas				3									3													3	1
Kentucky	3	1	1	1									6													6	8
Maryland	1												1													1	0
Michigan										1			1													1	0
Missouri	1							1					2													2	1
Montana	1												1													1	1
New Mexico																										0	2
North Dakota																										0	0
Ohio	4											1	5			1		1		1			1		2	8	11
Oklahoma																										0	1
Pennsylvania (bituminous)	11	4	4			3		2				1	25	1				1	2				1	2	5	31	27
South Dakota																										0	0
Tennessee	2												2													2	2
Texas																										0	0
Utah	1		1	2									4													4	3
Virginia	1		1										2													2	2
Washington	1												1													1	2
West Virginia	17	2	4		10	1							34								1				1	35	32
Wyoming	2												2													2	2
Total (bituminous)	56	9	18	9	12	4		5		1		2	116	1		1		2	2	1	1		2	2	8	126	145
Pennsylvania (anthracite)	15	7	6		1	3						1	33	1	1			2	1					6	7	42	51
Total, March, 1923	71	16	24	9	13	7		5		1		3	149	2	1	1		4	3	1	1		2	8	15	168	
Total, March, 1922	77	15	38	10	18	10		5		3		5	181	2		1		3	2	1	3		2	4	12		196

No Coal Stringency in Interior of Germany After Three Months' Occupation of Ruhr

By H. O. Herzog

Berlin, April 12, 1923.—More than three months having elapsed since the occupation of the Ruhr began a comprehensive survey of the German coal situation resulting therefrom in the occupied zones and in the German interior is possible. From the beginning a policy was adopted of keeping up production as far as possible and of employing men not actually engaged in production in clearing up, repair and development work, to a large part at the expense of the state. After the first turmoil had passed production settled down to a rate of about 70 per cent of normal, which since then has slowly but steadily shrunk.

From the beginning of the occupation on Jan. 11 to the end of January, when the blockade of the Ruhr came into force, the fuel ready for shipment was rushed to the German interior. Since then shipments by rail have dwindled by degrees to an average of 35,000 tons per day, or 12 to 15 per cent of normal. This is attributed to disorganization of the railway system. In the main the shipments go to Italy (to which country the reparation supply is maintained), to Holland and Switzerland in fulfillment of standing export contracts, and to consumers in the occupied parts. Shipments by water have almost stopped, the most important water-way, the Rhine-Herne Canal, having been blocked by two scuttled coal barges.

In addition to the officially recorded shipments a large part of the output is shipped over private junctions and by road vehicles to large consumers in the proximity, chiefly cokeries and iron works. Cokeries are so well supplied that during the three months of occupation they have been able to maintain their usual rate of production. Consumers have taken up rather more than their requirements in order to relieve the already congested pitheads. Nevertheless accumulations of coal and coke were estimated at the end of March at nearly 7,000,000 tons.

Organization Efforts of French Futile

This has been accomplished in spite of efforts by the occupying force to organize the removal of fuel. These efforts were first concentrated on the transportation problem, which presented far greater difficulties than had been anticipated. The German railway force lends no help whatsoever in this respect; on the contrary, carefully devised acts of sabotage are found a great hindrance. The automatic control employed in the network of railway lines in the Ruhr lends itself particularly to such a policy of obstruction. All junctions in the heart of the district are controlled from a central station, which has most effectively been put out of gear. The congestion of traffic in this part of the district has become so great that it defies all remedial efforts under present circumstances. It will take many weeks after the restoration of normal conditions to disentangle it. Conspicuous in the jam are a large number of fully loaded coal trains which neither party is able to shift one inch.

In view of such conditions the occupying force has restricted its efforts to the northern part of the system, which, being detached from the network in the interior, offers the least difficulties. Of the 1,600 miles of railway lines in the Ruhr about 400 miles have been put into commission by the occupying force. Service at a greatly reduced extent is maintained on them by makeshift methods. Similar conditions prevail with regard to the loading operations. The passive resistance in this respect is highly organized.

When the mines receive warning of approaching seizure, the hoisting and conveying machinery is rapidly but effectively put out of gear and its connection with the power house is severed. Essential parts are removed and hidden. To replace them is nearly impossible without an intimate knowledge of their design. In consequence the alien engineers have to resort to the most primitive methods of loading —by shovels, baskets and wheelbarrows. The headway made is therefore extremely slow. According to an official German statement the total of fuel removed by the occupying force from the beginning of the occupation up to the end of March amounts to 230,000 tons of coal and coke compared with a preoccupation supply which for the time indicated would have been 4,200,000 tons.

When it is remembered that 500-ton trains used to leave the Ruhr for France and Belgium at intervals of 10 minutes during 20 hours of the day and that nearly one-fourth of the German working force was employed for these shipments, it seems impossible that more than a small fraction of the usual reparation supply can be removed while passive resistance is in force in the entire district. No wavering in the resistance is observable; on the contrary, occasional acts of sabotage are committed such as the destruction of the Rhine-Herne Canal, which was about to be reopened to traffic. The concrete structure of the canal spanning the river Emscher was blown up at the point of crossing, the canal thus being laid dry for many months.

German Interior Gets No Ruhr Coal

The situation in the German interior, against which the Ruhr blockade is chiefly directed, has withstood the strain considerably better than could have been expected. The fact is clearly shown that the coal reserves in the country at the beginning of the occupation were much larger than was commonly assumed and officially stated. Since the end of January no Ruhr coal has reached the German interior, except the output of several mines in a detached area east of the occupied zone, having an average output of 400,000 tons of coal and 100,000 tons of coke per month, which has been gradually increasing. Apart from these mines the German supply rests now solely on the output of Upper Silesia, Lower Silesia and Saxony, in addition to the Central German brown coal output.

The three coal fields named produce a combined monthly average of 1,600,000 tons of coal and 230,000 tons of coke. Efforts to increase this output by overtime and work on Sundays have failed, indicating that the labor situation is not so well in hand as official announcements proclaimed. It showed in February even a drop compared with the January output. In March a larger falling off was noted owing to strikes in Upper Silesia. Production of brown coal has been increased slightly, but the remarkable fact developed that the increase was not readily absorbed by the market.

Imports have in no way assumed unusual proportions. The expected wild rush for foreign coal has not materialized, although British coal was temporarily cheaper than German. Total coal imports in January were 1,870,000 tons, which corresponds with the average of the latter part of last year. Five hundred and forty-two thousand tons of this came from Great Britain and 1,230,000 tons from Poland. The size of the latter quota is unusual. A considerable part of it came from Poland proper. As the amount exceeds the usual surplus available for export from both Polish Upper Silesia and the Dombrova basin combined it cannot be considered a permanency, especially as Austria, Hungary and Italy in part, as well as other small surrounding countries are dependent on the Polish supply. It was obtained by Germany by rushing all available rolling stock to the mines, thereby outdistancing other bidders that are not in so fortunate a position. Imports from Poland have since fallen to the normal of about 600,000 tons per month.

British imports, on the other hand, have risen to over 1,000,000 tons. The supply of Bohemian brown coal, which approaches in quality the low grades of bituminous coal, has been increased to nearly 300,000 tons per month. Dur-

ing March British imports further increased. In addition a number of orders were placed with the American market. The first consignment of American coal of 12,000 tons arrived early in April. South Africa is under consideration as a further source of supply. Negotiations in this direction have led to business on a small scale.

Imports during the first three months of the year averaged 2,000,000 tons per month. Only a small part of this quantity can be looked upon as in substitution of the 4,000,000 tons of coal and coke usually supplied by the Ruhr, unless it be assumed that last year's imports were not for actual demand but as a provision against an emergency like the Ruhr occupation, which indeed has been an impending danger for nearly two years. This assumption is corroborated by the fact that after three months of Ruhr occupation no actual stringency in the German interior is in sight. Husbanding measures by the authorities are peculiarly absent; as an illustration it may be mentioned that the embargo put on coal-tar products has been lifted on the ground that the coal situation turned out to be more favorable than had been previously assumed.

There is not the shadow of a doubt that the coal situation during the first months of the occupation has been largely supported by reserves. German demand will therefore become more pressing as these reserves dwindle. On the other hand consumption is gradually decreasing in proportion to the growing business depression. The latter is in no way a consequence of the Ruhr occupation, as is frequently supposed erroneously, but is chiefly due to the marked stabilization. In this respect the situation gives signs of growing distress. German imports have increased largely as the result of the artificially high mark rate, which has forced German prices above the world market level. Exports are declining in equal proportion, thus further widening the gulf in the country's foreign trade balance. The present situation is maintained under an enormous financial strain, evidenced by the rapidly rising flood of internal indebtedness. The government's scoop on the hoarders of foreign money by the mark stabilization combined with a severe curtailing of credits has considerably weakened the financial position of the industry. The question of how long Germany can maintain her front has become chiefly a financial problem. It can clearly be seen that Germany's remaining strength is being spent at a rate which she cannot hope to maintain much longer.

Northwest Rate Fight Starts This Week

The battle before the Interstate Commerce Commission over Northwestern coal rates was scheduled to start on Wednesday of this week at Minneapolis in hearings on five complaints. The dock operators are appealing for an increase in rail rates to the Northwest from Illinois, Indiana and Midwestern fields and the states thus attacked are lining up their defense.

The case of the dock operators has been pretty well explained to the U. S. Coal Commission so that the Illinois and Indiana men go into the hearing feeling they know what sort of ammunition their opponents are going to use. They have kept a tight mouth about their own case but they expect to tell the commission that they see no reason for making the people of the Northwest pay higher prices for coal just because the docks cannot meet rail competition. Furthermore, they will point out that the docks are not robbed by rates of quite as much territory as they claim although it is a fact that Illinois coal can be laid down in the Twin Cities for approximately 50c. a ton cheaper than dock coal. North of that point the field is a fair one with no favors, though the dock men will point out that Illinois coal can reach Minneapolis for $3.46 and then proceed to Duluth for an additional 31c. whereas it costs $1.82 to ship a ton from Duluth down to Minneapolis.

The case is an extensive one and may take a month for the first hearing alone. The further procedure that invariably follows in such a case is bound to drag it along for months if not for years. Illinois men are saying that it is foolish for Northwestern buyers to delay purchasing in the hope that a new rate schedule will be worked out this summer.

Docks are not buying heavily for summer stocking yet, but this is attributed to the many consolidation deals that still impend. No dock owner wants to be caught with heavy supplies on hand if he is to be absorbed in a combine.

Illinois Legislators Angered at Herrin Officials in Public Quiz

Dumbness, bad memory, evasion, defiance and all other sorts of defence which officials of "bloody Williamson" County raised last week to protect themselves in a public investigation at Marion, Ill., did not discourage a legislative committee which is trying to find out why troops were not sent to Herrin last summer in time to prevent the massacre. The committeemen grew irate and verbally flayed two or three of the witnesses and learned little that is valuable to them, but they did not give up the job. Warned that they had better stop such an investigation lest something happen to them, the committeemen declare they will take the investigation up the state to Springfield, the capital, and there compel full testimony or inflict grievous punishment.

Under questioning by the committee three men who were deputy sheriffs at the time of the massacre brazenly said they did not do anything to stop the attack on the Lester strip mine at Herrin because they did not know anything was going on. One man declared he did not intend to tell the committee anything either in Marion or anywhere they might summon him. Melvin Thaxton, who was sheriff at the time but who is now County Treasurer, could not satisfactorily explain to the committee why he had told Colonel Sam Hunter, of the state militita, that he had twenty deputies ready when as a matter of fact he had only three, nor why he considered the riot situation "in hand" while an armed mob marched unhampered to its bloody work, nor why he went away on the morning of the massacre, nor anything else. His answers were bland and dull.

Though it was plainly evident all week to the legislators that they were extremely unwelcome visitors in Williamson County, and mutterings were heard on all sides, they stuck to their job and quizzed every witness they could get. Some "could not be found."

Among other witnesses was Delos Duty, State's Attorney, who helped conduct the murder cases against two groups of the many United Mine Workers indicted for murder of the twenty-two non-union strip miners killed after they had surrendered under their flag of truce. Duty admitted he knew the night before the massacre that two union men had been shot down near Carbondale, a few miles from Herrin, by somebody, presumably guards of the imported strip miners. Yet in spite of that he told the committee he did not think the situation was as serious as it turned out to be and therefore he did not insist upon state troops coming in. He said Colonel Hunter that evening telephoned Adjutant General Carlos Black that "all was quiet." Colonel Hunter denies this telephone report to General Black and took a member of the committee to the local telephone office, where no record of such a call on that night was to be found.

William H. Warder, an old attorney of Marion and regarded as a most substantial citizen, told the committee that he was active before the massacre in trying to organize a citizens' committee to prevent trouble. He said that if he had been the adjutant general of the state he would have gone to Herrin personally on the strength of the grave reports which he knew Colonel Hunter turned in. He praised that officer for his efforts to get troops to the scene of trouble.

"Do you believe that troops could have prevented what happened?" a committeeman asked.

"If properly handled, yes. If not, they might have caused something much worse," he replied.

All in all, the legislative committee thus far has discovered little in the quest to learn why troops were not sent to Herrin after Colonel Hunter "repeatedly" asked for them. Adjutant General Black insists Colonel Hunter made no such requests. Witnesses in Williamson County have testified on both sides of this point. Some heard Colonel Hunter picture the situation as exceedingly dangerous and others heard him say "all is quiet." Adjutant General Black is trying to dismiss Colonel Hunter from the service.

Increase of 2,000,000 Tons per Month in Continental Demand for British Coal Laid to Ruhr Occupation

The occupation of the Ruhr and the practical elimination of Ruhr coal from European markets is causing an added demand of more than 2,000,000 tons of British coal per month for Continental consumption, according to a statement prepared by the Western European Division of the Department of Commerce. The statement continues:

"British coal exports are increasing and the price of coal is rising. The quantity available for domestic consumption is considerably in excess of last year. Production in the British iron and steel industry is now 50 per cent in excess of the 1922 figures and only slightly below the pre-war average. In the face of these facts, the loss of production during the Easter holidays, amounting to nearly 3,000,000 tons, is considered important.

"In 1922 British coal production amounted to 252,000,000 tons, of which 82,000,000 were either exported or used for foreign bunkering, leaving 170,000,000 for home consumption, an average of 3,150,000 tons per week. During February an average of 5,537,000 tons was produced weekly, of which 1,925,000 went abroad, leaving 3,612,000 for home consumption. In March an average of 5,510,000 tons was produced weekly, of which 1,930,000 tons went abroad, leaving 3,580,000 tons for home consumption. March exports of coal amounted to 7,180,000 tons. For February and March the margin of coal for domestic consumption was only 14 per cent above the monthly average for 1922, while demand for coal has increased to a much greater extent.

"One method of calculating the increased demand is a comparison of steel production. The monthly average production of steel ingots and castings during 1922 was 486,000 tons. In January 624,000 tons were produced, or 30 per cent above the 1922 average. In February 707,100 tons were produced, or 48 per cent above the 1922 average. In March 802,500 tons were produced, or 65 per cent above the 1922 average. With the steel industry producing at a rate more than 50 per cent above last year's average and coal production but 15 per cent increased, it is considered not surprising that coal prices have risen until the best grades of South Wales coal are quoted at over £2 a ton for export.

"The increased Continental demand for British coal during February was partly accounted for as follows: France imported 1,375,000 tons, 375,000 above the average before the Ruhr occupation; Italy imported 675,000 tons, or 175,000 above previous imports; Germany imported over 1,000,000 tons, or 250,000 more than the average during 1922; Belgium imported 425,000 tons, while previously almost no British coal was consumed in that country. Additional shipments for German account probably are contained in the figures for Holland and Denmark, while these countries used increased quantities of British coal on their own account in place of supplies previously obtained from the Ruhr. In March France and Germany each imported 1,800,000 tons of British coal, or a combined excess of 1,750,000 tons above the 1922 monthly average. While the situation in the Saar basin is partly improved by the return of some of the strikers to work, production is still below normal. This causes additional demand upon the French coal reserve. Altogether, it is apparent that as long as the Ruhr deadlock continues, western Europe is facing a probable net shortage of coal, which provides an opportunity for shipments from the United States. Under these circumstances, the loss of production in Great Britain due to the Easter holidays is significant.

"For the week ending March 31 British coal production was 4,874,000 tons; for the week ending April 7 it was 3,941,000 tons a combined net loss of almost 3,000,000 tons from the average figure of 5,700,000 tons per week previously maintained. However, the latest returns show that during the week ended April 14, 5,776,000 tons were mined, the largest weekly output in the last four years."

Merge Five Pittsburgh Coal Companies

The Bertha-Consumers Co. was organized in Pittsburgh, Pa., April 25, representing a merger of the Bertha Coal Co., the Consumers Fuel Co., the Consolidated Fuel Co., Marshall Fuel Corporation and the Jewel Coal Co.

The new company has a capital of $10,000,000, and the annual production at present is 6,000,000 tons, with immediate development contemplated to existing properties to make it 8,000,000 tons. There are twenty mines involved, and 40,000 acres of coal land, located in Pennsylvania, Ohio, West Virginia and Kentucky. The combined organization has 1,000 stockholders.

John H. Jones, of Pittsburgh, is president and founder of most of the companies merged. Most of the companies were of themselves mergers of smaller companies in the past. The merger becomes immediately effective, and is one of the largest that has taken place in the Pittsburgh coal fields in years. The general offices of the company are in Pittsburgh.

Head of Williams & Peters Dies

Richard H. Williams, of the coal firm of Williams & Peters and also a director of the Federal Reserve Bank of New York, died Saturday, April 28, at his home, 4 West Fifty-first Street, New York City, after a short illness. He was in his sixty-ninth year. He was born in New York City and was educated at private schools and at Columbia University. After leaving college he helped to organize the firm of Williams & Peters, coal dealers, at 1 Broadway, and was its senior member at the time of his death. Since 1885 the firm has handled the anthracite business of the Erie R.R., which includes the Pennsylvania Coal Co.

On being appointed to the Federal Reserve Bank directorate, Mr. Williams resigned as a director of the National Park Bank and the Fulton Trust Co. He was a director of the Pennsylvania Coal Co., a director and member of the executive committee of the Equitable Life Assurance Society, a director and member of the finance committee of the Atlantic Mutual Insurance Co., and a director of several other corporations. He was generally known as a banker rather than as a coal man.

He was a member of the Sons of the Revolution and the Mayflower Descendants and also held membership in many clubs.

Mr. Williams leaves a wife, who was formerly Miss Sarah Welford Peters; a daughter, wife of the Hon. Cecil Campbell, of London, and a son, Richard H. Williams, Jr., of New York City.

Funeral services were held Monday morning at 10 o'clock at Grace Episcopal Church, Broadway and Tenth Street.

Commission Issues Retail Questionnaire

Through its retail section the U. S. Coal Commission has sent to retail dealers a new questionnaire designated R-70, which requires among other data, the form and date of organization, and the names of officers, directors and stockholders. Later pages ask for a copy of the balance sheets, profit and loss statements and the amount of loans outstanding for the years 1918 to 1922, inclusive.

Costs are classified under three general heads: general and administrative expenses, yard expenses and delivery expenses, with twenty-six separate items distributed among these three main heads.

WE DON'T NEED a nationalization of the coal industry, but we do need a rationalization of the coal miners.—*Cleveland Times.*

Midwestern Coal Sages Foresee Good Summer and Autumn Business

There is some optimism among midwestern wise men of coal. They look forward to the summer with hopes of a steadily though slowly rising market and of the movement of more summer coal than ever before. There are several reasons assigned: The "stock-now" propaganda is beginning to have a slight effect already. Most coal buyers can see for themselves that railroads probably will be jammed with freight next winter and unable to handle a tremendous volume of coal in the cold months. Nobody knows whether the soft-coal miners will strike again next April or whether the anthracite men will choose to quit Sept. 1. It will soon dawn on the country that in view of the present conditions of transport and coal demand prices are now at rock bottom and there is no point to waiting for another drop.

The "stock-now" campaign, strenuous though it has been officially, is only just beginning to sink in where it will do the most good. For instance, the railways announced they were going to stock heavily during the summer starting at once so as to get much of their own coal off the lines before the autumn rush. Few have done anything about it. In the Middle West the Burlington is the first to act, principally because President Hale Holden was one of the men most active in the stocking program recommended to all roads. His company is now busily putting 500,000 tons on the ground at various points from Chicago westward. The Wabash is putting down 200,000 tons, which represents only thirty days' normal consumption. Most other roads in the middle section of the country are only talking about it. It is believed they will all act soon, however.

Car-loading reports running over 900,000 cars a week are pretty good arguments to support the statement that railroads are going to be so busy the rest of the summer that nobody can count on them being anxious to haul a great burst of coal next autumn, when general freight is almost sure to be even heavier than it is now. This fact also is sinking home on coal consumers. While there appears to be plenty of coal equipment ready for the use of mines right now, the fact is that if any considerable number of mines now shut down were to reopen, this supply, running up to 100 per cent in spots such as on the Illinois Central in western Kentucky, would be stretched out thin. This is one of the reasons why prices show a tendency to turn and rise, though they still remain low throughout the Middle West.

As one sales manager of a great company sees it: "We'll have a steadily rising business from June 1 to Dec. 15. Then there will be a drop. We will be wondering where our usual winter market is. It will have been filled in advance. This country is going to see the greatest stocking movement in years. Already it is starting among retail dealers in the bigger cities, and it will spread."

They Sling Mud at Each Other in the Illinois Union of Brotherly Love

John L. Lewis, president of the United Mine Workers, is not the only mine union leader who has his Brophy. Frank Farrington, president of the Illinois miners, has his in the person of John J. Watt, secretary-treasurer of the union sub-district centering at Springfield, Ill. Watt has worried Farrington politically at every opportunity. Recently he made a veiled charge that Farrington was mishandling the Herrin defense fund of 1 per cent per month assessed against every Illinois union miner, which now totals $800,000, according to Watt. This was grounds for an appeal to President Lewis to unseat Farrington.

Reaching that point, the row broke out in full-page advertisements in Springfield papers. Watt challenged Farrington to debate "The Evils of the Present Illinois Compensation Law," declaring the Ohio compensation law is better and should be adopted in Illinois. Farrington shied around the debate, charging Watt with being an "under-cover man," treacherous to the union and planning to try to cause a wildcat strike in Illinois so as to shatter the union organization. Watt replied with various and sundry squirts of mud, bringing to light the fact that John L. Lewis said that Farrington, Vice-President Fishwick and Robert M. Medill, director of the Illinois Department of Mines and Minerals, split money three ways in return for making a compact with William J. Lester permitting Lester's company to strip the coal whose ultimate loading caused the Herrin massacre.

And so the battle goes merrily on in the papers, leading from one subject to another, at so much a page, with the membership of the United Mine Workers as the bleachers crowd looking on and hooting approval of the hot shots and violent epithets each union official casts at the other under the salutation: "Dear sir and brother." A pleasant time is being had by all.

J. P. Cameron, Pittsburgh Operator, Dies

John P. Cameron, forty-three years old, a member of the Pittsburgh coal firm of Crawford & Cameron, died suddenly of pneumonia Monday, April 23, at his home in Pittsburgh. He had been ill only three days.

Mr. Cameron was born in Houtzdale, Pa. In 1911 he became associated in business with L. F. Crawford, handling electrical mine supplies. He was president of the West Branch Mining Co., a director of the Peale, Peacock & Kerr Co. of New York; vice president of the Lindley Coal Co., a director and treasurer of the Jefferson Gas Coal Co., a director and treasurer of the Jefferson Coal & Coke Co., a director of the Goodman Manufacturing Co. of Chicago, and was president of the Royal Coal Co. During the war Mr. Cameron was a member of the Fuel Administration, stationed in Altoona.



JOHN P. CAMERON

Mr. Cameron leaves one son, William R. Cameron; three brothers, A. P. Cameron, of Irwin, Pa.; S. P. Cameron, of Girard College, Philadelphia, and William R. Cameron of Philadelphia, and five sisters, Mrs. George S. Ramsey, of St. Mary's, Pa.; Mrs. H. R. Hoard, of Philadelphia, Mrs. George H. Gearhardt, of Lexington, Ky.; Miss Anne R. Cameron, of Philadelphia, and Miss Christine M. Cameron, of Philadelphia.

Government Fuel Yards Ask Coal Bids

Bids for furnishing 201,800 tons of low-volatile coal to supply the fuel requirements of the Government Fuel Yards in Washington, D. C., were asked April 28 by the U. S. Bureau of Mines.

The total tonnages and the kinds of coal required are as follows: 4,750 tons New River nut and slack through 2-in. screen; 170,500 tons New River run-of-mine; 25,000 tons Maryland, Pennsylvania, or northern West Virginia run-of-mine; 1,600 tons gas over ¾-in. screen. Under the specifications, deliveries must be made during the period from June 1, 1923, to March 31, 1924.

Bids to furnish the coal required will be opened by the Chief Engineer of the Government Fuel Yards May 15, at 2 p.m.

REPRESENTATIVES OF FEDERAL FUEL DISTRIBUTOR WADLEIGH have completed their studies of the question of community coal storage in Chicago and began similar studies in Indianapolis this week.

Coal Commission Seeks Means to Prevent Strikes; Hammond Deprecates Government Control

By Paul Wooton
Washington Correspondent of *Coal Age*

An impelling reason why operators and mine workers should devise means to reduce the possibilities of coal shortages is the growing conviction that emergencies in the future will be met in a more drastic way than were those of the past. The President's Coal Commission is urging that constructive suggestions be brought forward. The way now is open for anyone to suggest how mine operators and mine workers can live together with less discord. It is admitted that if there were no coal strikes, coal emergencies would be few. If there is no assurance that strikes are to be fewer, probabilities seem to point to the proposal of legislation which would set up special machinery which could be called into use whenever an emergency threatened. There is reason to believe that experience during the emergencies of the last few years has been such as to condemn any halfway measures. The organization that may be proposed most likely will be along the lines suggested by General Goethals, that is, to empower the President to appoint a fuel administrator in the face of an emergency. Such an administrator would have the powers of a dictator whose orders could not be interfered with by the Interstate Commerce Commission or any other federal body or official, save the President himself.

The members of the Coal Commission who just have returned from a visit to the anthracite region saw much in which they were interested. Chairman Hammond declares that the engineering practice among the large anthracite producers is splendid and is much ahead of that in the bituminous fields. The physical production of anthracite, he stated on his return, is handled so well that no radical improvement can be suggested or expected. The mining is well done and he doubts if any material economies can be effected under present conditions. He pointed out, however, that his observation is a general one and is not based on the detailed study, the results of which will be available later, being made of the coal that is left unmined.

The existing machinery for conciliating differences between operators and their employees impressed Mr. Hammond very favorably. While in the anthracite field, however, he heard some complaints that the time required to pass upon grievances is excessive. The commission will discuss the possibilities of making suggestions for the improvement of conciliation procedure and will consider whether or not such machinery could be employed to advantage in bituminous districts.

The main difficulty in anthracite comes in its distribution, Mr. Hammond said. Unnecessary turnovers result in high prices to the ultimate consumer. This reference was independent of the question of royalty. No attempt was made on the anthracite trip to investigate that factor in anthracite costs. This is to be taken up actively. Among those who will be heard on the subject is Senator Pepper, of Pennsylvania.

Mr. Hammond expressed particular interest in the stripping operations. He saw no evidences of destitution at any point visited by the commission. There were some indications of lack of thrift on the part of some of the anthracite workers. He spoke favorably of the housing provided by the companies, but did observe some bad housing conditions in the small towns outside of company jurisdiction. The members of the commission climbed around some underground, but Mr. Hammond is not strongly impressed with the advantages gained from such visits. They are necessarily hurried and it is probable that such trips into the bituminous fields will be limited.

The members of the commission discussed the labor situation with representatives of the operators and of the miners and urged them not to wait until the last minute to reach an agreement. Mr. Hammond's personal conclusion is that an amicable settlement will be reached.

Amplifying the thought expressed the week before by Governor Marshall, Chairman Hammond voiced the hope that the commission will receive more constructive suggestions now that it is reaching the point where conclusions must begin to take shape. He said that he does not want to see nationalization of mines or any more government control than is necessary. He suggested that leaders among the mine workers and among the operators arrange conferences in the hope of ironing out some of their internal troubles.

During the course of Saturday's conference Mr. Hammond reiterated his belief in storage. He still believes greater elasticity in operation can be effected if some storage is provided at the mine mouth. He commended the policy being pursued by the public utilities in providing ample reserves of coal.

Exchange of Trade Information Through Associations Again Up in Supreme Court

Arguments were presented April 25 and 26 before the U. S. Supreme Court in the case of the government against the American Linseed Oil Co. and others, involving the right of business to exchange trade information through associations or through private bureaus acting as clearing houses for such data. The case is considered to be the most important to trade associations since the hardwood lumber case, but it involves different questions than the latter.

The federal government alleged that by exchanging various forms of information which were distributed as statistics by the Armstrong Bureau of Related Industries the defendant linseed oil companies created a condition tending to prevent competition in prices of their product. The U. S. District Court for Northern Illinois, where the suit originally was instituted in 1921, held for the defendants and ordered the suit dismissed, the government appealing.

In arguing before the Supreme Court, Special Assistant Attorney General James A. Fowler declared that daily and instantaneous price reports were sent the bureau by the linseed oil members, and relayed back to the members by the bureau, charging that each day each member knew the prices quoted by his competitors.

Thomas M. Debevoise appeared as attorney for the American Linseed Oil Co. and John Walsh, formerly chief counsel for the Federal Trade Commission, appeared in behalf of the Armstrong Bureau and other defendants. They argued that while various statistical information was exchanged through the bureau, there was no restriction of output and no combination or agreement as to price. Prices of the oil followed the flaxseed market, they argued. The right of business corporations to compile statistics on which to base judgment was upheld, they contended, by the fact that the Department of Commerce gathers and distributes statistics of business.

The Quartermaster General of the Army has called for bids, to be opened May 9, covering the following coal requirements: Fitzsimmons General Hospital, Bunell, Colo., 1,000 tons; Fort Sam Houston, 3,000 tons.

Bids to be opened by the Army on May 3 cover the following coal supplies: 3,000 tons for Rock Island Arsenal; 1,000 tons for Fort Riley, Kan.; 3,650 tons for Fort Leavenworth, Kan.; 2,000 tons for Fairfield Air Depot, Osborn, Ohio; 1,000 tons for Fort Benjamin Harrison, Ind.; 600 tons for Fort Crook, Neb.; 700 tons for Fort Des Moines, Iowa; 1,000 tons for Fort Omaha, Neb.

Take Coal Cases to Supreme Court

Three coal cases involving the U. S. Government have reached the U. S. Supreme Court. In one case the government has filed a motion to dismiss the appeal of the Corona Coal Co. in a suit for additional compensation for coal requisitioned by the Railroad Administration. The coal company brought an action in the U. S. Court of Claims for $107,431.99, the difference between the contract price and the Fuel Administration price.

In the other two cases the Supreme Court has signified its willingness to hear arguments in the actions brought by Willard Sutherland Co. and by William C. Atwater & Co., Inc., against the United States, the question at issue being whether certain contracts with the Navy Department are to be considered "requirements" contracts and whether under them companies can be required to furnish excess tonnage at the contract price.

Never Averaged 200 Days Work per Year, Says Union Plasterer

Interesting evidence on the irregularity of employment among plasterers was brought out April 24, in the Criminal Branch of the New York Supreme Court, where thirty-six members of the Plasterers' Union, Local 60, are on trial, charged with conspiracy in connection with building operations in New York City from 1920 to 1922. Michael J. Colleran, president of the union and also president of the new Building Trades Council, testified that there were less than 200 working days in the year for plasterers.

As "irregularity" and "seasonal nature of the industry" never fail to play a prominent part in criticism and investigations of the coal industry, the following excerpts from Colleran's testimony should prove of more than passing interest:

Q—Under Art. 10 of the constitution with relation to wages, Sec. 2 of that article provides that your men are only to work on Saturday a half day. Now what I want to know is if the men only work a half day on Saturday, do they get a full day's pay or do they only get paid for a half a day?

A—For a half a day.

Q—And any of these holidays that have been enumerated, are those holidays with pay, or holidays without pay?

A—Without pay.

Q—Now, I also asked you before concerning the amount of time—the amount of days—that you in your experience, estimated that the men could work in the plastering industry. Will you give me the figures on that again?

A—Do you mean approximately how many days a plasterer can work?

Q—Yes, during the year.

A—During the year. I will have to in my own way do that.

The Court—Hasn't that been figured by the State Labor people? Somebody said 210 days.

Mr. Goldstein—The State figured it out but I want to show how he arrives at his figures.

Witness—There is 52 Sundays on which there is no work done. There is 52 Saturdays which would constitute half a day, which would constitute 26 whole days. There is eleven holidays. A total of 89. There is 89 days that work is not to be done at all. Eighty-nine from 365.

Mr. Untermyer—You mean except as overtime.

Witness—With the exception of overtime. That is 276 days. Our trade being a seasonable trade, you take the months of December and January. After we leave this commercial district and go out into the apartment houses and so forth, those two months are practically nil as far as work is concerned. That would be sixty days taken from that, which would make 217 days.

The Court—We have already taken out eight of those for Sundays and Saturdays.

Witness—Yes, that is counting those in.

Mr. Untermyer—That is besides the holidays.

Witness—Yes, I am bringing it down to show that around 210 days would be the approximate of all the days that a man could work if he had the work to do, and then when you figure in the heat of the summer, when the laborers quit, you lose a day or two days. In the spring of the year when it rains, the laborers quit, you lose one or two days, that is in a week—one or two days in a week—and also when the job is complete you are laid off, requiring you to go out the next day and look for a job. Taking all those into consideration you do not make 200 days. I think I worked about as much as any plasterer in the organization when working with the tools, and I never averaged anything over that.

Charge Dock Operators with Monopoly

The Northwestern Coal Dock Operators' Association, Minneapolis, Minn., its officers, directors and members have been cited in formal complaint by the Federal Trade Commission charging a conspiracy to suppress competition and create a monopoly in the sale of anthracite and bituminous coal at wholesale and retail in the Northwest territory. The complaint alleges both a violation of the Federal Trade Commission Act, because of unfair competition, and of the Clayton Act by reason of price discriminations. Thirty days are allowed to file answer, after which time the case will be set for trial.

It should be borne in mind that the issue of the commission's complaint is merely a citation which states the commission's reason to believe, based upon preliminary inquiry, that the charges of the complaint are true; in other words, the complaint simply initiates a proceeding to get at the facts in an orderly legal manner.

The officers and directors of the association named as respondents are: President, W. W. Broughton; Vice-President, J. L. McMahon; Secretary, W. A. Prinsen, and directors W. W. Broughton, Peter Reiss, H. E. Smith, E. N. Saunders, Jr., E. A. Uhrig, J. L. McMahon, F. G. Hartwell and W. H. Goodwin. The members of the association named as respondents are Pittsburgh Coal Co. of Wisconsin, Minneapolis, Minn.; Northwestern Fuel Co., St. Paul, Minn.; C. Reiss Coal Co., Sheboygan, Wis.; Clarkson Coal & Dock Co., St. Paul, Minn.; M. A. Hanna Coal & Dock Co., Cleveland, Ohio; Carnegie Dock & Fuel Co., Pittsburgh, Pa.; Berwind Fuel Co., Chicago, Ill.; Northern Coal & Dock Co., St. Paul, Minn.; Great Lakes Coal & Dock Co., Minneapolis, Minn.; Pittsburgh & Ashland Coal & Dock Co., Cleveland.

It is stated in the complaint that the respondent companies are the largest distributors of both anthracite and bituminous coal in the Northwest territory and handle in the aggregate approximately 80 per cent of all coal passing over the docks of Duluth, Minn.; Washburn, Ashland, Superior, Sheboygan and Milwaukee, Wis. The "Northwest territory" as described in the complaint comprises the States of Minnesota, Wisconsin, North Dakota, South Dakota and portions of Iowa and Nebraska. Retail branches are maintained by respondent in the cities of Duluth, St. Paul and Minneapolis. It is in this territory that the commission has reason to believe that the respondents have suppressed competition and are obtaining and maintaining a monopoly.

Among the practices of the respondents which are challenged in the complaint are (1) circulation among the respondents of suggested price lists and official price lists before they are actually issued, it being generally understood that the prices so submitted would be maintained by the respondent companies issuing same; (2) circulating lists of retail dealers to whom the respondent refused to sell for any reason whatsoever with a key indicating the reason for such refusal to sell; (3) selling coal in the cities of St. Paul and Minneapolis at prices less than received for the same grade of coal at the same time in the same quantities in Duluth, Minn.; (4) arbitrarily cutting the price of bituminous coal to compel competitors to join the association and to cease selling below the respondents' list price and subsequently arbitrarily raising the price of coal after competitors had joined the association; (5) using a uniform contract with retail dealers and large consumers prohibiting the purchaser from diverting or using the coal for other purposes than outlined in the contract; (6) refraining from soliciting certain municipal business, recognizing such business as the prospect of the local retail dealer; (7) refusing to sell or ship coal to retail dealers in the country trade not equipped with the usual equipment of a retail coal dealer.

Sign New Wage Agreement in District 10

District 10, United Mine Workers, and the five remaining union coal companies in the State of Washington have signed a new wage agreement which will run until March 31, 1924, the basic rate being $7.50 for daymen instead of $8.25, which the miners desired. Work was resumed May 1.

Bituminous Operators' Committee Asks Probe of Miners' War Chest

Investigation of the uses made of an alleged $15,000,000 annual war chest obtained by the United Mine Workers of America through the "check-off" system, and complete abolition or regulation of that system, is requested of the U. S. Coal Commission in a letter from counsel for the Bituminous Operators' Special Committee, made public on April 30. Pointing out that union leaders "compel the operators to serve as tax collectors by requiring them to deduct these assessments from the pay of the workers," Colonel Henry L. Stimson and Goldthwaite Dorr, who signed the letter, charge that the funds thus raised constitute the commissariat of a tightening labor monopoly.

"The amount a miner must contribute to this taxation," the letter asserts, "frequently equals or exceeds what he has to pay for rent. In some districts the monthly tax has even run as high as $15 per man. In some districts the initiation fee has been set even as high as $75. Their monopoly cannot be achieved without this system of forced contribution. Time and again it has been shown that without the compulsory machinery of the 'check-off,' this organization cannot reach its monopolistic objective. Mine workers again and again have refused to support it except under compulsion. Its legitimate activities do not need the support of this burdensome taxation. . . .

"In order to help make these studies constructive and to furnish the basis for remedial action [against acts of violence] there is a thread running through them all which we ask the commission itself to follow. Campaigns such as these which the United Mine Workers have been carrying on require money in vast sums. As the cases already presented have shown and as those we are about to present will still further show, they are not spontaneous uprisings of men goaded by grievances; they are deliberate campaigns waged with a central, organized purpose, backed by a central, well-filled treasury. In order to understand how they can be carried on, this financial system must be understood; in order to prevent their recurrence and curb their excesses, this system must be abolished or regulated. . . .

"The huge fund of the United Mine Workers, stated to be in excess of $15,000,000, raised annually by this system of taxation is an outstanding fact of labor relations in the coal industry. The secret disbursement of this huge fund without public accountability, taken in connection with a nation-wide campaign of violence and of defense of the perpetrators of violence, is a sinister fact of this industry.

"We therefore respectfully suggest that no investigation into the facts of the coal industry by this fact-finding commission can be complete without a drastic public investigation into and airing of these facts. No remedy can be suggested until the magnitude of this evil is understood and corrective measures to curb it devised. We therefore request the commission to investigate the amounts which are raised annually by 'checking off' the dues and assessments and fines of the United Mine Workers of America from the wages of miners.

"We ask it further to end the secrecy that has shrouded the use of these funds and trace relentlessly—as it alone has the power to do—the application which has for years past been made of the vast sums thus raised. . . .

"We believe that the people of this country have no conception of the extent to which the United Mine Workers have disregarded, flouted and escaped the law in their campaigns to extend and protect their closed-shop monopoly. We believe they have little conception of the violence and magnitude of these same campaigns. The public is the chief party in interest before the commission. If the economic welfare of the nation, and the security of its fundamental institutions are being threatened by a militant monopoly, the sinister power of which depends upon its ability to use a great war chest without public accountability, then the nation is entitled to know this fact.

"We therefore believe that a complete investigation of the full facts is imperative in the public interest."

Miners' Union in Realm of High Finance

The current report of the auditors of the United Mine Workers of America, published in the *Mine Workers' Journal* of April 15, 1923, shows actual cash on hand as of Feb. 1, 1923, as $1,182,259.44. During the period under review—Aug. 1, 1922, to Jan. 31, 1923—the union raised more than two and a quarter millions. The actual receipts during the six months period were $2,786,140.38. The main sources of income were the tax of $927,250.19 and the assessment of $1,466,472.34. This is a total of almost $2,400,000, equivalent to about $4 per member.

Included in receipts are the bank loans. They were $150,000 from the Indiana National Bank of Indianapolis, which has been paid back; $50,000 from the Harriman National Bank of New York, which during the period covered by the audit received payment of $150,000 in returned loans, and $50,000 from the Bank of the United States, New York City, which amount has likewise been returned.

Significant items, in view of the visit of President John L. Lewis to England, is a donation of $22,350 from British miners and a payment to the International Miners' Federation of $547.50 as dues.

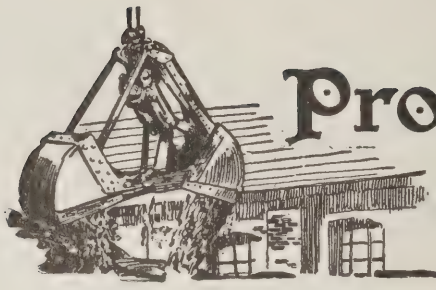
The most interesting details are those of expenditure. For example, W. Jett Lauck, who has been retained by the U. S. Coal Commission, drew $14,000 during the six months for "preparing statistical data." District No. 7 and District No. 9 each got $10,000 as aid, and District No. 1 got $15,000. These are the anthracite districts. During the half year lawyers collected fees aggregating a trifle under $100,000. The largest single amount went to Earl E. Houck, designated as "assistant to the attorneys." For no specified reason Mr. Houck got $6,510.30, and for "legal expenses, West Virginia cases," he got $40,000. Besides these "legal expenses, West Virginia cases," nearly $5,000 was paid to attorneys in District 29, which has headquarters in Beckley, W. Va. This money was divided as follows: C. M. Ward, $1,200; J. E. Summerfield, $1,006.51; John I. Hutchinson, $2,250; Kyle D. Harper, $598.78; C. B. Summerfield, $227.50.

The firm of Hughes, Rounds, Schurman & Dwight got $21,452.39 for legal services in the Coronado case. William A. Glasgow, Jr., counsel for the International union, was paid $939.56.

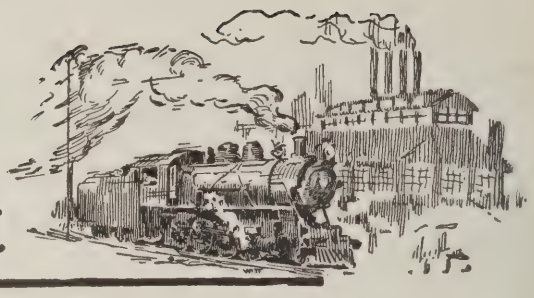
The union holds no securities except $301,550 in U. S. Liberty and Victory bonds. Its cash is divided into $873,494.13 on deposit in the United States and only $47,952.52 on deposit in Canada. Outstanding checks amounted to $40,737.21 on Feb. 1. The recapitulation is:

Amount on hand, Aug. 1, 1922	$731,349.66
Income, Aug. 1, 1922-Feb. 1, 1923	2,786,140.38
Total	3,517,490.04
Expenditures	2,335,230.60
Balance on hand, Feb. 1, 1923	1,182,259.44

Representative Men in the Mining Industry considered the question of industrial relations at a luncheon given by the American Mining Congress Friday, April 27, at the Bankers Club in New York. Sydney J. Jennings, president of the American Mining Congress, presided and addresses were made by W. A. Grieves, chairman of the Division of Industrial Co-operation of the Mining Congress, on the work of that organization, and by J. F. Callbreath, on proposed enlargement of activity of the industrial co-operation division of the Mining Congress.



Production and the Market



Weekly Review

The record month of April has closed with production of over 42,000,000 net tons of bituminous coal, equalled or excelled in but one other April, that of 1918, when production was 46,000,000 tons. April usually is the low month of the year for the soft-coal industry. Spot prices of bituminous coal, though on the decline for the past four months, averaged higher in April, 1923, than in any previous April save 1917, before governmental war control of prices, and 1920, when price fixing ceased. The average spot price of soft coal at the mine, according to *Coal Age* compilations, was $2.88 per net ton in April, 1923, compared with $3.21 in April, 1917, and $3.85 in 1920.

Anthracite, on the other hand, although running at top speed, is breaking no records. Total production in April was around 8,000,000 net tons, a familiar figure since it was almost reached in the Aprils of 1913, 1917 and 1921, and topped in 1914, 1915 and 1918.

Soft-Coal Prices Weak

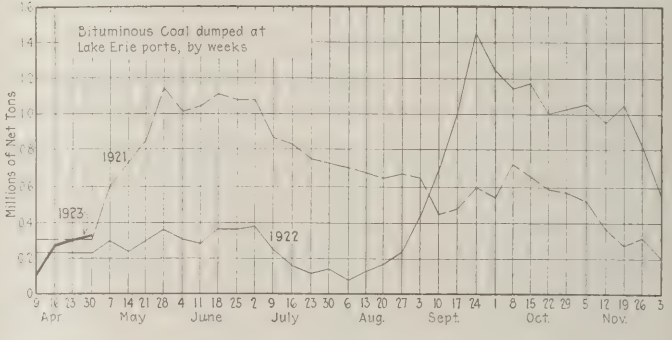
The soft-coal market continues dull and all prices are weak. Inquiries for future business are increasing and the trade is waiting for Lake business to open soon and give some additional impetus to trading.

Smokeless, southern Illinois, eastern and western Kentucky, Somerset, Clearfield, Pittsburgh, Ohio and Kanawha coals declined in price last week. *Coal Age* Index of spot prices of bituminous coal declined 7 points from April 23 and on April 30 was 224. The corresponding average price is $2.71.

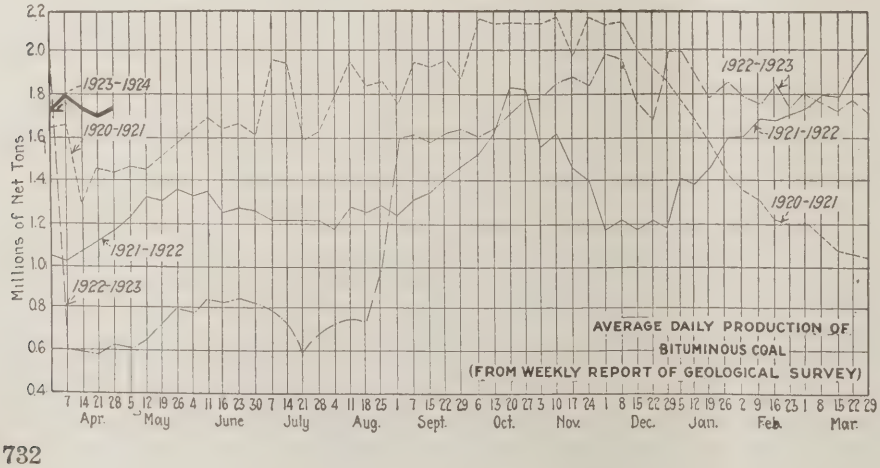
Each week more small operations are being closed because of low prices, particularly in central Pennsylvania, where many are hard pressed for orders. With the cheaper coals accumulating, producers are resorting to all means possible to move their product. The lack of orders in many districts has become more noticeable because of an improvement in car supply, this condition being principally attributed to limited production in Illinois, Indiana, southern Ohio and Cumberland-Piedmont districts.

Throughout the Middle West there is little activity and considerable urging is needed to move coal. The steam sizes are particularly sluggish in the Chicago market. There is a pronounced weakness in all grades in the Ohio markets with the exception of smokeless coals. Dealers are buying only to meet requirements.

Spot inquiry was light throughout the East, although there were increasing inquiries as to future business, with strong indications of heavy industrial purchasing soon. With embargoes in New England slightly modified there are indications that buying there will soon increase considerably. Little interest is being shown in May coal.



The general tone of the export market shows a slight improvement. Spot business to South America is a trifle more active. France continues to get considerable American coal, this being particularly true with regard to shipments from Baltimore, where 18 out of 29 vessels leaving that port during the first 21 days of April departed for France carrying 104,598 tons of cargo coal. From Jan. 1 to April 21 there have been 21 vessels leaving Baltimore for French ports with 121,310 tons of



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
April 7	3,835,000	9,629,000
April 14 (*b*)	3,656,000	10,401,000
April 21 (*a*)	3,575,000	10,244,000
Daily average	596,000	1,707,000
Calendar year	140,354,000	169,416,000
Daily av. cal. year	1,485,000	1,789,000
ANTHRACITE		
April 7	9,000	1,602,000
April 14	6,000	2,067,000
April 21	6,000	2,065,000
Calendar year	21,798,000	31,602,000
COKE		
April 14 (*b*)	140,000	421,000
April 21 (*a*)	94,000	437,000
Calendar year	2,217,000	5,995,000

(*a*) Subject to revision. (*b*) Revised from last report.

cargo coal. Coke movement for export is quiet, some distressed product being offered at low prices.

The lake situation is not yet in full swing. Heavy ice impedes traffic in the upper Lakes. There are many boats loaded at Lake Erie ports but they are not likely to be moved until after the first week of the present month.

"The present estimate of the total soft coal raised during the week April 16-21," says the Geological Survey, "including coal coked, local sales and mine fuel, is 10,244,000 net tons, which is 157,000 tons less than in the week preceding. It is, however, nearly three times the output in the corresponding week of a year ago, which was marked by the low point of production during the great strike. Preliminary reports of cars loaded in the week April 23-28 show a slight increase in the rate of production during the early days of the week and it is probable that the total output will be between 10,300,000 and 10,400,000 tons."

Dumpings at Hampton Roads for all accounts for the week ended April 26 totaled 323,855 net tons as compared with 377,538 tons dumped in the previous week.

Demand for domestic sizes of anthracite remains active. Most retail dealers complain of short supplies, while the steam sizes continue to accumulate and are draggy. Minneapolis and St. Paul retail dealers are laying in heavy supplies which so far have gone to them by rail, and they are looking forward to the opening of Lake navigation, when they expect increased shipments.

Midwestern Business More Sluggish

Every coal in the Middle Western markets needs a good deal of pushing just now and steam sizes are so sluggish that they hardly move at all no matter how vigorous the push. Southern Illinois screenings sagged until at the end of the week very little of it touched $2. Most of it moved at $1.75 or $1.80. Naturally all other steam coals were equally under downward pressure, with the result that a good deal of it moved at $1.50.

Southern Illinois domestic sizes are still moving at a little under the $3.85 price fixed on the circular, some of the worst selling down to $2.75. The increase to $4.10 effective May 1 did not force much buying. No other field

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

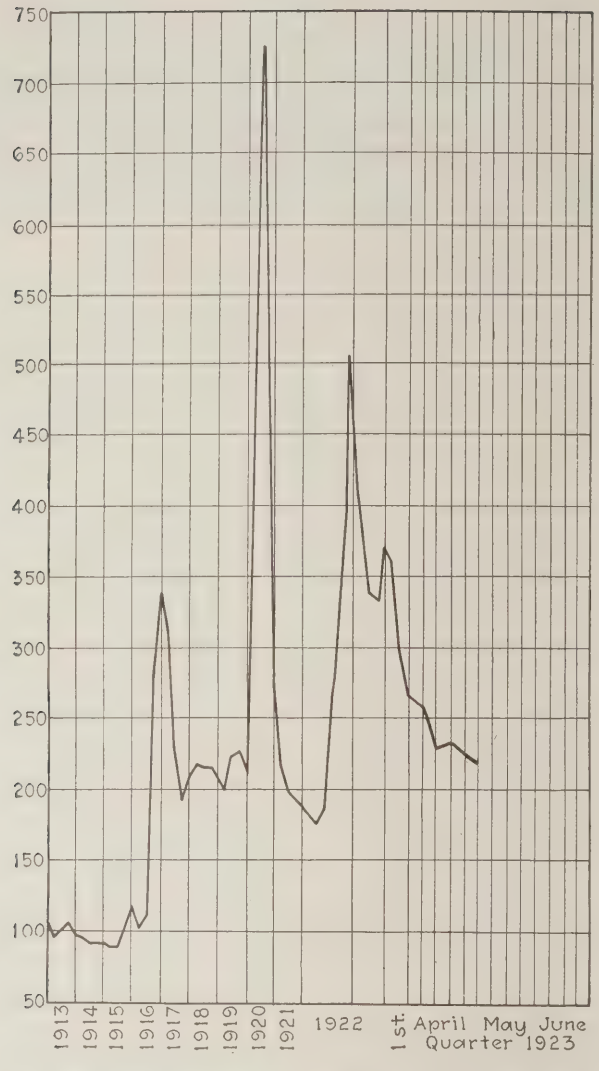
	Market Quoted	May 1 1922	Apr. 16 1923	Apr. 23 1923	Apr. 30 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.05	$6.10	$6.15	*$6.00@$6.25*
Smokeless mine run	Columbus	2.40	4.25	4.25	*3.75@ 4.50*
Smokeless screenings	Columbus	1.75	4.00	4.10	*3.75@ 4.25*
Smokeless lump	Chicago	2.75	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	1.95	3.75	3.85	3.75@ 4.00
Smokeless lump	Cincinnati	2.90	6.35	6.35	*6.00*
Smokeless mine run	Cincinnati	2.15	4.25	4.25	*3.75@ 4.00*
Smokeless screenings	Cincinnati	2.15	4.10	4.00	*3.75@ 4.00*
*Smokeless mine run	Boston	5.05	6.30	6.25	**6.25@ 6.50**
Clearfield mine run	Boston	2.60	2.95	2.75	*2.00@ 3.25*
Cambria mine run	Boston	3.00	3.65	3.35	3.00@ 3.75
Somerset mine run	Boston	2.80	3.35	3.15	*2.50@ 3.50*
Pool 1 (Navy Standard)	New York	3.75	4.00	3.85	**3.75@ 4.25**
Pool 1 (Navy Standard)	Philadelphia	3.70	4.00	3.95	**3.90@ 4.25**
Pool 1 (Navy Standard)	Baltimore	3.75	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.25	3.25	3.10	2.75@ 3.50
Pool 9 (Super. Low Vol.)	Philadelphia	3.30	3.25	3.20	*2.90@ 3.35*
Pool 9 (Super. Low Vol.)	Baltimore	3.40	3.25	2.90	2.90
Pool 10 (H.Gr.Low Vol.)	New York	3.00	2.65	2.50	**2.25@ 3.00**
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.15	2.65	2.55	*2.30@ 2.70*
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.25	2.90	2.50	2.50
Pool 11 (Low Vol.)	New York	2.75	2.30	2.05	2.00@ 2.50
Pool 11 (Low Vol.)	Philadelphia	2.80	2.25	.....	2.00@ 2.25
Pool 11 (Low Vol.)	Baltimore	3.10	2.25	2.15	2.15
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	2.70	2.05	1.85	*1.60@ 2.00*
Pool 54-64 (Gas and St.)	Philadelphia	2.50	2.20	2.20	*1.90@ 2.25*
Pool 54-64 (Gas and St.)	Baltimore	3.00	2.25	1.95	1.95
Pittsburgh sc'd gas	Pittsburgh	.....	3.10	3.10	*2.75@ 3.00*
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	2.15	2.10	*1.50@ 1.75*
Kanawha lump	Columbus	2.90	3.75	3.75	*3.25@ 4.00*
Kanawha mine run	Columbus	2.65	2.25	2.25	2.00@ 2.50
Kanawha screenings	Columbus	2.00	2.30	2.40	*2.00@ 2.25*
W. Va. lump	Cincinnati	2.75	3.50	3.85	*3.00@ 4.50*
W. Va. Gas mine run	Cincinnati	2.75	2.35	2.50	*2.10@ 2.75*
W. Va. Steam mine run	Cincinnati	2.40	2.35	2.50	*2.10@ 2.75*
W. Va. screenings	Cincinnati	2.20	2.15	2.25	2.00@ 2.50
Hocking lump	Columbus	3.05	3.00	2.85	2.75@ 3.00
Hocking mine run	Columbus	2.90	2.10	2.00	1.85@ 2.20
Hocking screenings	Columbus	2.15	1.60	1.70	1.60@ 1.80
Pitts. No. 8 lump	Cleveland	3.25	3.00	2.90	*2.25@ 3.50*
Pitts. No. 8 mine run	Cleveland	2.90	2.25	2.15	*2.10@ 2.25*
Pitts. No. 8 screenings	Cleveland	2.90	1.95	1.95	*1.70@ 1.90*
Midwest					
Franklin, Ill lump	Chicago	3.45	3.85	3.65	3.50@ 3.85
Franklin, Ill. mine run	Chicago	3.00	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	3.00	1.95	1.95	*1.75@ 2.00*
Central, Ill. lump	Chicago	2.75	2.75	2.70	2.65@ 2.75
Central, Ill. mine run	Chicago	2.75	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	2.00	1.55	1.55	1.50@ 1.65
Ind. 4th Vein lump	Chicago	3.15	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	2.50	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	2.25	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	2.60	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	2.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.40	1.55	1.55	1.50@ 1.60
Standard lump	St. Louis	3.15	2.50	2.50	2.50
Standard mine run	St. Louis	2.75	1.85	1.85	1.75@ 2.00
Standard screenings	St. Louis	2.75	1.10	1.10	1.10
West Ky. lump	Louisville	2.60	2.50	2.50	**2.25@ 3.00**
West Ky. mine run	Louisville	2.60	2.10	2.10	*1.85@ 2.10*
West Ky. screenings	Louisville	2.60	2.00	1.90	*1.75@ 2.00*
West Ky. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.50	2.50	2.50
Big Seam mine run	Birmingham	1.70	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	3.85	4.00	*3.50@ 4.00*
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.75	3.85	3.85	**3.50@ 4.50**
S. E. Ky. mine run	Louisville	2.75	2.75	2.60	**2.50@ 3.00**
S. E. Ky. screenings	Louisville	2.75	2.45	2.20	*2.00@ 2.50*
S. E. Ky. lump	Cincinnati	2.90	3.50	4.00	*3.00@ 4.00*
S. E. Ky. mine run	Cincinnati	2.40	2.25	2.25	2.00@ 2.50
S. E. Ky. screenings	Cincinnati	2.25	2.15	2.10	*1.75@ 2.25*
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.15	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.65	2.60	2.60	2.50@ 2.75

* Gross tons; f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Latest Company	Pre-Strike Company	April 23, 1923 Independent	April 23, 1923 Company	April 30, 1923† Independent	April 30, 1923† Company
Broken	New York	$2.34	.....	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85		.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85		$8.50@10.50	8.00@ 8.35	**$8.50@11.00**	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75		9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25		12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10		8.50@10.50	8.00@ 8.35	**8.50@11.00**	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25		9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25		12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20		8.50@10.50	8.00@ 8.35	**8.50@11.00**	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15		9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25		12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45		6.30@ 7.50	6.00@ 6.30	*6.30@ 7.25*	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25		7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25		7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50		2.25@ 3.50	3.50@ 4.15	2.25@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50		3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50		1.75@ 2.50	2.50	1.75@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50		2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50		1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50		1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50		.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 224, Week of April 30, 1923. Average spot price for same period $2.71. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

except Mt. Olive has committed itself to a May price, everybody apparently expecting to pick off some of the sparse domestic business which the Franklin County people may lose by increasing the circular. Mt. Olive lump is to increase from $3.25 to $3.50. The cool of early spring persists in this region, thus keeping the immediate demand up for lump and egg sizes.

St. Louis Trade Is Quiet

An unusually quiet period prevails at St. Louis and probably will prevail for a few weeks. Very little storage coal is being put in except a little of the higher grades, such as anthracite and coke and some Carterville lump. There is no need for current use and the demand for Standard and Mt. Olive is off. Wagonload steam is light and carload steam is in a bad way, with very little moving. Country domestic is practically stopped and country steam is difficult to find. Indications are that there will be a good movement of early storage coal in May.

Retail prices advanced on Carterville May 1 so that the new prices are: Carterville, $7.75; Mt. Olive, $6.50; Standard, $5.75; smokeless, $14.50.

Kentucky Feels a Pick-Up

With better car supply in the western Kentucky fields movement of coal has been improving somewhat. It is reported that there is better demand from retailers for domestic sizes, due to the fact that retail yards are low, and while retailers are not planning to stock very heavily, they are taking a fair amount, believing prices are now at rock bottom. At the same time there is a good industrial demand for screenings, and prices are holding. Mine-run is not so active, but is moving fairly well.

More river coal is coming into Louisville now than for some time. Some concerns which haven't stocked much of it for the past several years, are planning to handle more this season.

Northwest Awaits Lake Coal

The market at Duluth remains tranquil, with the docks at low ebb, and prices firm. Buyers are holding off hoping that the new coal which will come up after the opening of navigation will be cheaper. There is no free anthracite on the docks and the bituminous unbought totals between 100,000 and 150,000 tons. There is a very evident disposition on the part of the consumers to buy anthracite early. Dock men place the probable price at about $1.50 lower than this year.

The coal business is at a standstill at Milwaukee pending the arrival of new supplies by lake. About fifteen cargoes destined for Milwaukee have been taken on at Lake Erie ports. The steamers will start as soon as the Straits of Mackinac are free from ice. A hopeful feeling prevails, and jobbers are looking forward to a busy May.

Retail prices on all-rail hard coal in the Twin Cities are advertised by one concern at $17.50 to $18 delivered for egg, stove and nut. Pea is $16. The soft coal trade is still awaiting developments, though wholesalers look for a considerably better season than that which just closed.

The Kansas market is dull. Such Missouri, Oklahoma and Kansas mines as are open run only two or three days a week. Those of Arkansas are getting even less. There has been no formal cut in prices. Householders are not buying, even in face of the assurance that the retail price of Arkansas semi-anthracite will advance at least 50c. early in May.

In Utah and the mountain states a cold snap during the week kept retailers busy but did not reflect itself in stronger demand upon the mines. There is very little general buying for steam purposes. Railroads are taking a little, but that is about all. No price changes in Utah coal have been announced.

Weakness Pronounced in Cincinnati

There was a pronounced weakness in all grades and sizes of coal, with the exception of smokeless, in the Cincinnati market, while comparison as made with the latter part of March show that the volume of coal on the open market was about doubled. On the other hand there is an increasing evidence of stocking going on in some sections. Orders are not numerous in the Columbus market and dealers are only buying what they actually need to meet requirements. Operators and jobbers in the Cleveland market say that due to the limited transportation facilities and heavier shipping to Lake ports, the volume of coal being offered in the open market is less than in some weeks, at the present rate of operations.

In the Pittsburgh district a few additional mines have closed on account of dissatisfaction with current prices. During the week ended April 22 there was a slight increase in production in the central Pennsylvania field, the output amounting to 18,084 cars as compared with 16,929 cars the previous week. Car supply improved slightly but not enough to keep the mines in continuous operation.

Buffalo reports little change in the situation. Stocks are running low but consumers appear unconcerned.

Inquiry and Receipts Low in New England

Spot inquiry in New England is extremely light. Aside from contract quotas, receipts have diminished and there is little tonnage available for distribution inland. Congestion at the re-handling wharves has been practically all cleared up, and prices on cars for best grades from the Pocahontas and New River districts range now from $8.00@ $8.25 per gross ton on cars. While the trade is hopeful

that prices will not now recede more than 25@50c. it is probable that by the end of May more radical reductions will take place. Buying is only on a hand-to-mouth basis.

The spot market f.o.b. Hampton Roads shows no material change. Output is still much restricted, although accumulations at the piers continue about the same as for the past thirty days. There are few purchasers of single cargoes, practically all of the loadings being applied on season requirements, and the outlook for increased movement coastwise is by no means encouraging. The agencies are looking to the Lake trade to assist liberally in building up tonnage for the latter part of May and during June, but if conditions are no better in western Pennsylvania there will be strong competition from that quarter. Quotations are maintained about on the minimum base price named on the navy requirements, but distinctly there is a feeling that coal could be bought on offers at figures down to $6 f.o.b. vessel.

New minimum prices have been heard during the past week, but takers are not many and receipts are steadily diminishing. Even the producers of choice Cambria coals have made slashes in quotations previously made and are closely canvassing all the trade they have ever been in touch with to get spot business.

New York Buyers Look for Lower Prices

Buyers in the New York market expect lower prices, while on the other hand producers and sales agents believe the bottom is nearly reached. Buying is slow in the Philadelphia market and producers are looking for orders. Demand at Baltimore is light. Contract making is considerably behind the average and there is little stocking up to this time. Interest is centered in the export situation as it affects Baltimore.

In the Birmingham, Ala. district the steam trade is quiet. Coal is accumulating, but this factor so far has not become a serious problem. Several railroads have closed contracts for their requirements covering the next twelve months and others have our proposals.

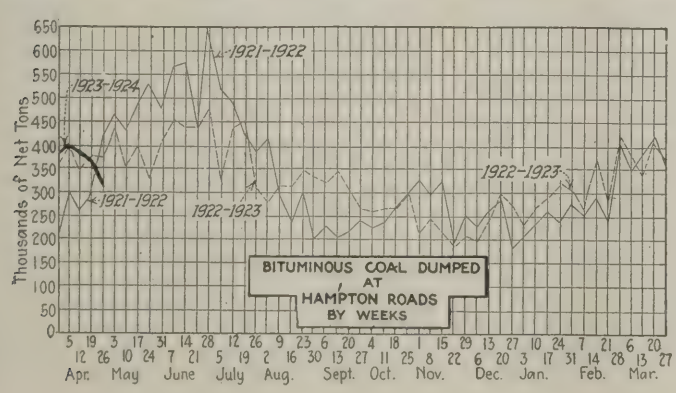
Lake Navigation Not in Full Swing Yet

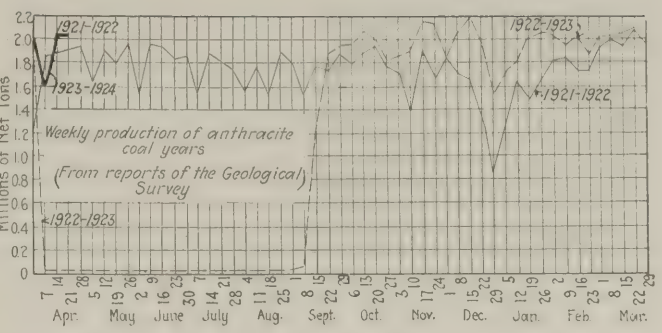
Lake navigation is not expected to open fully until about the middle of May. There is considerable ice in the upper Lakes and although many boats are loaded at Lake Erie ports they will wait for the ice to clear before starting for destinations. During the week ended April 30 soft coal dumped at Lake Erie ports amounted to 365,438 tons of cargo coal and 15,490 tons of fuel coal, making the dumpings to date 1,005,556 tons of cargo coal and 42,384 tons of fuel coal.

Domestic Anthracite Still Moves Rapidly

Domestic sizes of anthracite continue to move rapidly. Independent product is in heavy demand and it is said that many buyers, some from Canada, are canvassing the coal fields. The steam sizes are accumulating. It is reported that one or two producers have made contracts for large tonnages of rice coal on a basis of $1.75 per ton. Heavy shipments of the larger sizes are being made West.

"The rate of production of anthracite in the third week of April was the same as in the second week," the Geological Survey reports. "The total output in the week





ended April 21, including mine fuel, dredge and washery coal, and sales to local trade, is estimated at 2,065,000 net tons. The cumulative output during the present calendar year to April 21 stands at 31,602,000 net tons, an increase of 9,804,000 tons, or 45 per cent, over the production in the corresponding period of 1922."

Beehive Coke Output Gains

Production of beehive coke increased during the third week of April, according to the Geological Survey, to 437,000 net tons, as compared with 421,000 net tons the previous week. The cumulative production of beehive coke during 1923 to April 21 amounts to 5,995,000 tons as compared with 2,217,000 tons in the corresponding period of 1922 and 2,277,400 tons in 1921.

Anthracite Miners Call Off Button Strike

A strike of 10,000 anthracite mine workers at the Pennsylvania Coal Co. mines in the Pittston district was called off Monday, April 30, when mine foremen at a meeting with the general grievance committee, agreed to see that the thirty-five men who refused to join the union at the Butler colliery, which caused the suspension, get into good standing with the organization. The walkout was not sanctioned by the district officers of the union.

Work was resumed Tuesday, May 1.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Apr. 14, 1923 Inclusive	Week Ended April 14, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	31.0	45.1
Panhandle, W. Va.	51.3	57.3	55.5	54.4
Westmoreland	58.8	65.8	55.2	64.6
Virginia	59.9	55.7	55.2	66.3
Harlan	54.8	22.1	23.2	30.8
Hazard	58.4	16.4	22.1	30.1
Pocahontas	60.0	36.6	38.0	42.6
Tug River	63.7	28.8	35.0	44.4
Logan	61.1	26.2	30.9	30.2
Cumberland-Piedmont	50.6	31.7	48.1	61.1
Winding Gulf	64.3	30.4	34.2	36.2
Kenova-Thacker	54.3	42.4	34.2	34.7
N. E. Kentucky	47.7	28.4	28.2	(a)
New River	37.9	31.6	36.0	35.5
Oklahoma	59.6	59.1	42.9	43.4
Iowa	78.4	75.9	79.3	63.8
Ohio, Eastern	46.6	40.8	35.4	38.1
Missouri	66.8	76.3	75.9	57.0
Illinois	54.5	49.9	47.1	38.3
Kansas	54.9	55.9	47.3	36.2
Indiana	53.8	37.7	51.7	42.5
Pittsburgh†	39.8	41.2	34.5	43.7
Central Pennsylvania	50.2	53.4	46.9	56.2
Fairmont	44.0	35.5	34.8	45.8
Western Kentucky	37.7	32.4	32.9	36.5
Pittsburgh*	31.9	56.1	59.2	62.3
Kanawha	13.0	15.6	23.0	21.8
Ohio, Southern	24.3	38.1	32.4	29.1

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended April 14, 1923	946,759	182,356
Previous week	895,767	164,089
Same week in 1922	700,155	64,171

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
April 11, 1923	14,241	3,259	48,584	21,025
Same date in 1922	330,070	187,918	.....	.....
April 4, 1923	15,168	4,305	58,237	24,539

Foreign Market And Export News

British Coal Mines Yield Record Output; No Let-Up in Demand

A new high record in production was attained by Great Britain's mines during the week of April 14, when 5,777,000 tons of coal was produced, according to a cable to *Coal Age*. This is the record output for this year and also surpassed the output for any week of 1922, 5,742,000 tons having been produced during the week ended Dec. 16. The output for the week of April 7 was 3,941,000 tons.

Demand was irregular last week and quotations showed a slight decrease from the previous week.

According to a newspaper dispatch, South America has bought 100,000 tons of Monmouthshire large coal for delivery over the last half of this year on a basis of about 30s per ton at the mine.

Although most of the miners have returned to work following the recent labor troubles, and production increased, there has been no slackening in demand for Welsh coal. It is estimated the Welsh mines lost at least a fifth of their April production of the best steam coals and were compelled to carry their arrears of delivery into May.

Both contracts and inquiries from the Continent are steady and show no indication to fall off.

Coal exports officially reported from London for the week ended April 27, in tons follow:

South Wales district	2,300
Newcastle (Tyne) district	11,214

Board of Trade statistics showing coal exports during March of this year, compared with the same month of last year, in tons, follow:

	March 1923	March 1922
Germany	1,836,000	468,000
France	1,805,000	1,238,000
Italy	788,000	681,000
Argentine	184,000	132,000
Other countries	2,567,000	2,682,000
Total	7,180,000	5,201,000

Dumpings at Hampton Roads Decrease

Business at Hampton Roads was not so brisk last week, but large supplies of coal were in transit and accumulations at the piers substantial. The week ended with few vessels in sight, although the trade had a generally bright outlook.

The seamen's strike had not affected business at that port, and no fear was held by shippers of developments that would interfere with business. The general feeling was that the strike would not work any hardship there.

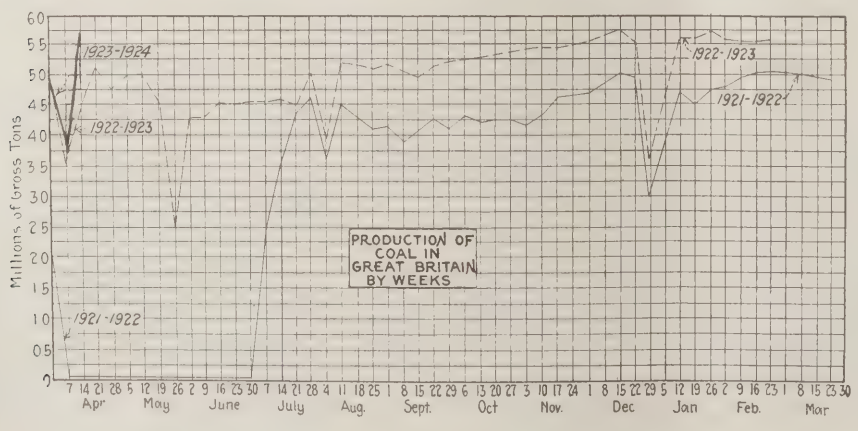
Coastwise trade held firm, while export business was good, with more coal moving to France and still other cargoes for France in sight. Contracts were not in evidence, and little faith in the strength of the market was held.

French Coal Production

During February, coal production in France, in metric tons, was as follows:

Districts:	Coal	Coke	Patent Fuel
Arras (devastated and non-devastated mines of the Department du Pas-de-Calais)	1,035,453	40,949	37,194
Douai (Department du Nord: all devastated mines)	374,384	38,035	75,201
Saint-Etienne (Loire coal field)	265,481	27,827	15,213
Lyons (Bianzy, La Mure, etc.)	227,458	.....	23,143
Clermont-Ferrand (minor coal fields of the center of France)	103,546	.....	9,267
Southern Coal fields: Alais	146,791	583	55,279
Southern Coal fields: Toulouse	152,757	9,463	4,984
Southern Coal fields: Marseilles	66,112	.....	1,420
Minor coal fields of the West of France: Nantes	4,587	.....	71
Minor coal fields of the West of France: Bordeaux	4,097	.....	3,192
Nancy (Ronchamp colliery)	8,482	1,742	.....
Strasbourg (Lorraine coal field)	89,436	3,083	.....
Totals	2,478,584	121,682	224,964

Production in January amounted to 3,147,681 tons of coal, 131,994 tons of coke and 292,880 tons of patent fuel. Due to the strike in the Lorraine district coal produced during February was 314,936 tons less than in January and coke 5,033 tons less.



Swiss Coal Imports

During the year 1922 the total imports of coal into Switzerland amounted to 2,200,000 tons, as compared with 1,630,000 tons in the preceding year. Though the imports increased largely in 1922, yet they represented only two-thirds of those before the outbreak of the war. The steadily progressing electrification of the country decreases the demand for coal to a certain extent, the Gotthard line alone using now about 110,000 tons of coal less than before its electrification.

Export Clearances, Week Ended April 21, 1923

FROM HAMPTON ROADS

For Bahamas:	Tons
Amer. Schr. Edward R. Smith, for Nassau	442
For Cuba:	
Nor. SS. Songelv, for Havana	3,580
Nor. SS. Skogstad, for Havana	5,680
For France:	
Br. SS. Hambleton Range, for Dunkirk	5,848
For Mexico:	
Nor. SS. H. C. Flood, for Vera Cruz	2,650
For Norway:	
Nor. Bark Amasis, for Sandefjord	2,044
For West Indies:	
Nor. SS. Ringborg, for Barbados	4,023
Nor. SS. Sagoland, for Fort de France	3,787

FROM PHILADELPHIA

For Belgium:	
Dan. SS. Gudrun Maersk, for Antwerp (coke)	3,037
Swed. SS. Indianic, for Antwerp (coke)	...
For France:	
Belg. SS. Caledonier, for Dunkirk	...
Swed. SS. Lulea, for St. Nazaire	...

Hampton Roads Pier Situation

	April 19	April 26
N. & W. piers, Lamberts Pt.		
Cars on hand	1,191	1,307
Tons on hand	77,961	88,783
Tons dumped for week	136,941	95,033
Tonnage waiting	5,000	10,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,743	1,623
Tons on hand	98,950	94,830
Tons dumped for week	126,114	117,747
Tonnage waiting	17,619	3,989
C. & O. piers, Newport News:		
Cars on hand	2,603	2,526
Tons on hand	136,315	135,560
Tons dumped for week	74,033	76,377
Tonnage waiting	9,250	9,955

Pier and Bunker Prices, Gross Tons

PIERS

	April 21	April 28†
Pool 9, New York	$6.00@$6.35	**6.00@ 6.45**
Pool 10, New York	5.40@ 5.75	*5.25@ 5.75*
Pool 11, New York	4.50@ 5.00	4.50@ 5.00
Pool 9, Philadelphia	6.30@ 6.75	*6.25@ 6.70*
Pool 10, Philadelphia	5.40@ 5.80	*5.30@ 5.70*
Pool 11, Philadelphia	4.40@ 4.80	*4.30@ 4.70*
Pool 1, Hamp. Roads	6.25@ 6.50	**6.40**
Pools 5-6-7, Hamp. Rds.	5.25	**5.30**
Pool 2, Hamp. Roads	6.25@ 6.50	**6.40**

BUNKERS

Pool 9, New York	6.30@ 6.65	**6.30@ 6.75**
Pool 10, New York	5.70@ 6.05	*5.55@ 6.05*
Pool 11, New York	4.80@ 5.30	4.80@ 5.30
Pool 9, Philadelphia	6.60@ 6.85	**6.65@ 6.80**
Pool 10, Philadelhia	5.65@ 6.20	*5.55@ 6.10*
Pool 11, Philadelphia	4.70@ 5.15	*4.60@ 5.05*
Pool 1, Hamp. Roads	6.50	6.50
Pool 2, Hamp. Roads	6.50	6.50

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	April 21	April 28†
Admiralty, large	40s.@ 45s.	*40s.@ 42s.6d.*
Steam, smalls	30s.@ 32s.6d.	*30s.@ 31s.*
Newcastle:		
Best steams	34s.6d.@ 35s.	**35s.**
Best gas	32s.6d.@ 35s.	*30s.@ 32s.6d.*
Best bunkers	35s.	*34s.@ 35s.*

†Advances over previous week shown in **heavy** type; declines in *italics*.

News Items From Field and Trade

ALABAMA

The School of Mines of the College of Engineering of the University of Alabama offers five fellowships in mining and metallurgical research in co-operation with the U. S. Bureau of Mines, open to graduates of universities and engineering schools who have proper qualifications to undertake research investigation. The value of each fellowship is $540 per year of nine months beginning Sept. 1. The following problems have been selected for investigation for the year 1923-1924: (1) Beneficiation of Iron Ores: (a) High Silica Iron Ores. (b) Brown Iron Ores. (c) Gray Iron Ores (Partly magnetic). (2) Coal Washing.

Fellows will be exempt from all laboratory and non-resident fees and will only be required to pay a matriculation fee of $10, student activities fee of $13.50 per year and a diploma fee of $15. Applications are due not later than June 15th and should be addressed to H. D. Pallister, Professor of Mining Engineering, School of Mines, University of Alabama, University, Ala.

ALASKA

B. B. Stewart, supervising mining engineer for Alaska, announces **a big increase in production of coal by private operators** in 1922 on Alaskan public lands. The output last year in the territory amounted to 84,403 tons, as compared with 76,285 tons in 1921, an increase of 8,118 tons. Government operations on reserved units form less than 10 per cent of the total production.

COLORADO

SUMMARY OF COAL PRODUCTION OF COLORADO, 1922

Number of mines operated	275
New and old mines opened	36
Mines closed, 16; abandoned, 2; total	18
Sub-bituminous coal produced, tons	2,814,779
Semi-bituminous coal produced, tons	714,322
Bituminous coal produced, tons	6,441,444
Anthracite coal produced, tons	17,255
Semi-anthracite coal produced, tons	15,810
Total coal produced, tons	10,003,610
Increase, 1922	861,663
Run-of-mine coal produced, tons	3,727,227
Lump coal produced, tons	2,852,582
Nut coal produced, tons	664,832
Pea coal produced, tons	73,115
Slack produced, tons	2,685,854
Percentage of slack produced	42.8—
Coal mined by hand, tons	4,904,874
Coal mined by machine, tons	5,098,736
Kind and number of machines used: Compressed air, 176; electric, 297; total	473
Coal mined for shipment, tons	6,592,881
Coal shipped out of the state, tons	1,887,884
Coal sold to local trade and used by employees, tons	544,611
Coal used at the mines for steam and heat, tons	227,836
Coal made into coke, tons	750,998
Coke made, tons	490,668
Days coke ovens were operated	337.7
Coke ovens used	377
Men employed at coke ovens	173
Miners employed: Pick, 4,824; machine, 3,770; total	8,594
Total men employed in and about mines (average)	13,436
Number of employees, foreign born	6,222
Employees speaking English	12,363
Average days worked (man days)	199.54
Daily production per miner, tons	5.8
Annual production per miner, tons	1,164 +
Number and type of safety lamps used: Flame, 883; electric, 4,906; total	5,739
Carbide lamps used	8,772
Pounds of carbide used (approximately)	213,456
Cost of development work in mines during 1922, 137 mines reporting	$779,202
Days lost account of car shortage, 109 mines reporting	5,619
Coal lost through shortage of labor (37 mines reporting), tons	489,975

ILLINOIS

Mine No. 2 of the Bell & Zoller Coal Co. at Zeigler, was scheduled to reopen April 25 after a two-week's shutdown following **a breakdown of the main hoisting engine.** While hoisting coal about three o'clock in the afternoon, the driving rod of the engine broke and both cylinder heads blew out. Nobody was hurt but the under frame was broken and had to be welded. **A strike of engineers** at about the same time took three men off the job but they were expected to return by the 25th.

Injury to six men and some property damage was done at Mine No. 12 of the Old Ben Coal Corporation recently at Christopher, when the steps in the airshaft of the mine gave way, letting six men fall a short distance to the bottom of the pit. Some of the injured men were engaged in repairing the steps when the accident happened while others were ascending the steps to leave the mine. It is the opinion of Superintendent L. T. Putnam that one of the higher flights of steps gave away and its weight caused the others to fall. The mine will not be operated until the steps and air shaft are repaired.

The mines of the Johnston City Coal Mining Co. at Johnston City **and the Freeman Coal Mining Co.** at Freeman **are to be electrified** according to announcements just made. The mines will also be equipped with electrical machinery and latest methods of mining by electrical equipment. The power for these mines is to be furnished by the Central Illinois Public Service Company, now supplying over 70 mines in Illinois with electrical power.

On Tuesday, April 17, **the No. 55 mine of the Springfield District Coal Mining Co. broke its previous hoisting record** of 2,452 tons, producing 2,602 tons. The mine is in charge of Mine Superintendent Harry Preval and Thomas Lawless, manager. This is considered a good record.

Recently the **No. 9 mine of the Consolidated Coal Co.**, located at Murphysboro, **has been closed down on account of high water** in the Big Muddy River. **The Security Coal & Mining Co.** at DuQuoin was about ready to resume operations after being closed down for four weeks on account of a creek breaking in, when the same creek got on a rampage again and poured in once more.

J. L. Bane and A. E. Butters, both of Ottawa, are interested in **a project to reopen the Rutland coal mine.** Rutland is a village near Ottawa on the Freeport division of the Illinois Central, the old "main line." Mr. Bane is the president of the Ottawa Ice & Fuel Co. and Mr. Butters is an attorney. The two men have offered to put in capital to the amount of $30,000 if Rutland citizens will raise $10,000. A meeting has been held in the village and $4,700 has been raised for the purpose.

Drillers for the Schuline Mining Co. on the Weir farm, near Sparta, **have completed their work,** as the drill has gone through the second vein of coal at a depth of 140 feet. The coal is 5 ft. 10 in. thick with a good roof. As soon as the shaft can be lowered from the first vein to the second vein, the mine will be worked. It was originally the intention to mine the first vein but it was found that this vein was of uneven thickness and could not be mined successfully so a decision was reached to drill to the second vein.

The Chicago Norfolk Western Coal Co., 343 South Dearborn Street, Chicago, has been incorporated with capital of $20,000 by L. C. Sieber, C. B. Sieber and J. L. Johnson.

The Coloma Coal and Lumber Co. of Virden, has been incorporated with capital of $45,000. N. E. Tiedebohl is the president; William H. Hocker, vice-president, and T. C. Tiedebohl, Jr., secretary and treasurer. The officers are the sole directors.

Fred Price, superintendent of the mine of the Tamaroa-Little Muddy Coal Co., at Tamaroa, has resigned on account of ill health caused from injuries received in a mine explosion a few months ago. He has been succeeded by Superintendent Frankey, formerly connected with a Freeburg mine. Two weeks ago the mine was forced to suspend operations for some time due to the caving in of a portion of the shaft. Excessive rains caused the walls of the shaft to give away. The damage has been repaired, however, and the mine is again operating as usual.

INDIANA

The Struggling Monkey mine, operated by Charles Whitlock, of Terre Haute, failed to meet the pay roll of the miners on Tuesday, April 10, regular pay day, and because of this fact the mine **has shut down,** with a possibility that work will not be resumed under the present management. The mine was started by the late Ben R. Whitcomb about six years ago. A deal is at present under way and if the negotiations are completed the plant will be taken over and operated by the Interurban Coal Co., which is now operating mines in Vigo, Clay and Sullivan counties. This company is owned principally by W. A. Satterlee, Henry Meyer and Dr. I. D. White, of Clinton.

IOWA

The new Pershing No. 2 mine will be located two and one-fourth miles north and east of the present location of Pershing No. 1 mine, a 3,000 tonner, making it about five miles from Tracy. The company hopes to be able to hoist 2,000 tons a day from the new shaft by winter. The new mine is to be electrically equipped throughout, drawing power from Des Moines through the Knoxville (Iowa) plant. The No. 1 Pershing mine has had an average of 600 men on the payroll all winter, and plans to have 450 or 500 men in the new works by next autumn.

The Summit Coal Co. of Nevada, is making arrangements to open a mine near that town.

KANSAS

Governor Davis has sent Edward T. Hackney, formerly a member of the state board of administration, **into the Kansas coal fields in response to the petition of many union locals urging the state government to do something to keep the coal mines working.** Mr. Hackney began by going over the Jackson-Walker Coal Co.'s books in Kansas City, Mo. Then he proceeded into the field. From there he went home to Wellington without making public the nature of his forthcoming report to the Governor. All the union petitions for state action against mine closings asked that under no conditions should the matter be turned over to the Kansas Industrial Court, so thoroughly detested by union labor and so bitterly assailed by Governor Davis during his campaign for election last autumn. Governor Davis has announced, however, that the case of shutdown mines may be referred to the court anyway. **Union officials of District 14** have answered many inquiries from members saying the organization **will not approve any co-operative mine leases for miners who want to try running mines.**

A mule fell on **Harry McGoey,** an employee of the Clemens Coal Co., in the company's No. 18 mine Feb. 15. The man died on April 14. His widow and son were awarded $3,118 in the District Court at Pittsburg.

J. F. Klaner, of the Klaner Coal Co. of Pittsburg, left April 17 for Kodiak, Alaska. After three weeks of bear hunting there, Mr. Klaner intends to go to Whale Island, where he is part owner of a blue fox farm, staked and stocked by him and a partner a little more than a year ago.

KENTUCKY

Bids for coal for the seven state penal and charitable institutions of Kentucky will be received until May 8, according to an announcement by B. T. Brewer, secretary of the State Board of Charities and Corrections. Announcement of the successful bidders will be made May 10. The seven institutions last year used approximately 37,000 tons of coal, ranging in price from

$1.55 to $5 the ton. No contracts were made last year on account of the coal and railroad strikes.

MINNESOTA

The Pure Carbon Co., Wellsville, N. Y., recently appointed as its Minneapolis representative, the **Charles A. Etem Co.**, 917-A Marquette Avenue.

MISSOURI

The sale of all stock in the Jackson-Walker companies of Kansas City, Mo., held by Mrs. L. C. Jackson, of Wichita, Kan., and Mrs. George T. Walker, of Kansas City, to C. P. A. Clough, president of the five companies, has been announced. The transfer gives Mr. Clough 49 per cent of the stock of the Jackson-Walker Coal & Mining Co., with capital stock of $150,000; all stock of the Marceline Coal & Mining Co., Marceline, Mo., capital stock $80,000; 50 per cent of the stock of the Toluca Coal Co., Toluca, Ill., capital stock $125,000; complete control of the Jackson-Walker Mercantile Co., Frontenac, Kan., capital stock $50,000, and of the Marceline Mercantile & Supply Co., Marceline, Mo., capital stock $20,000. J. A. Parkinson, secretary-treasurer of the companies, is the only other stockholder. He holds 51 per cent of the Jackson-Walker Coal & Mining Co. stock and 50 per cent of that of the Toluca Coal Co.

James F. Walsh and others have chartered the **Donald Coal Mines** for coal production in the vicinity of Westernport, the capitalization being $250,000.

T. H. Walton, head of a large coal company in Higbee, reports that **it is possible that his mine will have to close down for the summer** at least, unless he can obtain a renewal of the contract with the Chicago & Alton R.R., which expired April 1. Walton has been in Chicago, where he has been conferring with officials of the road relative to a new contract. The mine is one of the largest in this section of the state. There is practically no demand for commercial coal from local mines because of Illinois competition.

The mine of the **Marriott Coal Co.** in Moberly **has been reopened** following a 10-day shutdown. A new wage scale has been made.

NEW HAMPSHIRE

On April 19 the House rushed through a bill patterned after the Massachusetts law, giving authority to state and local boards of trade and sealers of weights and measures **to inspect all coal coming into the state and to condemn and confiscate all coal unfit for ordinary use.** Dealers are prohibited from selling coal with any foreign substance which impairs the quality. Fines from $100 to $1,000 and imprisonment from one month to one year are provided.

NEW YORK

The Coal & Iron National Bank has elected as vice-president **John M. Ross,** who for the past 18 months has been vice-president of the Lowry Bank & Trust Co., of Georgia.

OHIO

The Cincinnati School Board will open bids for approximately 30,000 tons of coal for the supply of its institutions on May 24.

Considerable development work is going on in various coal fields of the state of Ohio judging from the number of corporations chartered with the Secretary of State. Among the number are the **Nelsonville Consolidated Coal Co.,** of Nelsonville, with a capital of $25,000, chartered by D. H. Armstrong, R. S. Oxley, D. F. Shafer, A. H. Schory and A. P. Amann; **the Blowers Coal Co.,** of Bellaire, with a capital of $200,000 to mine coal in the eastern Ohio field by George A. Blowers, M. M. Weinstein, C. H. Poole, A. E. Clark and D. B. Brooks; **the Empire Mining Co.,** of Shawnee, with a capital of $12,000 by George W. Morgan, W. C. Edwards, John E. Nealson, E. B. Hopkins and William R. James; **the Standard Clay Co.,** of Empire, with a capital of $100,000 to mine coal among other things by Frank W. Stone, M. G. Bell, C. G. Jones, George S. Cotrell, and R. B. Holmes.

The Magnolia Coal Co., Magnolia, has been incorporated with a capital of $5,000 to mine and deal in coal both at wholesale and retail. Incorporators are H. E. Hunker, Paul G. Weber, Anne Zimmerman, Frank T. Bow and Agnes Parker.

Jerome Watson, St. Clairsville, Ohio, has been **appointed chief of the Ohio division of mine inspectors,** succeeding William Robinett, of Jacksonville. Mr. Watson formerly held the same position under the last administration of Governor James M. Cox.

Three large mines of the Ohio Collieries Co., near Athens, **were closed recently** for an indefinite period, and it was later announced that more of the big coal operators in the Hocking Valley field would suspend operations soon unless conditions in the fuel trade show marked improvement. The closing of the mines was due to a slump in trade brought on by the weather and the late opening of the lake trade.

I. H. Buchanan, general manager for the **Clay County Coal Co.** at Patchfork and the **Willis Harlan Coal Co.,** at Hima, Ky., was in Cincinnati recently purchasing new equipment.

PENNSYLVANIA

Several of the small coal-mining companies in the Connellsville region which last year signed the union scale of wages upon the condition that the union would keep them supplied with men, have **refused to renew the agreement this year.** The coal business being very unsatisfactory as to demand and prices a number of these operations have closed down indefinitely.

The Hudson Coal Co., the second largest anthracite taxpayer in the state, has carried **an appeal from the Auditor General's assessment** to the Dauphin County Court. The Philadelphia & Reading Coal & Iron Co., **has appealed to the State Supreme Court** from the Dauphin court's decision involving a half million tax.

The Burns bill, providing that mining and distribution of coal be placed under the jurisdiction of the Public Service Commission and that all coal-carrying and coal-producing corporations be subjected to the supervision of the commission as public utilities, **was defeated** in the House April 24 by a vote of 55 to 110. There was no debate on the bill. Representative Burns did not even explain its provisions to the House. Representative Whiteman, of Westmoreland, who opposed the measure in committee, merely stated to the House that it proposed to put all coal corporations in the state under the Public Service Commission.

A preliminary injunction has been granted in the court at Ebensburg, Cambria County, **the Sterling Coal Co.,** against E. P. Reed and Robert Reed, trading as the Reed Coal Co. at Bakerton, Cambria County. The injunction is to restrain the defendant company from mining coal in West Carroll township, the plaintiff company claiming ownership of the "B" seam, comprising some 85 acres, and that the defendant company has no right in or upon the tracts mentioned in the bill and would interfere with the plaintiff's operations.

Stanley Guoga, of Wilkes-Barre, pleading guilty April 25 before Judge Fuller on the charge of violating the mine act of June 2, 1891, **in smoking a cigarette in the mines** of the Lehigh & Wilkes-Barre Coal Co., **was fined $200** and sentenced to serve one month in the county jail. Sentence was suspended, and the defendant was paroled on condition that he pay the costs and $100 into court for charitable purposes. The money must be paid within 60 days.

Judge John A. Berkey of Somerset County on April 26 granted **a preliminary injunction** on a bill of equity filed by the Quemahoning Coal Co. **to restrain union officials from any procedures such as congregating, picketing, etc.** The defendants named are John Brophy, individually, and as president of District No. 2, U. M. W. of A., and others, including all the officers of District No. 2, and organizers employed by them. May 4 has been fixed for the time of hearing at the court house in Somerset. It is alleged in the bill that the defendants have been interfering with the company's operations at the mines at Harrison.

The Central Cambria Coal Mining Institute held a meeting in Portage on April 25 and **elected the following executive board:** Wallace Sherbine, general manager of the Portage-Wilmore Coal Co.; Patrick J. Keenan, Plymouth Coal Mining Co.; James West, Sonman Shaft Coal Mining Co.; F. M. Fahey, of the Gorge Coal Mining Co., and S. R. Kellerman, of the Sonman Shaft Coal Mining Co.

The Sugar Notch Colliery of the Lehigh & Wilkes-Barre Coal Co. was **shut down April 9 by the refusal of a miner to accept other work** when it had become dangerous for him to continue the employment on which he was engaged. He refused to work anywhere else in the mine. The aggrieved miner arrived at the mouth of the shaft with a member of the Grievance Committee, stopped the inside men from going to their labor and prevailed upon the breaker employees to go home. The colliery was unable to operate, 816 men being forced into idleness. The loss of production is about 1,800 tons daily.

The Hazle Brook colliery of the Wentz Coal Co. has resumed operations after being idle ten days. The excavation of coal from strippings near the breaker was conducted with such speed that the work of taking off the top layer of clay and rock could not keep pace and the miners had to lay off while the steam shovels caught up with the task of making the anthracite measures accessible.

The report of the **Pennsylvania Coal & Coke Corporation** and subsidiaries for the first three months of 1923 shows **gross earnings of $2,351,348.71,** with operating expenses and taxes, not including federal taxes, of $1,946,592.82. Miscellaneous income amounted to $36,048.97. The net income before federal taxes for the quarter, after deducting charges to income of $51,323.58, was $389,481.28. Tonnage shipped during the three months was 616,375 tons. James A. Hamilton, president of the W. F. Gilbert Co.; of New Haven, Conn., and Edward H. Everett were elected directors of the corporation to succeed R. H. Williams, Sr., and R. J. Doherty, resigned. The annual meeting will be held on May 7.

The Shade Coal Mining Corporation, which is the operating company for the Emerson & Morgan Coal Mining Corporation, of No. 1 Broadway, New York City, **has taken over the Antoinette Mine** of the Frauenheim-Logansport Coal Co., located on the Western Maryland R.R. in Somerset County, and production will commence at once. The coal is a smithing and byproduct fuel and is classified in Pool 9.

Charles F. Hall has resigned his position with the Equipment Corporation of America and **has organized and controls the Acme Equipment Co.,** contractors and dealers in railroad and mining machinery, 207 Fulton Building, Pittsburgh.

The Philadelphia & Reading Coal & Iron Co. has awarded a contract to the Ball Lumber Co. for the construction of ten additional blocks, making twenty houses, at Branchdale. Work has already begun. This makes a total of **seventy-two new houses either building or about to be built** in the Reading's spring program. Ground is now being prepared for the 18-house operation at the Bast colliery, at Big Mine Run, near Ashland. These houses will be in an unusually good situation on a hillside commanding an extensive view of the Mahanoy Valley, and the village seems certain to become one of the showplaces in that district. It will be known as Woodside, its site being on what was formerly known as Woodside Park.

The following bituminous coal companies were chartered at Harrisburg recently; **Meadow Brook Fuel Co.,** mining coal and manufacturing coal, Uniontown; capital stock, $20,000; Thomas M. Whyel, Uniontown, treasurer; incorporators, Thomas M. Whyel, Elizabeth P. Whyel and Frances P. Hutchison, Uniontown. **Douglass Brothers Coal Co.,** R. F. D. 3, Beaver Falls; $10,000; producing, mining and selling coal; treasurer, E. T. Douglass, who with David Douglass, R. F. D. 3, Beaver Falls, and H. A. Douglass, New Brighton, is an incorporator.

State Senator Robert D. Heaton, Schuylkill County, **introduced two bills** in the Senate April 24 **amending the workmen's compensation act** of 1915. One of these continues compensation in case of remarriage, and the other provides that the first day of disability shall be included as one of the ten days during which no compensation shall be paid and that the computation of the 300-week period in cases of death shall start with the day after death except where the death occurs within the ten-day period after an accident, in which case compensation shall be paid beginning the tenth day after the accident.

A state charter was issued recently to the **Cohen Mitchell Coal Co.,** Lewistown, Hyman J. Cohen, Lewistown, is treasurer, and the capital stock is $100,000. The incorporators are Hyman J. Cohen, Harold D. Cohen and James W. Mitchell, Lewistown.

The following bituminous coal companies have recently been incorporated: **Superior Coke Co.,** Latrobe, $100,000, Joseph M. Steele, Latrobe, treasurer. Incorporators, C. A. McFeely, Pittsburgh; F. B. McFeely, Latrobe and Frank O. Keltz, Latrobe. **H. A. Davis & Co.,** Pittsburgh, $500,000; D. R. Davis, Pittsburgh. Incorporators: H. A. Davis, H. R. Davis and H. B. Day, Pittsburgh, **Anderson Fuel Corporation,** Pittsburgh, $25,000; Guy D. Anderson, Aspinwall. Incorporators: Guy D. Anderson, Aspinwall; Bruce Harrison, Aspinwall, and Raymond B. Gabler, Pittsburgh.

A. W. Bittner has been appointed by the Consolidation Coal Co. as referee in all disputes arising between employees of the company at its mines in Somerset County.

TENNESSEE

O. P. Pile, Chief Mine Inspector, **will hold an examination for mine foremen** at the Government Building in Knoxville, May 22, 23 and 24.

VIRGINIA

The Virginia Coal & Coke Co. reports for the first quarter of 1923 net earnings of $243,559 after payment of interest, taxes etc. This is equivalent, after preferred dividends, to $1.81 a share earned on $10,000,000 outstanding common stock. While less than the net earnings of $273,184, or $2.10 a share, in the preceding quarter, it is a striking increase over the corresponding period of 1922, when the company returned a net loss of $81,047. The gross earnings for the first three months of 1923 were $351,752.

At the annual meeting of the **Mead-Toliver Coal Co.** a resolution was passed **to change the name of the company to the Killarney Smokeless Coal Co., Inc.** The principal office to be in the Peoples Bank Building, Lynchburg. The company was formerly under the management of C. H. Mead, Beckley, W. Va., but the present officers are as follows: James Gorman, president and treasurer; Dr. J. H. Craft, vice-president; G. H. Nowlin, Jr., secretary. The directors of the company are James Gorman, John J. Morrison, G. H. Nowlin, Jr., Philip Konrad, George W. Craft, Dr. J. H. Craft and J. A. Morrison.

WEST VIRGINIA

The Bertha Coal Co., Pittsburgh, Pa., **plans extensive improvement and enlargement of its Frances Mine, at Cresaps,** near Moundsville, on the Ohio River division of the Baltimore & Ohio RR. Approximately $300,000 will be expended for the erection of a new rail and river tipple, thus insuring steady operation of this plant, since at the present time shipment is being made by rail only. Modern shaker-screen equipment of the latest type as well as the erection of a number of new houses is included in the expenditure. The Frances Mine is now producing about 1,000 tons of coal daily, which will be increased to 2,500 tons when these improvements are completed.

Beckley people have organized the **Raleigh Peerless Coal Co.** with a view to developing coal properties in the Winding Gulf region, the new concern being capitalized at $100,000. The office of the company will be at Beckley. Among those interested are G. E. Thompson, Bernadine Norris, W. W. Goldsmith, H. M. Kilgore, and W. G. McClure.

C. H. Mead and associates have organized the **Faith Pocahontas Coal Co.,** Mr. Mead having been elected president. This company will at once proceed to develop its large holdings in the near future, several thousand acres of smokeless coal land on Milam Fork Branch of the Virginian Ry. being owned. Unless there are some unforeseen delays it is believed that it will be possible to begin shipping coal before the end of the year.

The West Virginia Rail Co., Huntington, purposes spending $290,000 to add another unit to its plant to manufacture frogs, switches, steel mine ties and timbers.

The Blake-Towson Coal Co. has been organized by Kingwood people with a view to operating in the Preston County field, having a capital stock of $125,000. Offices of the company are to be at Tunnelton. Chiefly interested in the new enterprise are G. C. Blake and Edith D. Blake of Cumberland, Md.; M. P. Blake, of Tunnelton, and Nora A. Towson of Kingwood.

Walter R. Thurmond and others prominent in the mining industry of Logan have **launched the Perry Branch Coal Co.,** the headquarters of which are to be at Kleencoal. The company has a capital stock of $25,000. Associated with Mr. Thurmond in the new company are W. L. Harvey, of Kleencoal; Innis D. Thurmond and R. J. Sellman, of Logan.

The Brighton Coal Co. has been launched by J. M. G. Brown and others of Morgantown, with a capital stock of $150,000. Mr. Brown and some of his associates recently purchased the holdings of the American Gas Coal Company at a sale decreed by the circuit court of Monongalia. Interested in the new company are: J. M. G. Brown, Robert D. Hennen, Louise R. Hennen, Mary B. Brown and T. Frank Burk.

The report of special commissioners Frank Cox, James R. Moreland and Edward G. Donley having been submitted and confirmed, **sale of the property of the American Gas Coal Co.** for $301,600 to J. M. G. Brown and Robert G. Hennen, under a decree of the court, has been confirmed.

The Island Creek Coal Co. reports operating profits of $990,656 for the first quarter of 1923, against $1,021,627 in the corresponding period last year. After allowing for depreciation and depletion reserves and estimated federal taxes there was reported net earnings available for dividends of $738,276, against $760,496 in the first three months of 1922.

With a view to operating in the Harrison County mining region, **the Evert Coal Co. has been organized,** having a capital stock of $25,000. Offices of the company are at Clarksburg. Active in organizing this concern were D. H. Dent, of Pickens; E. M. Pearcy, K. G. Davis, J. A. Farrell and O. L. Karichoff, all of Clarksburg.

Coal production in 1922 in the Pocahontas field, which totaled 15,073,908 tons, according to figures compiled by the Pocahontas Operators' Association, was the third highest in the history of the field. In 1916 there was produced in and shipped from the field 16,171,782 and in the following year a total of 15,156,353. In 1921 only 12,184,390 tons were shipped. Since the opening of the Pocahontas field in 1883 a total of 268,863,716 gross tons of coal have been shipped.

An injunction granted New River operators some time ago will remain in force until either the operators or the United Mine Workers seek to have it changed, and in either event **six months notice is to be given by the party seeking to change the status of the injunction.** That in substance is the gist of an agreement reached between counsel representing the McKell Coal & Coke Co., the Jones and other interests in the New River field and the United Mine Workers of America. An order to this effect has been filed with the clerk of the District Court for the southern district of West Virginia. Judge McClintic issued the injunction last summer, an appeal being taken by the United Mine Workers to the U. S. Circuit Court of Appeals. The agreement of counsel on each side—C. J. VanFleet for the United Mine Workers, and J. W. Maxwell for the operators—will apply to the appeal in the court of appeals and the case will be continued from term to term until either one side or the other seeks a change, provision having been made that in such an event, the six months notice will be required as has been agreed upon for the lower court.

WISCONSIN

Emil J. Earling, president of the Central Coal Co. of Milwaukee, announces that the **company has sold its coal docks in Milwaukee and at Escanaba, Mich.,** to the Industrial Coal Co., of Pittsburgh. The Central Coal Co. will in the future, Mr. Earling says, confine its activities to the operation of its mines in Illinois and the sale of rail coal. The company has operated its docks in Milwaukee for eighteen years.

Emphatic denial of the reported consolidation of the C. Reiss coal interests with the Pittsburgh Coal Co.'s dock holdings throughout the Northwest has been entered by various persons in both companies, notably Peter Reiss, who was recently made a director of the Pittsburgh Coal Co. He said he had been interested in the Pittsburgh company for years and his election as a director to fill a vacancy had no significance. Northwest officials of the Pittsburgh company also deny the story, saying that although a consolidation was considered at one time, there is no likelihood of it now.

WASHINGTON, D. C.

The use of industrial motion pictures has reached a point where the Secretary of the Interior believes a more **uniform policy should be adopted in the preparation of such films.** The various bureaus of the department heretofore have proceeded separately without regard to a common policy. There has been some criticism of government films on the ground that they give undue advertising to certain companies. A thorough investigation of the whole subject is being made with the idea of establishing a policy and with the idea of materially expanding the production of this type of motion picture.

A request that American coal producers submit bids in connection with a purchase of 150,000 tons of coal which the Central Railway of Brazil expects to make on May 19 has been received at the U. S. Department of Commerce.

The Bureau of Supplies and Accounts of the **Navy Department, will open bids** at noon on May 10 for furnishing and delivering about **22,450 gross tons of various sizes of anthracite** at various points along the Atlantic coast and Great Lakes, Ill. Detailed information may be obtained at the office of the bureau.

CANADA

At the recent annual convention in Toronto of the **Canadian Retail Coal Dealers' Association** interest was manifest in the possibilities of Alberta coal for Ontario, but it was the general feeling of the merchants that they would have to move warily for the present, until the probable lower cost at the mines, the prospect of lower freight rates and the qualities of the different kinds of coal had been more fully investigated. It was felt by most of the delegates that the Government commissions for the supply of coal for domestic use had so far been a waste of public money and the government is to be asked to discontinue the appointment of these so-called useless bodies. G. F. Rogers, of St. Catherines, Ont., was elected president: W. H. Smith, Owen Sound Ont., vice-president, and B. A. Campbell, Brantford, Ont., secretary-treasurer.

COAL OUTPUT OF BRITISH COLUMBIA, MARCH, 1923

VANCOUVER ISLAND DISTRICT

Mine	Tons
Canadian Collieries (D) Ltd.,	
Comox	20,675
Extension	21,337
South Wellington	10,853
Western Fuel Corporation, Nanaimo:	
Reserve Mine	21,836
No. 1 Mine	30,009
Wakesiah Mine	10,256
Granby Consolidated, Cassidy	21,758
Nanoose-Wellington Collieries,	
Lantzville	9,533
Old Wellington, Nanaimo	920
Total	147,177

NICOLA-PRINCETON DISTRICT

Middlesboro Collieries, Middlesboro	7,999
Fleming Coal Co., Merritt	881
Coalmont Collieries, Coalmont	12,209
Princeton Coal & Land Co., Princeton	812
Total	21,901

CROW'S NEST PASS DISTRICT

Crow's Nest Pass Coal Co., Coal Creek	45,312	
Crow's Nest Pass Coal Co., Michel	29,900	
Corbin Coal & Coke Co., Corbin	4,297.09	
Total		79,509.09
Grand total, March		248,587.09

Canadian mines during December last produced 1,734,000 net tons of coal, making the output for the calendar year 15,045,000 tons, or 2 per cent below the three-year average of 15,307,800 tons, according to a statement issued by the Dominion Bureau of Statistics. **Imports** of coal for December **amounted to 2,307,000 tons,** or 471,000 tons less than in the preceding month but 67 per cent more than the three-year average for the month. For the calendar year imports were 14,255,600 tons, while the three-year average for the same period was 18,634,000 tons. A slight decrease in exports of Canadian coal was recorded, **166,200 tons being exported during the month** as compared with 169,000 tons in November, a decrease of 2 per cent. The record for the year 1922 equalled 82 per cent of the three-year average. There was available for consumption in Canada during December 3,875,000 tons, which when compared with the three-year average for the month was 40 per cent greater. The coal available for consumption in Canada during the year was 27,482,300 tons as compared with a three-year average of 31,736,800 tons, a decrease of 14 per cent.

Coal Mines of British Columbia used 26,762,001 ft. of timber, including 12,279,871 ft. of mine props and 10,740,000 ft. of butts, last year.

Coke made from bituminous coal as a substitute for United States anthracite was under discussion in the Senate Committee on Fuel Supply for Canada when C. B. Bagg, of the Montreal Heat & Power Co., stated that his company had marketed up to 150,000 tons of domestic gas coke a year. The coke output was limited to the quantity of gas which could be used, so that it was not practicable to encourage more people to use coke.

Members of the Western Canada Coal Operators' Association in session at Calgary passed a **resolution against the proposed amendments to the Industrial Disputes Act** that would mean, in brief, **consideration of the arbitration board's report before wages could either be reduced or increased.**

Publications Received

Production of Explosives in the United States During the Calendar Year 1921, by Wm. W. Adams, Bureau of Mines, Washington, D. C. Technical paper 313. Pp. 25; 6 x 9 in.; tables.

An Investigation of the Properties of Chilled Iron Car Wheels, by J. M. Snodgrass and F. H. Guldner, Engineering Experiment Station, University of Illinois, Urbana, Ill. Part III. Bulletin No. 135. Pp. 100; 6 x 9 in.; illustrated. Covers strains due to brake application, coefficient of friction and brake-shoe wear.

Mine Power, by W. R. Woolrich, University of Tennessee, Engineering Experiment Station, Knoxville, Tenn. Bulletin No. 2. Pp. 49; 6 x 9 in.; illustrated. Factors in the economical generation, distribution and maintenance of electric power and power equipment in the coal mines of Tennessee and Kentucky are the subjects touched upon in this bulletin.

"Howdy" is the name of a little bulletin which has recently made its appearance. It is published monthly by The Morrison & Risman Co., Inc., of Buffalo, N. Y., and a copy may be had by dropping a postcard to them. It is devoted to fun and facts.

Recent Patents

Coupling for Mine Cars. F. W. Fries and Wm. J. Fries, Carlinville, Ill.; 1,439,158. Dec. 19, 1922. Filed March 3, 1922; serial No. 540,760.

Coal Screening and Washing Machine. Wm. F. Martin, Wormleysburg, Pa.; 1,439,252. Dec. 19, 1922. Filed May 18, 1922; serial No. 561,981.

Coal-Washer Jig. Louis MacKenzie and Wm. Richardson, Jr., Ensley, Ala.; 1,439,431. Dec. 19, 1922. Filed March 18, 1922; serial No. 544,863.

Mining Machine Jack. Morris P. Holmes, Claremont, N. H., assignor to the Sullivan Machinery Co., Chicago, Ill.; 1,439,677. Dec. 19, 1922. Filed April 2, 1919; serial No. 287,025.

Crusher. Milton F. Williams, St. Louis, Mo., assignor to the Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.; 1,439,781. Dec. 26, 1922. Filed July 1, 1922; serial No. 572,135.

Crusher and Pulverizer. Harold M. Plaisted, St. Louis, Mo., assignor to Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.; 1,439,754. Dec. 26, 1922. Filed Aug. 8, 1921; serial No. 490,617.

Hammer Rod for Crushers. Wm. M. Davidson, St. Louis, Mo., assignor to the Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.; 1,439,800. Dec. 26, 1922. Filed July 28, 1922; serial No. 578,176.

Cage Partition Plate for Crushers. Wm. M. Davidson, St. Louis, Mo., assignor to the Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.; 1,439,872. Dec. 26, 1922. Filed Sept. 11, 1922; serial No. 587,433.

Miners' Knife. Henry Kallio, Painsdale, Mich.; 1,440,014. Dec. 26, 1922. Filed April 5, 1920; serial No. 371,350.

Obituary

Frederick Marietta, formerly a mine superintendent of the Stickel & Frank coal interests at Connellsville, Pa., died April 17. He was a graduate of the Carnegie Institute of Technology in Pittsburgh in the co-operative department of mining engineering, and also received a diploma from the U. S. Bureau of Mines in first-aid and mine-rescue work. During the recent war he was assigned to the Wissahickon Barracks at Cape May.

Traffic News

The Smokeless Fuel Co. takes exception to a tentative report involving numerous shipments between the company's mines and Lamberts Point, in which certain demurrage charges were approved. The company contends that the demurrage charges are in excess of those that would have accrued had the railroads released from demurrage account cars which had been dumped prior to the registry of their respective vessels. The Norfolk & Western contends that the tariff and not the exchange rules is the basis for the assessment of demurrage charges. The record will not support a finding, the carrier contends, that the computation of detention by subtracting the date of car arrival from the date of release of equivalent tonnage, without allowing any additional credit for the days elapsing between the date of dumping and the subsequent date of arrival of equivalent cars in transit, is unjust and unreasonable, or contrary to the applicable tariff.

Freight rates on coal from northern Alberta mines to Prince Rupert **have been raised $1 per ton,** according to notices sent out by the Canadian National Railways.

In a complaint filed by the Winding Gulf Colliery Co., the Interstate Commerce Commission is asked **to require the Chesapeake & Ohio Ry. and the Virginian Ry. to interchange at Pemberton** and not discriminate in the rates applied upon coal traffic interchanged at that point. The commission is asked to require the railroads to provide other facilities and service and to establish New River district rates on coal traffic interchanged within the district from the complainant's mines.

The Northern West Virginia Coal Operators' Association, in a traffic case against the Pennsylvania R.R., points out that in July, August, September and October, of 1919, mines on the Monongahela Ry. had an average car supply of 81.9 per cent. During December, January and February, following, the average supply was 54.6 per cent. On the other hand, it was declared that mines on the Pittsburgh & Lake Erie and on the Monongahela division and Pittsburgh West End Division of the Pennsylvania, received 90.5 per cent car supply during the first period and 60.5 per cent during the second period. Had cars been distributed on a pro-rata basis, the mines operated by members of the Northern West Virginia Coal Operators Association would have received an average of 87 per cent car supply. For that reason it is contended that mines on the Monongahela were subjected during those periods to prejudicial action and are entitled to reparation.

Increases in the rates on coke from the Cleveland ovens to points in New York State, which the Wheeling & Lake Erie R.R. proposed to put into effect May 1, **were suspended** April 26 by the Interstate Commerce Commission until Aug. 29, to allow investigation. The present rate on coke to all of the northern New York territory from Cleveland is $2.39 per ton, the commission order said, while the suspended Wheeling & Lake Erie schedule proposed to make new rates to Niagara Falls at $2.76 per ton, to Lockport $3.40 and to North Tonawanda $3.19.

Questions involved in the case of the **Northern West Virginia Coal Operators' Association vs. the Pennsylvania R.R.** will be considered at an Interstate Commerce Commission hearing in Washington on May 15. Examiner McQuillan will preside.

Rates on bituminous coal from southern Illinois fields to Ste. Genevieve and Mosher, Mo., have been unreasonable since March 26, 1921, in the opinion of examiner Koch expressed in a tentative decision. Reasonable rates are suggested for the future and reparation should be paid, the examiner holds.

In the case of the Big Mandy Coal & Mining Co., the Interstate Commerce Commission holds that **the rates on coal from mines on the Lenox R.R. to Cincinnati and points in the Cincinnati switching district, as well as to points in Central territory, are unreasonable.** Reparation was awarded and reasonable rates prescribed for the future.

Thomas Moore, purchasing agent of the Virginian Ry., is authority for the statement that **orders for equipment** for that road placed since Jan. 1 **aggregate $6,000,000.** On April 12 the company ordered 1,000 all-steel gondola cars having a capacity of 120 tons and 500 all-steel hopper coal cars of a capacity of 70 tons. In January the road ordered 15 freight locomotives.

The Hood Coal Co., Wilmar Coal Co., Cava Coal Co. and Mack Coal Co.., operating in the vicinity of Shinnston, W. Va., have filed a petition with the Interstate Commerce Commission asking reopening of their case with a view to **placing them on the same rate basis as enjoyed by other companies in the field.** The petition states that "a comparison of rates shows that the complainants' mines are well within the distance limits of the group taking the Fairmont rate to Eastern and Western destinations.

Coming Meetings

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting May 23 and 24 at Wilmington, Del. Secretary, W. M. Bertolet, Reading, Pa.

American Association of Mechanical Engineers will hold its spring meeting at Montreal, Quebec, Canada, May 28-31. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

National Association of Purchasing Agents will hold its eighth annual convention and Informashow at Cleveland, Ohio, May 15-18. Convention headquarters, room 219, Hotel Winton, Cleveland.

The National Association of Manufacturers will hold its 27th annual convention at the Waldorf-Astoria, New York City, May 14-16.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24, Secretary-treasurer, J. G. Crawford, Chicago.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Michigan-Ohio-Indiana Coal Association will hold its annual convention at the Hotel Sinton, Cincinnati, Ohio, May 22-24. Secretary, B. F. Nigh, Brunson Bldg., Columbus, Ohio.

West Virginia Coal Mining Institute has tentatively set June 5 and 6 for its annual meeting, to be held at Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Retail Coal Dealers' Association of Texas will hold its eighteenth annual convention at Galveston, June 11 and 12. Secretary, C. R. Goldmann, Dallas.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Industrial Co-operation—How?

INDUSTRIAL co-operation is a fine sounding phrase but as a phrase it needs considerable interpretation. Under the auspices of the American Mining Congress, a committee endeavoring to give point to the subject held a meeting in New York recently, attended largely by employers of labor. The substance of its deliberations are contained in a formal resolution which, after asserting that industrial peace is vital and can be reached only through mutual confidence between management and workers and that energy should be diverted from strife to practical co-operation, offers the good offices of the Mining Congress toward reaching those desirable ends. The thinking behind this offer to help bring peace in the industrial world is found in two paragraphs of the platform of the Division of Industrial Co-operation of the congress, one stating that the confidence in management so fundamental to industrial peace can be obtained only by closer personal touch between management and employees, the other that "future peace of industry will not be found in 'organized employers' and 'organized employees' that are created to fight each other. This has been tried for half a century and failed."

One can read nothing less from these words than a declaration for the open shop, for each company or plant management to negotiate with its own labor without interference from national organizations of either employers or employees. Thus and thus only is that desired degree of personal contact attained and retained. The open shop, with works councils and employee representation in management has been attained in many places. It is a proved fact in a number of industries, for it withstood the shock of the great boom of 1920 and the depression of 1921. But it is not to be found in the coal industry.

Before the coal operators chase this mirage let them give heed to the practical problem in the immediate forefront, of dealing with a miners' union that is today, because of its national scope, in as strong a position to dictate terms to management as were the coal operators to dictate to labor thirty years ago. The movement for a mine workers' union was fostered by the necessities of the worker. History is quite clear on that point. Of more immediate interest than discussion of a theory of industrial co-operation based on abolition of the union is the question of whether the employers of union coal-mine labor can recognize and cope with the condition of a labor monopoly essentially complete now. The country is not complacent in the matter; it is quiescent because it has turned the job over to a coal commission. If all that the coal operators can suggest by way of solution for national strikes is to smash the union they may expect instead paternalistic control. No matter what a commission might urge, no congress will deal in such stern doses.

Is present necessity about to drive the union operators into collective action, or into the hands of the government? The non-union operators, observing the two major disasters that have overtaken their Northern brethren in recent years, are united in steadfast opposition to the union, fighting fire with fire to save themselves from domination by Indianapolis.

"Maximum Economic Strength"

IN A RECENT issue of the *United Mine Workers Journal*, Philip Murray, vice-president of that organization, made a plea since repeated to the U. S. Coal Commission for the unionization of all the coal-mine workers of the country, in which article he says "All the coal operators in the country, including those in the non-union fields, are organized in a single, compact national organization known as the National Coal Association." From this he argues that "in all fairness, it should be possible for all the miners of the country" to have their nationwide union so that they "may meet the maximum economic strength of the operators with the maximum economic strength of the mine workers."

Mr. Murray's statement of fact is on a par with that of the man who defined a lobster as a red fish that walked backward. A lobster is not a fish, it is not red, and does not walk backward. The National Coal Association is national in name but not in membership; it includes in its membership but about half of the bituminous coal operators and none of the anthracite operators. It is not organized for and has never functioned as a body for negotiating with the labor it employs. And when it comes to matching "full economic strength" the mine workers, with some two-thirds of the soft-coal and all the anthracite mine labor, have demonstrated most conclusively that they now have a united whole and that the operators, and the whole country, are as shifting sands before them.

The largest employer of non-union coal-mine labor, the Steel Corporation, does not participate in the National Coal Association. There are many others, both union and non-union, that are outside the fold. Mr. Murray doubtless would tell the operators that they too should enjoy the check-off and thereby make their association 100 per cent strong. He appreciates, of course, that were it not for the compulsory payment of dues to the United Mine Workers through the check-off, the paid-in membership of that organization would be nearer one-half than all the men in a given field. The record in the anthracite region shows this. Just as there are operators who are willing to participate in the benefits of organization but who are not willing to share in the responsibility and expense, so there are mine workers who pay dues and go along with the crowd only because they are forced to do so by the complete control of the union in their field.

There is no organization in the bituminous-coal industry that brings the operators together for the purpose of bargaining with union labor. Locally in smaller

groups the associations of operators have interest in labor as the chief factor for their existence, now that trade bureaus have been banned, but on a national scale there is no counterpart for the local wage-negotiating group. That is one of the serious lacks in the industry. Instead of arguing for a national labor union, for the inclusion of non-union fields within its grasp, the United Mine Workers might strive to organize the coal operators in order that there might be some semblance of equality in the economic strength of the two groups. It is all one-sided now.

The strike of 1922 is too fresh in memory for anyone to entertain even a small measure of credence for Mr. Murray's naïve assertion that the poor weak United Mine Workers should be left unhampered by the non-union coal operators in its efforts to build itself to that measure of "full economic strength" whereby it may meet the "maximum economic strength" of the operators. He certainly must have smiled when he penned those words.

If Flour Were Coal

CENSUS returns show that the value of the products of flour and grist mills in the United States in 1921 was nearly $1,200,000,000. The number of establishments engaged in the industry that year was 6,485. Thus it will be seen that in point of value and of number of plants the milling industry is comparable with that of the production of bituminous coal. The decline in value of output from 1919 to 1921 was 42 per cent, compared with less than 9 per cent drop in the output by soft-coal mines in the same two years.

In other words, here is an industry about which little is heard, one that comes in for no berating by the public, one that has as great fluctuations, as great irregularity in operation, as bituminous coal. Flour is as essential to public welfare, health and happiness as coal, perhaps more so in that all the flour is used for human consumption and but from 10 to 15 per cent of bituminous coal goes to householders. The Census reports also that the unit values of flour and grist-mill products were much higher in 1919, were in fact abnormal, as a result of federal stimulation of production during the war. Yet there has been no long series of congressional investigations or a Flour Commission. It is to be presumed that the operators of flour mills are just as human as coal men, with a normal desire to be engaged in a profitable business.

What are the conditions that have immunized flour? In the first place there is no United Flour Workers of America, hence no stoppage of flour production. Should 75 per cent of the flour mills be closed for five months because of a disagreement between the management and the men, a situation would arise demanding the attention of the federal government. Although flour can be more easily stocked than coal, the country normally carries a reserve of less than 30 days' supply. Should the production of flour be stopped for even a short period, prices most certainly would mount and actual want develop. But that has never happened.

In the last three years the production of wheat flour has ranged from 7,461,000 barrels to 13,917,000 barrels per month, a spread as wide as is found in the production of coal, save during national strikes. Yet the flour mills have had no occasion to complain of car shortage. The output of the mills apparently flows over the rails as regularly as it is produced and required. If flour were to have the experience of bituminous coal there would be periods when customers could get but half the quantities they required or bought because the railroads were not able to furnish transportation.

Now, since the men who make and market flour are as numerous as those who produce soft coal, and since they are business men, large and small, as in the coal industry, there must be problems of production and of merchandising, cancellations of orders, questions of contract performance, of quality, and of price, such as characterize the coal trade. It is hardly to be thought that the flour industry functions perfectly. May it not be that because it has no major labor problem and no difficult transportation situations flour is not like coal?

Concerning Private Management of Roads

FREIGHT-CAR shortages, as reported by the American Railway Association, are gradually decreasing. At the same time loadings of freight cars are increasing, and at approximately a million cars per week are now at a level previously reached only in the fall season, when crop and coal movements are accelerated. In the week of April 21 loadings of revenue freight were 957,743 cars, exceeding all weeks since that of Nov. 17, 1922, and within 6 per cent of the highest record of all time, that of the week of Oct. 15, 1920.

Now, the conjunction of these two things, car loadings of such huge proportions and a shortage currently less than 50,000 cars and diminishing, means one of two things—either the roads are vastly more efficient than in the immediate past, when car shortages of over 100,000 cars were coupled with loadings below 800,000 cars per week, or there has been an increase in equipment and facilities. The answer is found in both directions. A total of 5,130 new freight cars and 142 new locomotives were put in service in the first half of April. In the three and a half months from Jan. 1 to April 15 the number of new cars installed reached 44,302 and of new locomotives 1,077. On April 15 new cars on order numbered 116,890 and locomotives numbered 1,950.

These additions to equipment do not suffice to account for the remarkable showing being made by the railroads; they are but substantial helps. The railroads are digging in their toes and working to meet the load imposed by a truly remarkable increase in industrial activity. They have a definite program. They are organized into a definite, compact unit. They have a common motive and that is to show the country that, given half an opportunity, the railroads of the United States can, *under private ownership and management,* meet the transportation requirements of the country.

The railroads have called on the managers of all other business to assist them in carrying out their program for this year by loading cars to capacity, by decreasing car detention and by storing coal during the summer. Business is responding. A part of the railroad managers' program calls for storage of railroad fuel during the coming summer. Reports are to the effect that but few roads have taken steps toward putting down coal against next winter's needs. When they really put the coal storage part of their program in action the railroads will have assured themselves of relief for a major portion of their coal transportation problem of next winter.



Efficiency Methods Practiced at Hardburly Mines

Storage of 480 Tons Aggregate Capacity Steadies Flow of Coal to Tipple—Egg Coal from Two Seams Kept Separate—Entry Driving Speeded with Lowered Cost and Bettered Air—Slate Dumped at Minimum Expense

By Alphonse F. Brosky
Assistant Editor, *Coal Age*, Pittsburgh, Pa.

IN PREVIOUS articles on the methods and practices of southeastern Kentucky it will have been noted that not only is there a wide diversity in the mining methods of the various coal companies but that the surface equipment also is by no means standardized. For instance, many different means are used for lowering coal to the tipple, the rope-and-button conveyor, the scraper conveyor, tubes and the monitor being all in use. The last of these is found at the Hardburly mine of the Hardy-Burlingham Mining Co., located at Hardburly, Perry County, Ky., which village is six miles northeast of Hazard.

The 2,500 acres of land owned by this company is underlaid by three minable coal seams. No. 4 seam is 100 ft. below the railroad and has a thickness of 39 in. No doubt this coal will be removed in the distant future after the thicker and more easily mined coals above it have been extracted. No. 7 seam is 200 ft. above the railroad, its thickness being almost 5 ft. From this the greater part of the output of the mine is derived. No. 8 seam also has been mined. This is 68 in. thick in some inextensive areas. It lies approximately 380 ft. above the railroad. At the time of my visit no coal was coming from this upper seam.

As the coal comes to the twin tipple at the bottom from two different hills, whenever both seams are being worked, four dumphouses are kept in operation. After being transported a short distance along the hillside from the mine openings the coal is discharged by kickback dumps into 100-ton bins. This operation requires the services of four men in each of the upper dumphouses and six men in each of the lower dumphouses. The coal is lowered to the tipple in 10-ton tank-type monitors, two in balance for each dumphouse.

The company contemplates a change in its method of lowering coal to the tipple. The use of monitors breaks the product, for when they are used it has to be dumped twice instead of once. To avoid this loss, the coal on both sides of the valley, hereafter will be transported in full trips from both seams to one point at the elevation of No. 7 seam, from which it will be lowered to the tipple in mine cars on an endless rope operating on an 18-per-cent grade. With the proposed change a full trip of mine cars may be fed to the bottom, and their contents emptied by a rotary dump into a large storage bin. At this point a reciprocating feeder will deliver the coal to a conveyor which will carry it to the shaker screens.

At the present time only one bed, the lower, or No. 7, seam is mined, though, as already mentioned, the upper, or No. 8, seam is provided with equipment for lowering coal to the tipple. Here, as elsewhere, the railroad-car supply is limited and the mine operates only a few days a week. Rather than work two seams part time and only at a fraction of capacity, the company closed down the upper seam and takes coal only from the lower, or No. 7, seam. To avoid confusion the conveying and dumping problems will be described on the assumption that both seams are being mined.

The monitors handling the two coals separately discharge them at the foot of the hills into individual 20-ton bins. Conveyor feeders discharge the coal to main run-of-mine conveyors of the double-compartment apron type, each of which is capable of handling 300 tons of coal per hour. The two screening units can handle efficiently all the coal that can be passed over the two conveyors, or a total of 4,800 tons per day. This is the ultimate output of the Hardburly mine, which places it in the group of the few large one-tipple operations in Kentucky.

From a distance the dumphouses, because of their generous proportions, closely resemble the usual 1,000-ton tipple and undoubtedly would be taken for such were they located at the foot of the hills. With a view to obtaining a large ultimate output and in order to

NOTE—Headpiece shows Hardburly tipple designed to handle 4,800 tons per day. On the right are two of the dumphouses with the 100-ton bins and their monitor roads. Five tracks go under the tipple.



FIG. 1

Hardburly, Ky.

Largest operation in the Hazard field. Note the four dumphouses, two on each hillside, each receiving the output from a separate seam of coal and each dumping into a separate pair of monitors. All four dumphouses have each a storage capacity of 100 tons. Most of the residences in the mining village are for the housing of two families. Hardburly lies near the headwaters of Lotts Creek not far from the Knott County line but still in Perry County.

insure facility in handling this tonnage the dumping operations in the several headhouses must be practically continuous. Delays at these points would militate against the establishment of a capacity run and cause delays all along the line.

To avoid such irregularities in the flow of coal provision is made at the dumphouses so that coal can be stored in bins in case the monitors are delayed. Thus, if the inclined planes are not working, the operation of the mine continues, at least for a while, unaffected. On the other hand, if the trips fail to come to the dump the supply of coal in the bins allows the monitors to make several trips, thus keeping the tipple in operation. These four bins have inclined bottoms which discharge the coal by gravity to the monitors. At the foot of each hill are located two 20-ton bins into which the monitors discharge. Run-of-mine conveyors feed the coal from these pockets to the tipple proper.

With storage bins thus located the efficiency of the tipple is increased and the tonnage of the mine augmented. The four bins already described and shown in the diagrammatic plan, Fig. 2, each have a capacity of 20 tons, thus providing a total storage of 80 tons, which is available for preparation over the tipple the moment the machinery is started up. At many mines where coal has to be lowered to the tipple much valuable time is lost every morning before the preparation machinery can begin to operate. But at this mine, with the four bins filled, the tipple may run at capacity for a period of eight minutes. This time is sufficient for the loading, lowering and dumping of the monitors, by which the bottom bins can be replenished.

Each of the four dumphouse bins is of 100 tons capacity. They also form reservoirs, and when filled they supply the monitors with coal sufficient to run the tipple at capacity for a period of 40 minutes without needing refilling. These bins release about 150 mine cars which otherwise would have to stand at the dumphouse or on an underground sidetrack all night in order to supply coal for the early morning run.

Two sizes, lump and egg, are prepared over the tipple, the slack resulting being chuted into the railroad car directly from the screens or else carried by a slack conveyor to a mixing table where combinations of various sizes are made. The screening equipment prepares the mine-run coal so that 40 per cent of it, which is known as "lump," passes over a 4-in. round screen, 30 per cent, termed "egg," passes over a 1¼-in. round screen, the remaining 30 per cent, as slack, passing through the latter.

The run-of-mine conveyor,

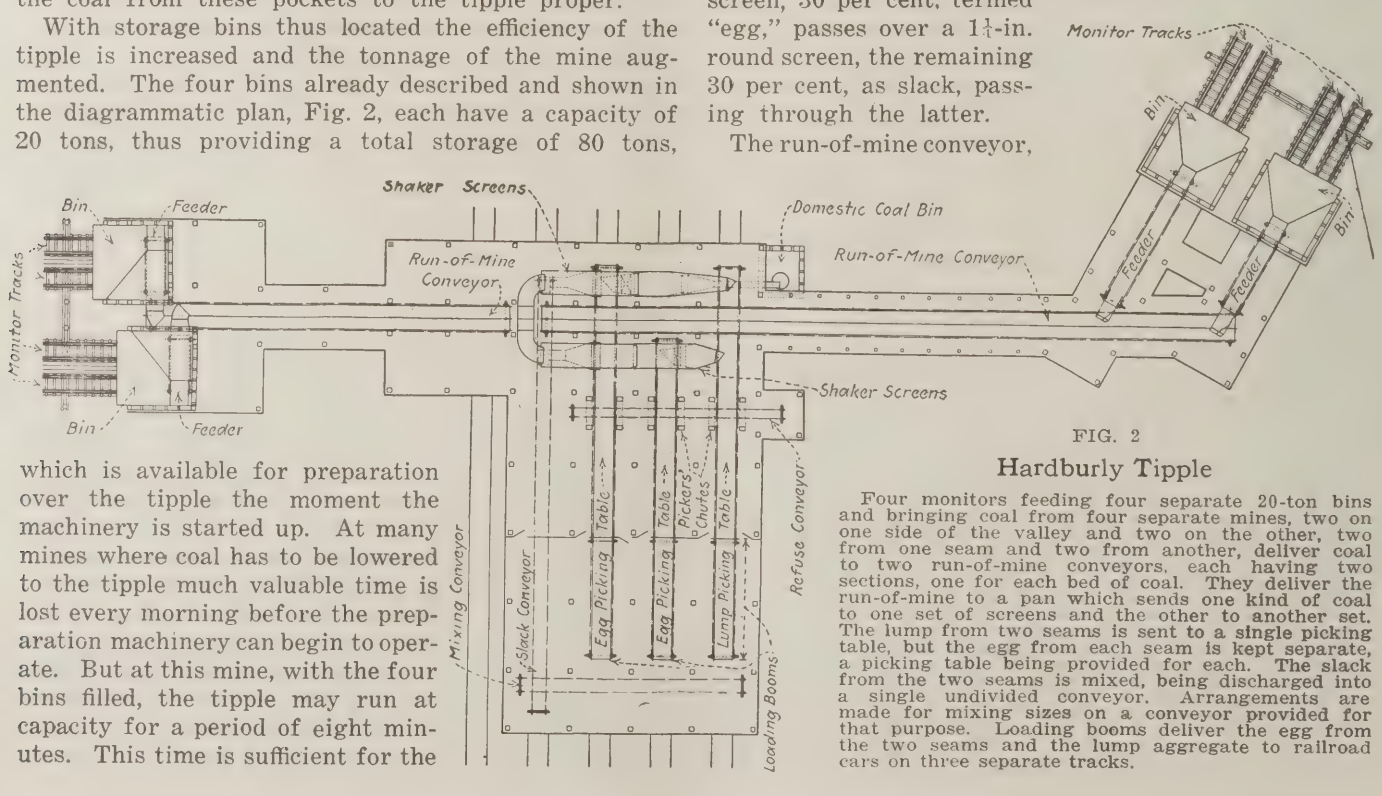


FIG. 2

Hardburly Tipple

Four monitors feeding four separate 20-ton bins and bringing coal from four separate mines, two on one side of the valley and two on the other, two from one seam and two from another, deliver coal to two run-of-mine conveyors, each having two sections, one for each bed of coal. They deliver the run-of-mine to a pan which sends one kind of coal to one set of screens and the other to another set. The lump from two seams is sent to a single picking table, but the egg from each seam is kept separate, a picking table being provided for each. The slack from the two seams is mixed, being discharged into a single undivided conveyor. Arrangements are made for mixing sizes on a conveyor provided for that purpose. Loading booms deliver the egg from the two seams and the lump aggregate to railroad cars on three separate tracks.



FIG. 3

Run-of-Mine Conveyor

On each side of the tipple is a conveyor that takes the whole product of two mines, keeping each separate. It will be seen that at the time of taking the photograph from which this illustration was made the coal from only one mine was being transported, the right-hand half of the conveyor being empty. It will be noted that the conveyor shed is open to the weather on both sides.

which leads from the lower bins to the tipple, has two compartments set side by side, the coal from each of the two seams being carried separately to a receiving bin between the two sets of screens. Here the coal from the two seams is still further diverted, each coal going to its own screening rig. The screens and run-of-mine conveyors are normal to the railroad tracks, but the picking tables with their loading booms run parallel thereto.

Lump coal separated over the two screen sets is merged to pass over one picking table, but the egg for each seam is cleaned on a separate table and loaded into railroad cars without mixing. The egg coal, though it comprises only 30 per cent of the whole product, is singled out for this preference because it is to be used for metallurgical purposes and is not destined, like the lump coal, which constitutes 40 per cent of the product, for the domestic market. The egg coal and slack are shipped to the parent corporation, the Andrews Steel Co., of Newport, Ky., where these products are consumed for metallurgical and steam purposes respectively. Fig. 2 shows clearly the general arrangement.

Two systems of mining are used at the Hardburly mine. The older workings are laid out in panels and operated on the system of half advance and half retreat, by driving as many as twenty-four rooms in one direction advancing and as many more in the opposite



FIG. 4

Tipple Floor

In the foreground are the loading booms and behind them the picking tables. The loading boom to the right takes the lump coal and those on the left take egg coal from two separate seams. The boxes for refuse can be seen alongside the picking tables. They discharge onto a conveyor below. The slack conveyor on the extreme left is out of sight. In the rearground are the screens for the coals from each of the two seams, which in sizing are kept separate. The slack, as also the lump, in the two seams is, however, mixed on leaving the screens.

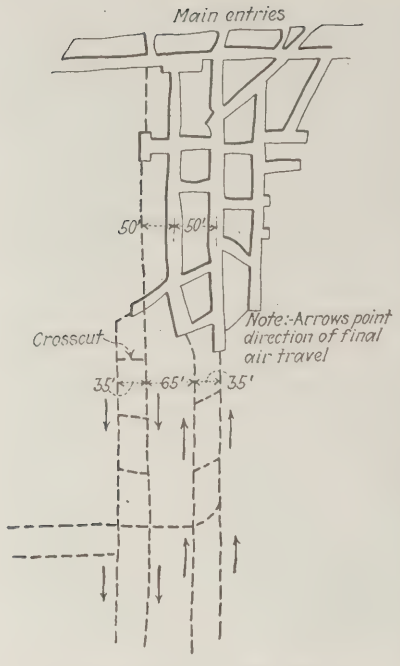


FIG. 5—OLD AND PROJECTED WORKINGS

The old workings at the top have provision made for four headings at 50-ft. centers. Arrangements are now made to make the outer pillars 35 ft. wide less the width of one roadway and to make the inner pillar 65 ft. wide less the same reduction. The two headings will first be ventilated in pairs, one being the return for the other, but after they arrive at a crosshead one pair will serve as returns for the other pair, as the ventilation arrows indicate.

direction retreating, thus completing one panel. The number of rooms for which provision is made, however, depends entirely upon local conditions, being varied as the outcrop is approached. This, however, is the old method, though it, perforce, is being continued in the workings thus started. Unless this system is watched closely, creeps are likely to ensue, and the method described and about to be discarded has the disadvantage that the men in charge, whenever working places are needed, are tempted on the advance to drive rooms in both directions instead of in one only. Another system is now used in the new workings. This is similar to that in operation at the Lynch mine of the United States Steel Corporation. Each section of the mine is divided into six panels.

The rooms in panels Nos. 1 and 2 are driven on the advance end toward the nearer extracted area. The rooms in panels 5 and 6 also are driven on the advance and toward their nearer extracted area, that is in the opposite direction to the rooms in panels Nos. 1 and 2. These rooms are drawn on the advance so as to form straight pillaring lines across panels Nos. 1 and 2 and Nos. 5 and 6. This makes the roadways adjacent to these panels untravelable wherever the pillaring line has struck them, but approach always is possible through the roadway between panels Nos. 3 and 4, which are left standing until the advancing headings reach their terminus; then the roadway between panels Nos. 3 and 4 has served its purpose and is worked out on the retreat. In this way there always is a roadway, well protected,

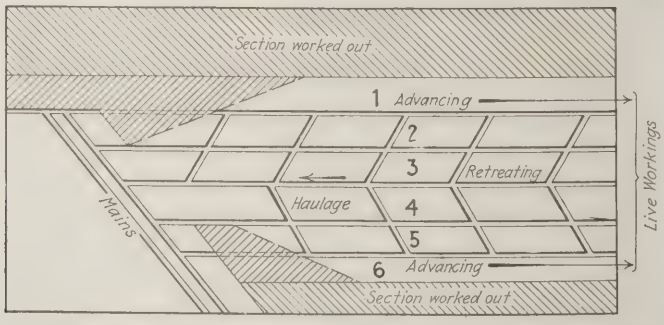


FIG. 6—SYSTEM OF MINING NOW BEING INAUGURATED

Work proceeds, advancing in panels 1, 2 5 and 6 and the pillars are drawn advancing, thus caving the headings so that the roadways would be closed if it were not for the heading between panels 3 and 4 and the side roadways through those panels by which approach is kept open to the working entries. Panels 3 and 4 are withdrawn retreating.

through which access can be obtained to the advancing headings. The rooms are made 350 ft. long. Consequently the pillar on either side of the roadway in the center is of that width and is amply able to prevent any undue pressure such as will close or weaken that roadway.

Barrier pillars 100 ft. wide protect the mains for a distance within the hills until the overburden becomes excessively heavy and then these pillars are widened to 150 ft. The entries were driven at first on 50-ft. centers. Now, however, where the entries are quadruple the three intervening pillars are made of unequal size, the outer pillars of the three being narrowed to 35 ft.

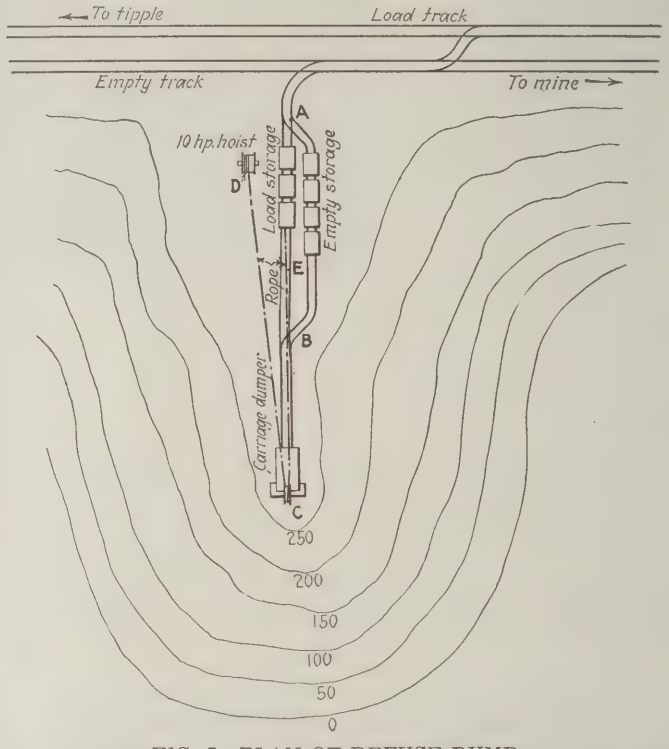


FIG. 7—PLAN OF REFUSE DUMP

A storage for empties is placed from *A* to *B*. At *C* is a carriage dump up which the empties are pulled to a kickback tippling device, *C*, the rope being payed out or wound up by the 10-hp. hoist, *D*. A man is stationed at *E* to transfer the rope from the last empty to the nearest loaded car. The dumping device is automatic, but a man is needed to run the hoist and it is preferable to have one to couple or uncouple the rope.

and the innermost pillar of all being widened to 65 ft. This renders it easy to make crosscuts between the outer pairs of headings and so enables fresh air to be carried more speedily to the advance faces. It also accelerates the progress of the entry. Hardly anything slows up heading driving so much as the excavation of long crosscuts between headings.

Eventually the air is driven up two of the entries on one side and down the two others on the other side, as the arrows indicate in the sketch, but when the headings are being driven temporary brattices are installed on crosscuts, and the narrow pillars are broken through with only two cuts on each side. As the shoveling distance is only a few feet, coal can be shoveled from the crosscut into a car without the formality of laying track. It is unnecessary to make crosscuts through the large pillars more frequently than every 350 or 400 ft.

At the Hardburly property the rock from mines working at an elevation above the railroad is discharged by means of a kickback dump mounted on an inclined track affixed at one end to the rock pile and supported at the other end by a small truck. The arrangement is really that of a track upon a track.



FIG. 8

Carriage Dumper

Two tracks are provided at the end of the dump. One carries the cars on the level, aligns the upper, or inclined, track and supports the carriage by which the upper part of the incline is upheld.

The dumping carriage has been located a stone's throw from the portal of the mine on a slate pile that projects from the hillside. A sidetrack leads off the main tramroad and along the center line of the protruding dump to its brink, where the carriage dumper is placed. The Hardburly mine is equipped with two of these carriage dumpers, one on each hill, which differ in the track arrangement only, the construction of the carriages being identical. Fig. 7 is a schematic sketch showing a track arrangement that will work well with this slate-car dumper.

Between the dumping point and the main tramroad a parting track for empty cars has been placed. The switch, *B*, nearest the carriage dump is a self-acting or spring switch, while that at *A* must be thrown by hand. The mine car loaded with slate is pulled onto the carriage dump by a §-in. steel cable which passes around a horizontal 12-in. sheave, *C*, on the carriage dumper and thence back to a 10-hp. motor-driven hoist located at *D*.

One man can perform the entire dumping operation, but as several daymen generally are working about the mine portal and as the dumping operation is intermittent, two men will work to better advantage, the hoistman and his helper. The latter locates himself in the vicinity of point *E*, where he disengages the rope from the empty and attaches it to the loaded car.

Quick Action with Only Two Men Working

Slate cars coming from the mine singly or in numbers are allowed to accumulate on the slate track until an opportune time when the dumping commences. The loads of slate are pulled by the rope, one at a time, to the carriage dumper, which automatically empties the mine car. The empty car is then kicked back and drops by gravity and switches to the empty or run-around track under control of the friction brake of the hoist.

Little time is consumed in the dumping, as may be realized after a study is made of the general arrangements. But it is only after the slate bank has been built out far enough to afford storage room for empties and loads that automatic and quick action is attained. However, where the hillside falls away sharply, with well-planned stowing of the slate one set-up of the main track, moving successively ahead, should successfully take care of the mine refuse for a period of years, as the larger pieces of slate roll down the hill for considerable distances.

The track bed on any slate dump settles more or less, which necessitates occasional filling in, tamping and aligning of the track. After a time the slate disintegrates and the track becomes compact. Thereafter only the more recent additions to the track approaching the dumping point require attention. A haul of 500 ft. would not be beyond the limits of recognized efficiency.

The empty and loaded track usually are on the same level, for it is easy to get the empty car to pull the rope back to the desired point on the sidetrack. It gets so good an initial start when plunging down the incline of the dumper that it does not readily stop. Nevertheless the distance may eventually become too great, and in that case it will be necessary to grade the



FIG. 9—GALLOWS FRAME

In this view can be seen the rope by which the cars are drawn up the incline, the kickback dump by which the cars are discharged and the device by which the end gate is lifted.



FIG. 10

Another Type of Dumper

Here the track on which the incline rests is not along the line of the incline but at right angles thereto, permitting the dump to be pried sideways and the end of the dump to be fanned out.

empty track so as to keep the car moving to its destination. The friction brake on the hoist can control the mine car at all times.

In Fig. 8 is shown one of these carriage dumpers. The rails on the incline are on a grade of about 20 per cent and are held in gage by bolts of round steel and by spikes in the elevating platform on the right and in a wooden tie in the middle. To this tie are fastened angle-iron guides which hold the riser track on and directly above the level track. If desired, a chain may be fastened about this bearing tie and the track tie beneath it.

The elevating platform has a frame of 4x12-in. oak stringers. These are braced crosswise by bolts and also by a floor of tie members that are alternately 2x10 in. and 3x10 in. The lower end of the frame rests upon 6x8-in. ties which in turn are supported on $\frac{3}{4}$-in. plates. These, by through bolts and plates, are caused to enfold the rails.

The frame rises on a grade of 20 per cent and rests on a six-wheel truck that is built up solid and runs on mine-car wheels. These are chained to the track as shown. A gallows frame, Fig. 9, is erected on the elevating platform and to this is attached the rope sheave and a grab arm for opening the end gate of the mine car. Directly beneath this gallows frame and at the end of the elevating platform is placed an off-balance dumper such as was commonly used in the past for dumping coal.

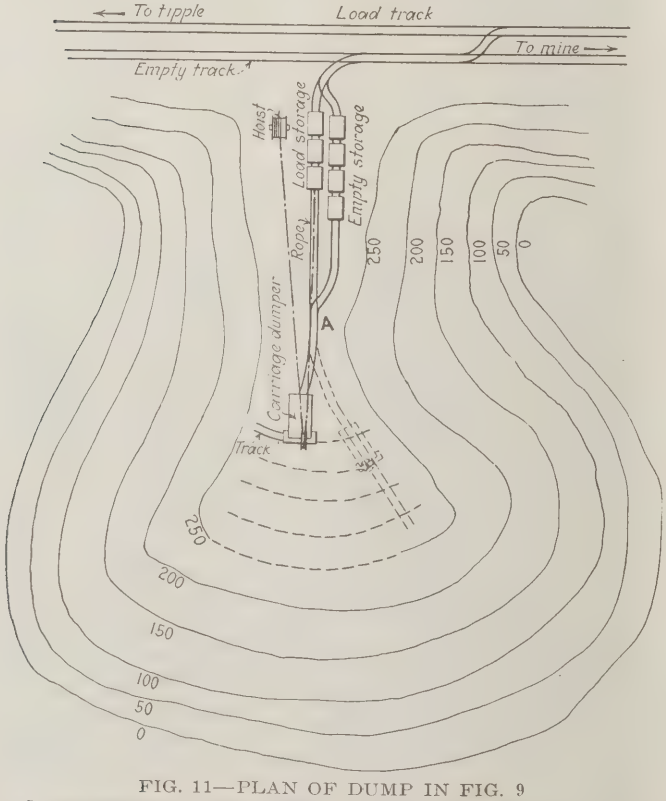


FIG. 11—PLAN OF DUMP IN FIG. 9

In consequence of the ability of the carriage dumper to move on an arc it is possible to swing the dump and enlarge the area over which the refuse is dumped, thus increasing the capacity of the slate pile considerably.

This carriage dump can be moved ahead easily by the hoisting rope, which is passed around a fixed object somewhere in front of the carriage.

Fig. 10 shows another form of the carriage dumper with a track arrangement different from that already described. The wheels of the carriage move on a track at right angles to the line of the incline of the dumper. By moving the incline on these rails the bank is widened out in fan shape. The track can be shifted ahead or pushed over laterally as occasion demands, movement in either direction adding to the storage capacity. Fig. 11 shows a sketch plan of this arrangement.

The men at the Hardburly mine find that by playing a stream of water on the slate dump its settling is hastened, for the water speeds up the rate of disintegration, or weathering, of the slate. The water comes from a 3-in. pump stationed in the mine.

57 Leases Issued to Mine on Public Lands Containing 422,000,000 Tons of Coal

A total of 57 leases for the operation of coal mines on public lands estimated to contain 422,000,000 tons of coal had been issued by the Department of the Interior up to March 1. The required investment of capital in connection with the operation of these leases amounted to $2,976,-650. A total minimum annual production of 2,108,400 tons of coal is required from these leasing operations, technical supervision of which is entrusted to the Bureau of Mines.

The largest number of leases for the operation of coal mines granted in any state was 21, in Utah. Twelve leases had been granted for operations in Colorado, 8 in Wyoming, 7 in North Dakota, 5 in Montana, and 2 each in New Mexico and Washington.

A total of 337 permits for prospecting for coal on leased public lands also were issued by the Interior Department up to March 1. Of these, the largest number, 79, were in Wyoming; 71 were in Colorado, 42 in Montana, 33 in Nevada, 30 in Utah, and 25 in Oregon. Nineteen permits for prospecting in New Mexico have been issued, 18 in Washington, 8 in Idaho, 5 in North Dakota, 3 each in California and South Dakota, and 1 in Arizona.

The coal-prospecting permits issued covered 293,104 acres.

Steep Pitches in Thick Coal Seams Greatly Affect Eastern Middle Anthracite Field Operations

Tendencies in Fifty Years Are Like Those in Other Districts—Thickness Drops 61 per Cent and Production per Man 30 per Cent—Purchased Power Boosts Output

By Dever C. Ashmead
Kingston, Pa.

SMALL basins, steep pitches, thick beds and moderate depths make mining conditions in the Eastern Middle anthracite field different in some respects from those of the Northern field, described in three previous articles in this series. The general tendencies, however, are much the same as the years roll by. The average thickness of the seams in this field has decreased 61.6 per cent, from 21.10 ft. in 1872 to 8.10 ft. in 1922, just as thickness in the whole Northern field has decreased; but this Eastern Middle field still averages 1.27 ft. thicker than the Nanticoke district, 3.22 ft. thicker than Lackawanna and 3.01 ft. thicker than Wilkes-Barre. Output per man in this field, as in the others, also has dropped — from 2.81 tons a day per man fifty years ago to 1.95 tons now — especially since the war, though the output per miner over the half century has fallen much less than in the whole Northern field. The Eastern Middle field comprises the area between the two main deposits of anthracite, the Northern and the Southern coal districts. It is located on a high plateau between these two. In the Eastern Middle district erosion has been very great, so that what remains is only the bottoms of the basins. These take the form of separate canoe-shaped troughs of relatively small size and generally having heavy pitches.

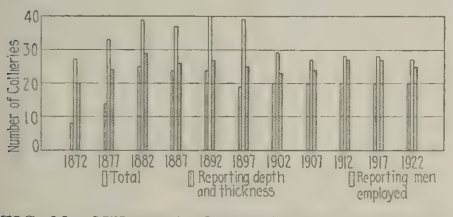


FIG. 38—NUMBER OF EASTERN MIDDLE FIELD COLLIERIES CONSIDERED IN THIS ANALYSIS

This diagram shows in the first column of each group the number of collieries that reported on the thickness of the coal beds and the depth of the workings. The second column shows the number reported by the state mine inspectors, and the last column the number used in the tonnage calculations. The collieries which produced a large portion of their coal from strippings have been omitted from the calculations. However it was not possible to exclude all stripping coal.

The Mammoth bed, known as the Baltimore bed in the Northern field, and the Buck Mountain bed attain great thickness in parts of this field. Small basins, steep pitches, very thick beds and moderate depths are features that make this field radically different from fields previously described in this series of articles. It requires an entirely different type of mining, and in many places permits extensive strippings, especially where thick beds turn over to flats at the outcrop or lie in small basins from which the entire rock filling can profitably be removed to recover the coal. The section shown in Fig. 39 consists of two sections taken from the reports of the second geological survey of Pennsylvania. These sections were about two miles apart but have been combined to show the general conditions in the field. The beds that are being mined in this region, named from the surface down, are as follows: Primrose, Holmes, Mammoth, Wharton, Gamma, Buck Mountain and Alpha. Below these is the Pottsville Conglomerate.

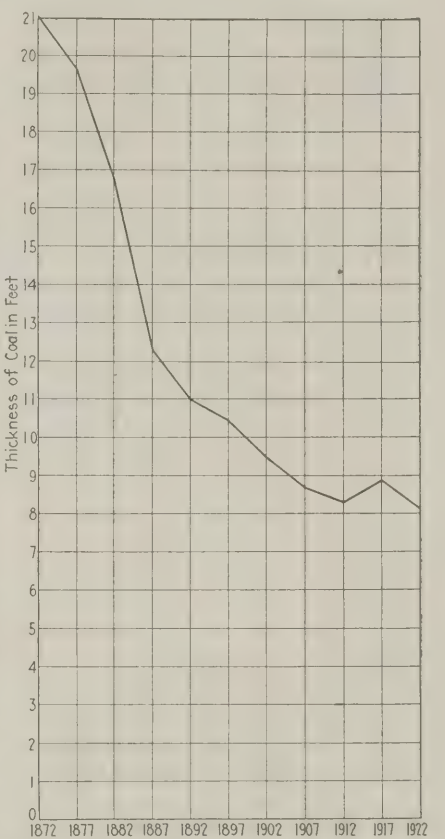


FIG. 40—AVERAGE THICKNESS OF THE COAL BEDS IN THE EASTERN MIDDLE FIELD

In the footnote to Fig. 3 in the study of the Lackawanna district (*Coal Age*, Vol. 23, p. 324) the full method of calculating this curve was set forth. The rapid decrease in the earlier years and the gradual slackening off are of importance as indicative of the future.

In the earlier years of the period under consideration the Mammoth bed was practically the only one that was worked to any extent, but as the workings became more extensive and the first mining approached completion

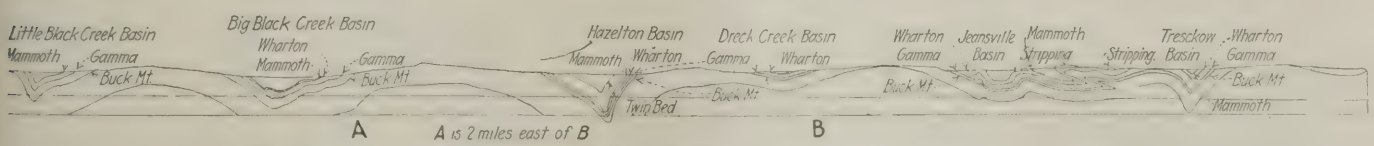


FIG. 39—CROSS-SECTION OF THE EASTERN MIDDLE FIELD NEAR HAZLETON

This cross-section was reproduced from the reports of the second geological survey of Pennsylvania. The northern end of the cross-section was made two miles east of the southern section. This was done so that some idea of the number of different basins in the region might be obtained. It will be noted that the section shows a series of detached V-shaped basins.

NOTE.—This is the fourth in a series of articles by Mr. Ashmead describing conditions in the seven sections of the Pennsylvania anthracite region. Previous articles appeared as follows in *Coal Age*, Feb. 22, March 22 and April 5. The fifth will be printed in an early issue.

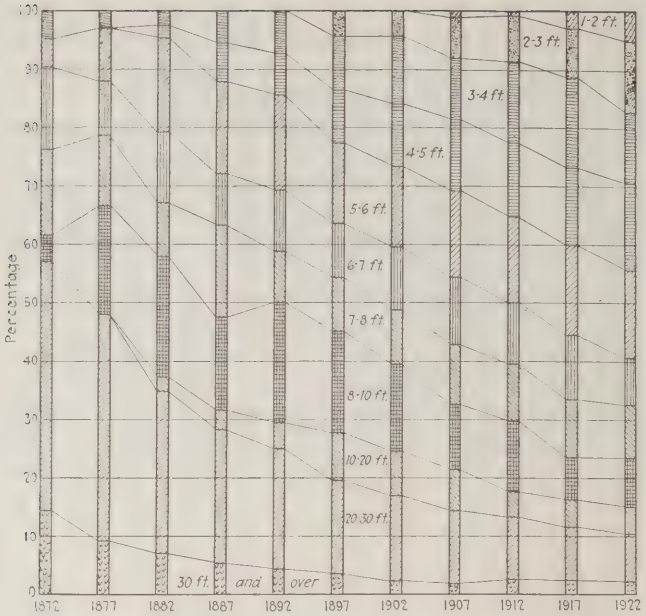


FIG. 41—PERCENTAGE DISTRIBUTION OF BEDS BY THICKNESS IN EASTERN MIDDLE FIELD

in this region, then the thinner beds began to be worked and as a result there has been a steady decrease in the number of thick beds being mined and a corresponding increase in the number of thin beds. Fig. 40 emphasizes this. It shows that the average thickness

TABLE XXXI—NUMBER OF EASTERN MIDDLE FIELD COLLIERIES IN THIS STUDY

	Reported by Inspectors	Having Depth and Thickness Data	Having Tonnage Data
1872	27	8	20
1877	33	14	24
1882	39	25	29
1887	37	24	26
1892	40	24	27
1897	39	19	25
1902	29	20	23
1907	27	20	24
1912	28	20	27
1917	28	20	27
1921-22	27	20	24

of beds decreased from 21.10 ft. in 1872 to 8.10 ft. in 1922. This is a drop of 13 ft., or 61.6 per cent. The decrease, however, has not been uniform, for in the first fifteen years the decrease was 8.86 ft., or at the rate of 0.59 ft. per year, but in the last thirty-five years the decrease has been 4.14 ft., or at the rate of 0.12 ft. per year.

From Fig. 41, which shows the variation in the thickness of the beds being mined, it is seen that in 1872 57 per cent of the beds were over 20 ft. thick and 95 per cent of the beds were thicker than 4 ft. The same condition applies to 1877, except that the beds thicker than 4 ft. had increased to 97 per cent. It was not until 1897 that beds

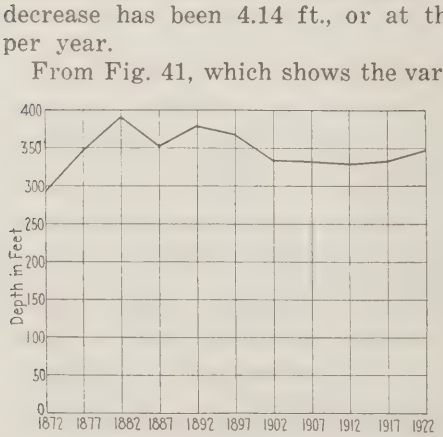


FIG. 42—WEIGHTED AVERAGE DEPTH OF WORKINGS IN THE EASTERN MIDDLE FIELD

Under Fig. 5 in the first part of this article in the footnote is described the method used in the calculation of this curve showing the average depth of workings (*Coal Age*, Vol. 23, p. 325).

TABLE XXXII—WEIGHTED THICKNESS AND DEPTH AVERAGES OF EASTERN MIDDLE FIELD BEDS

	Thickness of Beds	Depth of Workings		Thickness of Beds	Depth of Workings
1872	21.10	284	1902	9.43	334
1877	19.67	346	1907	8.69	332
1882	16.71	391	1912	8.29	327
1887	12.24	351	1917	8.89	333
1892	10.96	379	1922	8.10	347
1897	10.41	367			

less than 3 ft. thick were mined and in 1907 operations began in beds between 1 and 2 ft. thick. In 1922 these amounted to 5.5 per cent of the total number but their proportion of the total coal mined was less than that. In 1922 beds over 20 ft. thick had decreased from 57 per cent in 1872 to only 10.5 per cent, and the beds thicker than 4 ft. had decreased from 95 per cent to 71 per cent. Naturally, thin beds had to be opened in order to keep up production.

Fig. 41 illustrates the even decrease in the percentage of the thicker beds of coal being mined and the correspondingly even increase in thin beds. There seems to have been greater development in the thin beds in this region than in any of the previously described regions, for Fig. 41 shows that in 1922 about 5.5 per cent of the beds were under 2 ft. thick. This may be due to the fact that strippings uncovered both thick and thin beds. Unfortunately the data available do not make this point clear.

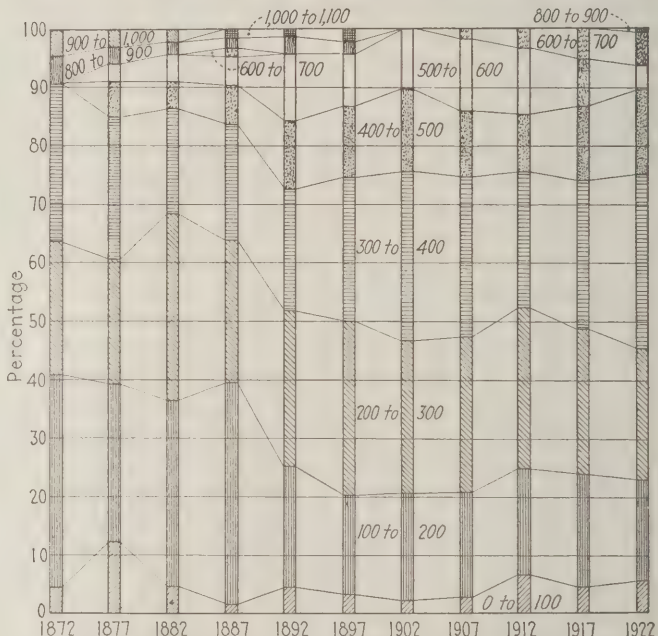


FIG. 43—PERCENTAGE OF BEDS AT EACH 100-FT. INTERVAL OF DEPTH

The method of calculating this curve was described under Fig. 6 in the first part of this article (*Coal Age*, Vol. 23, p. 325).

The average depth of workings in the Eastern Middle field has been affected by the local conditions at one of the operations. As a result the curve in

TABLE XXXIII—POWER INSTALLED AND RELATIVE COAL PRODUCTION

	Boiler Horse Power Installed	Engine Horse Power Installed	Tons per Boiler Horse Power	Tons per Engine Horse Power
1877	25,110	15,085	0.78	1.297
1882	32,670	28,875	0.663	0.749
1887	34,280	.....	0.536	.....
1892	41,550	.....	0.644	.....
1897	39,870	.....	0.741	.....
1902	38,328	33,868	0.683	0.774
1907	62,470	67,493	0.451	0.418
1912	56,210	51,857	0.439	0.476
1917	59,925	46,077	0.444	0.579
1921	49,365	.....	0.510	.....

Fig. 42 does not show the exact conditions as they exist in the field. Generally speaking the depth of the beds is not great, the deepest reported being between the 1,000- and 1,100-ft. intervals, as is shown in the curves in Figs. 43 and 44. The vast majority of workings lie above the 500-ft. interval.

Figs. 43 and 44 show that from 1872 to 1897 there were some rather deep workings in this field. These old workings eventually were abandoned but not exhausted. If they had been omitted from the calculations in the earlier periods, then the curve would have been nearly level, possibly showing a slight increase in depth instead of a decrease. As these deep workings were at a colliery of large production and their depth was weighted with the other depths, their effect on the curve was great. In the earlier period there were two large strippings which since have been practically abandoned. If the data from these operations had been included the depth curve would have shown a decided increase. The easy strippings in this district are becoming exhausted and a growing proportion of the total production is coming from deep mines.

A good many mines in this field have been electrified in recent years with a consequent increase in power consumed. Although steam plants installed in 1921 fell 10,000 b.hp. short of the total installed in 1917, the curve in Fig. 45 indicates an increase in the amount of coal produced per boiler horsepower. Central-station power accounts for this. This same increase in a much less degree is shown in the period from 1912 to 1917. Coal produced per boiler horsepower increased 0.005 ton.

Previous to 1912 the curve shows an almost steady decrease from 1897 and it is reasonable to suppose that this decrease would have continued were it not for the fact that the tendency among coal companies was to forsake mine steam plants for purchased power.

The mule-haulage curve in Fig. 46 shows that the tons of coal hauled per mule steadily declined until 1897. This means that haulage distances were growing. Since then the coal hauled per mule has steadily increased. At first this increase was gradual, then it rose sharply with the introduction of electric locomotives in 1902. Electric haulage probably appeared before 1902, but no inspectors' reports mentioned it until then. From 1917 to 1922 there was a drop in the tons of coal hauled per mule per day.

The locomotive curve shows a continual rise in the number of underground locomotives per 100,000 tons of coal produced. As was to have been expected, the last four years showed a sharp rise in this curve.

The coal lies to a great extent in heavy pitches. Instead of running mine cars into the rooms, they can be loaded by gravity from the breasts in some cases. This restricts the use of the locomotive to main-line

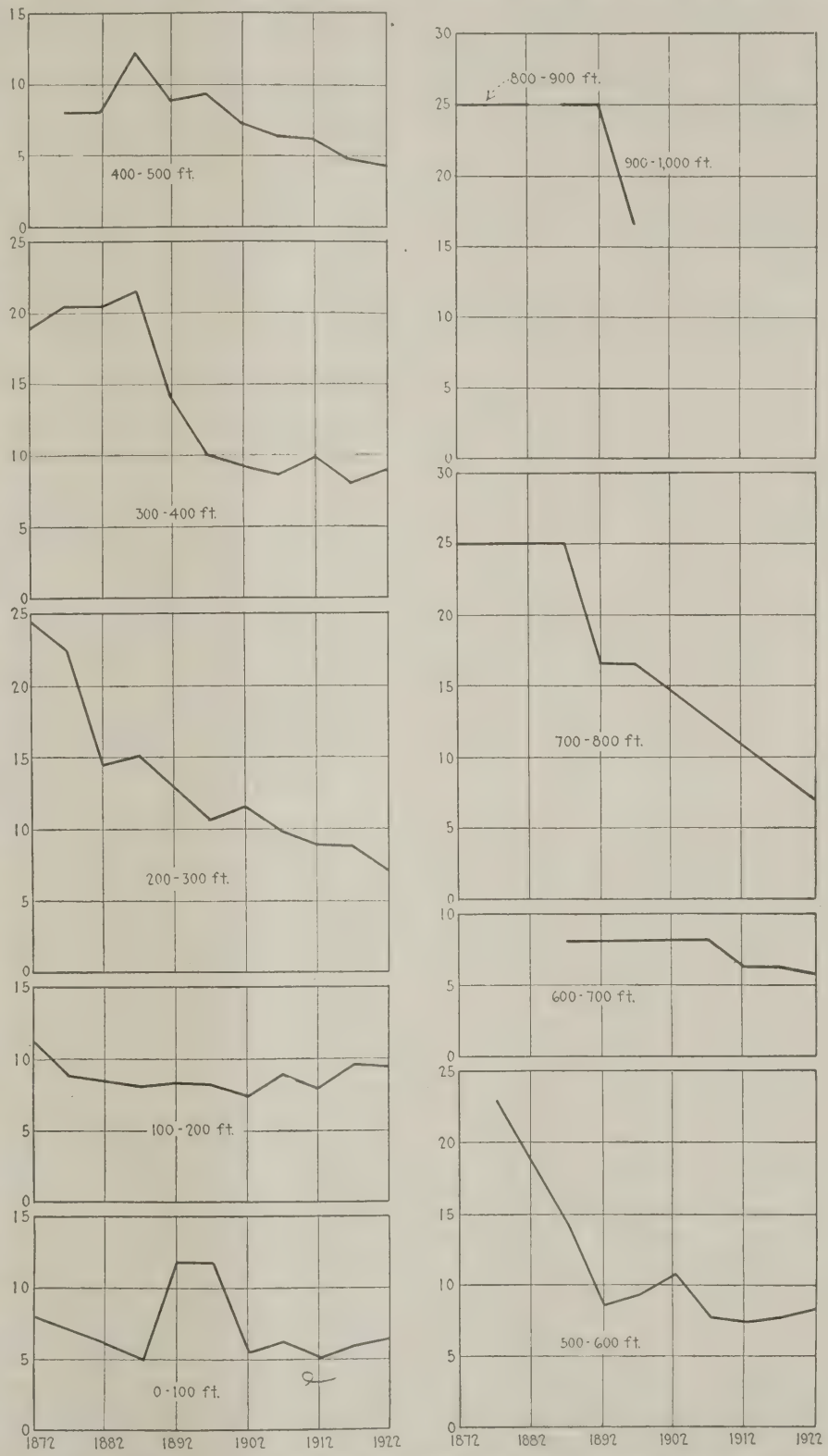


FIG. 44—AVERAGE THICKNESS OF BEDS BY 100-FT. DEPTH INTERVALS

A description of the method used in the calculation of this curve will be found in the footnote to Fig. 7 in Part 1 of this series of articles (*Coal Age*, Vol. 23, p. 326). This is a diagrammatic representation of how the depth of the workings changed and also how the thickness varied at the same time. Here can be seen the influence of a few deep workings on the curve in Fig. 42 during the early period of the operations.

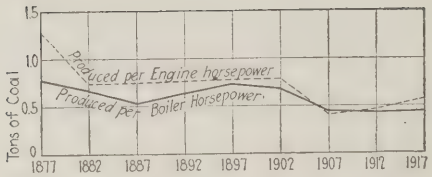


FIG. 45—DAILY PRODUCTION PER BOILER HORSEPOWER AND ENGINE HORSEPOWER

A full description of the method used in calculating this curve will be found under Fig. 8 in Part I of this series (*Coal Age*, Vol. 23, p. 326). Table XXXIII gives some of the important data used in the calculating and the plotting of this curve.

haulage. There is some flat mining in the region, however, and the use of a few locomotives, especially storage-battery locomotives, at certain operations reduces the amount of coal hauled per locomotive.

The general impression of this region is that the length of haul is on the decrease and probably will continue so. Unfortunately it was not possible to obtain exact figures on this.

Most underground mining in the Eastern Middle field is on pitches. Since much coal is loaded into mine cars by gravity, the natural supposition would be that the production per employee would be higher than in the northern districts of the anthracite region. This supposition is borne out in comparison with the Lackawanna and Wilkes-Barre districts, but the four big modern collieries of the Nanticoke district put that territory's production ahead.

TABLE XXXIV—NUMBER OF MULES AND LOCOMOTIVES AND THEIR TONNAGE PERFORMANCE

	Number of Mules	Daily Tonnage per Mule	Number of Locomotives	Locomotives per 100,000 Tons of Output per Year
1877	943	20.77	...	....
1882	1,386	15.10	...	....
1887	1,460	12.56	...	....
1892	1,805	14.59	...	....
1897	1,848	15.96	...	....
1902	1,545	16.92	11	0.14
1907	1,477	19.02	18	0.21
1912	1,096	22.50	39	0.53
1917	1,016	26.22	53	0.66
1921	1,090	23.10	80	1.06

TABLE XXXV—PRODUCTION AND DAYS WORKED IN MIDDLE EASTERN FIELD

	Production	Days Worked		Production	Days Worked
1872	911,771	...	1902	2,758,655	120
1877	2,032,306	194	1907	6,398,023	232
1882	4,949,835	224	1912	6,213,167	233
1887	4,170,708	211	1917	7,030,442	291
1892	4,664,643	226	1921	6,112,997	277
1897	4,608,672	171			

In Fig. 47 the lowest set of curves shows that production per man dropped sharply in the first two periods, more slowly in the next three, ascended in the following three, when strippings and deep mines began to feed coal to the same breakers, but the figure decreased in the final two periods. Production has dropped from 2.81 tons in 1877 to 1.95 tons in 1921, or a decrease of 30.6 per cent.

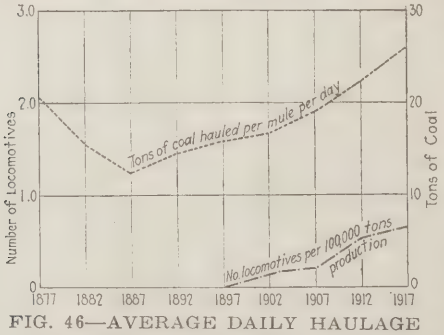


FIG. 46—AVERAGE DAILY HAULAGE PER MULE AND THE NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS PRODUCED PER YEAR

In Table XXXIV will be found the data relating to these curves. The method used in calculating them will be found under Fig. 9 in the first article of this series (*Coal Age*, Vol. 23, p. 327).

TABLE XXXVI—AVERAGE DAILY PRODUCTION PER EMPLOYEE IN MIDDLE EASTERN FIELD

	Total Employed			Inside Men			Outside Men		
	Reported	Corrected for Sizes	Corrected for Time	Reported	Corrected for Sizes	Corrected for Time	Reported	Corrected for Sizes	Corrected for Time
1877	2.38	3.20	2.81	4.02	5.40	5.08	5.90	7.92	6.34
1882	2.16	2.87	2.48	3.71	4.93	4.54	5.13	6.82	5.46
1887	1.76	2.13	1.84	3.64	3.67	3.36	4.19	5.06	4.05
1892	1.72	2.05	1.77	3.07	3.65	3.36	3.99	4.74	3.80
1897	1.92	2.20	1.90	3.25	3.73	3.42	4.62	5.31	4.25
1902	1.80	1.90	1.68	2.94	3.10	2.88	4.65	4.92	4.37
1907	1.92	1.99	1.84	3.02	3.12	2.99	5.28	5.47	4.87
1912	2.13	2.16	2.02	3.14	3.20	3.06	6.60	6.72	5.90
1913	2.03	2.07	1.93	3.06	3.12	2.98	6.12	6.23	5.54
1917	2.07	2.07	2.07	3.25	3.25	3.25	5.68	5.68	5.68
1921	1.95	1.95	1.95	2.98	2.98	2.98	5.61	5.61	5.61

The middle set of curves in Fig. 47 indicates a 43-per cent decrease in output per day per inside employee. From the dot and dash line, illustrating the final corrections for both sizes of coal and the change in time it is found that there has been a steady decrease in the output per inside man employed from 1877 to 1902 and then an increase to 1917 and another drop to 1921. The total decrease was from 5.08 tons in 1877 to 2.08 tons in 1921. It is probable that the inclusion of stripping coal here again accounts for the increased production from 1902 to 1917. In spite of the whole period's decrease, the production per inside man is about 20 per cent higher than in the Lackawanna, Wilkes-Barre and Nanticoke districts. The upper part of Fig. 47 indicates the output per outside employee. This curve shows what might have been expected to happen in a period when such progress was made in the preparation of coal. In the earlier years there was a steady falling off in production, due to a reduction of efficiency and to the necessity for better preparation of coal by the addition of more pickers, since there was no mechanical means for cleaning coal in those days. Naturally production per man dropped.

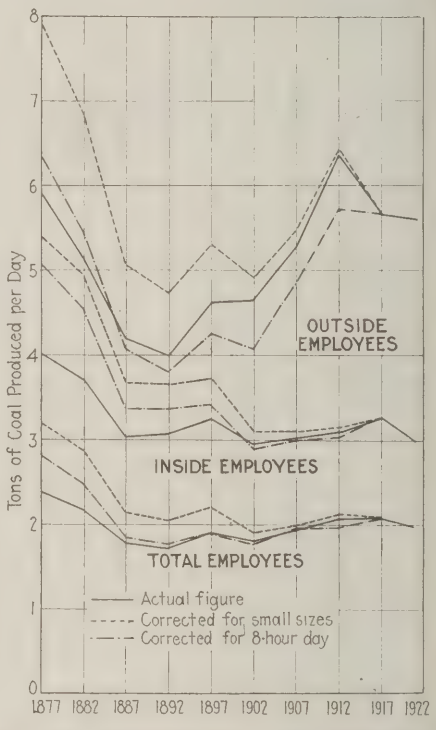


FIG. 47—AVERAGE DAILY PRODUCTION PER EMPLOYEE IN MIDDLE EASTERN FIELD PER INSIDE MAN AND PER OUTSIDE MAN

These curves are corrected for the estimated amount of small-sized coal that went into the culm banks in the earlier years and also for the introduction of the nine- and eight-hour day. These calculations are explained under Fig. 10 in the first article in this series (*Coal Age*, Vol. 23, p. 327). The sizes of coal produced in this region were obtained from very accurate information. These figures were procured in detail for each of the different districts that have been and will be discussed.

In the late seventies mechanical means of cleaning the coal were beginning to be introduced and from 1892 to 1897 the daily production per man employed showed

TABLE XXXVII—AVERAGE DAILY PRODUCTION OF INSIDE MEN IN ASTERN MIDDLE FIELD

	Miners and Miners' Laborers		Inside Company Men		
	Reported	Corrected for Time	Reported	Corrected for Sizes	Corrected for Time
1877	5.23	7.03	16.40	22.1	17.70
1882	5.70	7.57	10.71	14.3	11.40
1887	4.79	5.79	8.32	10.81	8.10
1892	4.65	5.53	8.98	10.69	8.55
1897	5.18	5.96	9.02	10.36	8.57
1902	4.58	4.84	7.96	8.41	7.48
1907	4.67	4.84	8.58	8.86	7.90
1911	4.82	4.91	9.00	9.20	8.16
1913	4.57	4.65	8.94	9.10	8.10
1917	4.88	4.88	9.81	9.19	9.81
1921	4.39	4.39	9.10	8.19	0.10

an upward trend, which continued without interruption until 1912. From this period there has been no increase in the district.

Comparing this production curve with those in the previous articles of this series it is plain that in the Eastern Middle field the output per outside man is about two tons a day less than in either the Lackawanna or the Wilkes-Barre field and approximately three tons less than in the Nanticoke field. There are reasons for this. In pitch mining the rock cannot be separated in the mine because the coal is run out of chutes directly into the mine cars. Therefore this operation has to take place in the breaker and more hand picking is required. Also more men are required for the disposal of the mine rock after it is picked out.

It has been mentioned previously in this discussion that the strippings could not be entirely separated from the underground mining. This further increased the outside forces and therefore reduced the tons of coal produced per outside man.

The true comparison in the districts treated in this series of articles is not between the amount of coal produced per outside man but in the increase in the amount of coal produced. In the Eastern Middle field the production increased from 3.80 tons per man in 1892, the lowest production year, to 5.61 tons in 1921, or an increase of 47.7 per cent. The Lackawanna County district shows a gain of 46.8 per cent; the Wilkes-Barre district, 47.8 per cent, and the Nanticoke district, 75 per cent. This is the highest increase that has so far been brought out, except in the four modern Nanticoke collieries, which showed a gain of 294 per cent. This comparison shows that although the Eastern Middle field increase in production has been good there is still considerable room for improvement, as its increase has been exceeded by almost 50 per cent by the one district in the Northern field wherein conditions are similar—Nanticoke.

The bottom set of curves in Fig. 48 shows the production per day per miner and miner's laborer. Only the final curve corrected for size of coal will be discussed. This is represented by the dot and dash line.

There is a steady downward trend to the year 1902, assuming that data for the year 1897 is in error and the average for 1892 and 1902 is considered instead. From 1902 on, the curve becomes level until 1917. Then there is a considerable drop to 1921.

What sustained the production of the miner and miner's laborer from 1902 to 1917, when in the previous periods there had been a heavy drop? In the discussion of the depth curve in Fig. 42 it was brought out that at about 1902 there was a marked change in the method of mining. The old and wasteful methods were abandoned. Second mining was adopted. Work was more concentrated, thus reducing the length of haul and giving the miner a better turn, therefore increasing his output. The curve also is affected by the inclusion of some stripping coal in the last few years, as has been explained. Comparing this curve with the three previously described districts, it is found that the output per miner and miner's laborer is about one ton more in the Eastern Middle district than in either the Lackawanna or the Wilkes-Barre district but only about half a ton more than in the Nanticoke district, where all the data are influenced largely by the four modern collieries so frequently mentioned. This greater output per miner and miner's laborer is largely due to gravity loading underground. The Lackawanna district shows a decrease of about 43.7 per cent in the output per miner and miner's laborer. The Wilkes-Barre district decrease is 42.9 per cent, and that of the Nanticoke district 54.2 per cent. The Eastern Middle District shows a drop of only 37.9 per cent.

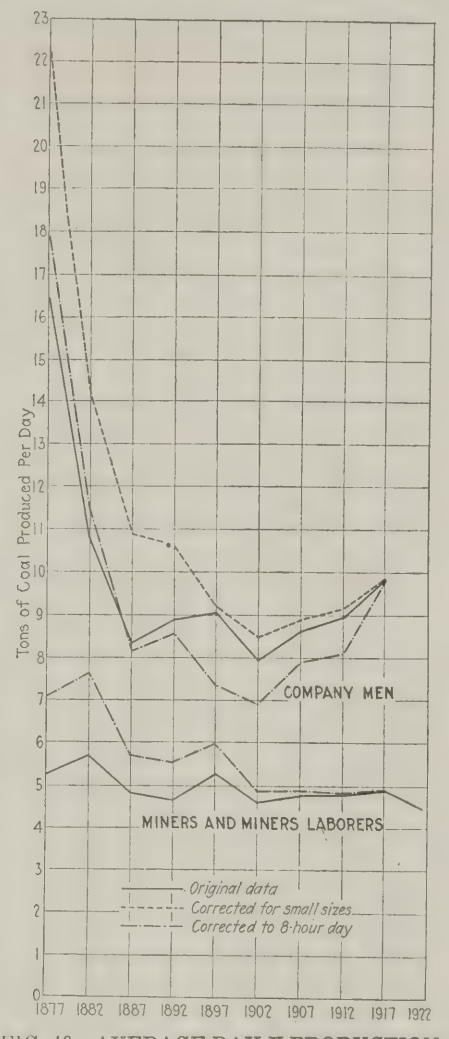


FIG. 48—AVERAGE DAILY PRODUCTION FOR INSIDE EMPLOYEES OF MIDDLE EASTERN FIELD

Corrections are shown for miners and miners' laborers allowing for small sizes not shipped in earlier years and for the introduction of the nine- and eight-hour day in the case of inside company men. In making the calculations it was found that the year 1912 was incorrect, so the points in 1911 and 1913 were calculated and plotted and a line drawn connecting these two points. At the place where this line intersected the vertical division line was considered the correct figure for the year 1912.

The upper set of curves in Fig. 48 gives the average daily output per inside company man. Here there is a tremendous drop, particularly in the earlier years. This output declines to 1887; then it levels off for two periods and takes a final drop in the period ending 1902. From

TABLE XXXVIII—MEN EMPLOYED IN EASTERN MIDDLE FIELD

	Total Employees	Inside Employees	Outside Employees	Miners and Miners' Laborers	Inside Company Men
1877	7,660	4,555	3,105	3,439	1,116
1882	10,268	5,953	4,315	3,886	2,067
1887	11,224	6,500	4,724	4,128	2,372
1892	12,007	6,742	5,166	4,440	2,302
1897	14,044	8,201	5,843	5,211	2,990
1902	12,760	7,817	4,943	4,925	2,892
1907	14,309	9,121	5,178	5,909	3,212
1912	13,688	9,389	4,299	5,945	3,444
1917	10,517	6,681	3,836	4,462	1,219
1921	11,399	7,449	3,930	5,024	2,424

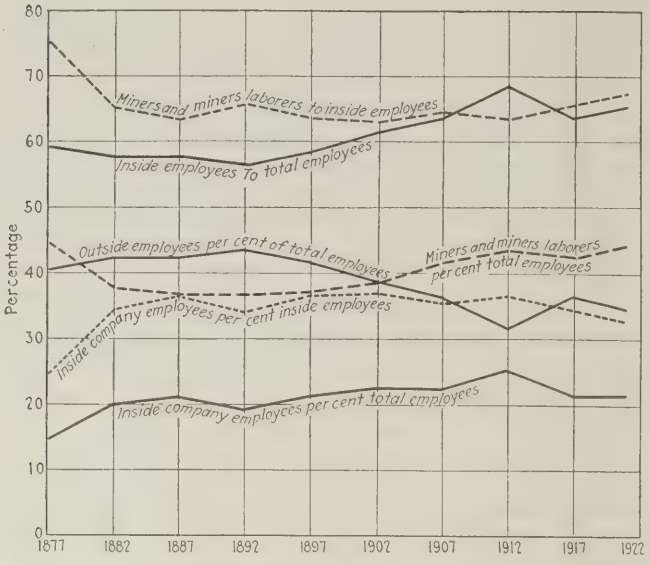


FIG. 49—PERCENTAGE OF EMPLOYEES BY CLASSES IN EASTERN MIDDLE COAL FIELD

Refer to Fig. 12 in the first article in this series (*Coal Age*, vol. 23 p. 329) for a description of the methods used in calculating these curves. The actual number of the men employed is shown in Table XXXVIII and the percentages in Table XXXIX.

this point the curve shows an increased output per man and reaches its highest point in 1917. Then there is a slight falling off.

The output in this district in the earlier years probably is 60 per cent higher than in any of the previously described districts, and even in 1921 it is about 30 per cent higher. Why should this condition obtain? The cause of the difference can be attributed mainly to the method of mining. In the earlier period the work was all done in the steep pitching beds. Here it was unnecessary for the driver to enter the rooms to get the mine cars. The coal was loaded into the trips on the gangways from chutes from the breasts. This reduced the number of mules and drivers. Some hint of this is given in the curves showing the tons of coal hauled per mule per day. By comparing the different curves it will be found that the amount of coal hauled per mule in the earliest periods is higher in this district than in any of the others. But this does not tell the whole tale. In this district the haulage was gangway haulage and therefore more mules were used per team than in the other districts. Therefore fewer drivers were needed and naturally the output per man was higher.

Heavy Pitches, an Advantage in Operation

As the change in mining methods came the flatter beds were developed and the average size of the teams decreased. Therefore the number of drivers increased. This, therefore, decreased the amount of coal produced per man. Even now a considerable part of the coal hauled is loaded from chutes and the number of haulage men is less in this field than in the fields where the beds are flatter. The drop in output per inside man has been 48.6 per cent, which is greater than in the Lackawanna County district, where the decrease was 40.2 per cent; the Wilkes-barre district, 40.5 per cent, or the Nanticoke district, 8.4 per cent. A greater decrease in this district is to be expected; as mining conditions have changed considerably, while in the other districts they have remained more nearly the same. Reduction in the Nanticoke district has been retarded by the opening of new mines.

TABLE XXXIX—PERCENTAGE OF VARIOUS CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

	Inside Men	Outside Men	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers (a)	Inside Company Men (a)
1877	59.5	40.5	44.9	14.6	75.4	24.6
1882	57.8	42.2	37.8	20.0	65.5	34.5
1887	57.9	42.1	36.8	21.1	63.5	46.5
1892	56.2	43.8	37.0	19.2	65.9	34.1
1897	58.4	41.6	37.1	21.3	63.6	36.4
1902	61.2	38.8	38.6	22.6	63.0	37.0
1907	63.7	36.3	41.3	22.4	64.8	35.2
1912	68.6	31.4	43.4	25.2	63.5	36.5
1917	63.5	36.5	42.4	21.1	65.8	34.2
1921	65.5	34.5	44.1	21.4	67.4	32.6

(a) Percentage to total inside employees.

In this district, as in the others, the number of the outside employees has continued to decrease in proportion to the total employed. This is due mainly to the introduction of modern methods of preparing coal. The district has some modern breakers which have considerably reduced the number of preparation employees.

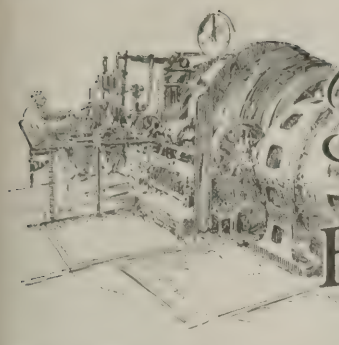
From 1882 to 1902 there was practically no change in the number of miners and miner's laborers but when the character of the mining changed in this period the number increased. This may have been caused entirely by the change in mining methods, or partly by the opening of the thinner beds or by a decrease in the efficiency of the men. Who can fix the proportion of each cause?

Underground Communication by Radio

SEVERAL months ago experiments in underground transmission of the human voice by radio were carried on under the auspices of the U. S. Bureau of Mines, but it was found that natural and artificial interferences—the latter caused by the presence of steel and electrical equipment in the mine—partly frustrated their success. The practicability of underground communication by the wireless telephone had not been indubitably established until recently, when broadcasts from local stations in New York were received aboard a subway train in the East River Tunnel. The success of the experiment is the more remarkable when one considers that much steel is used in subway construction and other disturbances are set up by the inductance from electrical apparatus.

The coal industry is not so much interested in this feat as an accomplishment of science as in the possibility of radio-transmission of the human voice in a mine. Wireless telephony when more perfect probably will remove many objectionable features of our present systems of communication, in which broken circuits caused by roof falls, grounding and leakage through a wet condition about the bare telephone wires make them unreliable. Granting that further refinements in radio will be made we may be optimistic in the belief that some day mine locomotives will be dispatched without wires and the work of mining be otherwise regulated. It is conceivable that the greatest possibilities lie in directing safety and rescue work in mine disasters. Men trapped in remote parts of a mine by explosion or fire could often be saved were it possible to establish communication with the surface as by wireless.

The first step in recognition of the applicability of radio to mining is its adoption for communicating market news and orders from the main offices to isolated mining towns, as is now being done in certain parts of Kentucky.



Practical Pointers for Electrical and Mechanical Men



Starting Synchronous Motors

SYNCHRONOUS motors may be started in any one of several methods. One method usually is selected before the motor is designed and this selection afterward determines the method of starting which is normally used for that particular motor; under certain conditions, however, either one of several methods may be employed.

Most synchronous motors in service around the coal field are used on synchronous motor-generator sets furnishing direct current to the haulage motors, coal-cutting machines, etc. These machines frequently are self-starting, this being possible owing to the fact that it can be very easily accomplished because the synchronous motor is invariably started under no-load.

In the design of the motor an extra winding called a squirrel-cage winding is put on the face of the poles of the rotating field. This winding is used only for starting duty and for this reason it has a relatively low capacity—by this we mean that it can be used only for starting duty and not for carrying any of the direct-current load of the motor-generator set.

In order that the squirrel-cage winding of the synchronous motor shall properly function it is necessary that its resistance be maintained as low as possible, the principle of its operation being exactly the same as that when inserting resistance in the rotor winding of a slip-ring motor to reduce its speed.

An occasional difficulty experienced with this type of synchronous motor is that the starting winding does not bring the motor up to full speed. In this event the trouble usually can be found in the squirrel-cage winding. What has happened is that the resistance of the winding has increased. Fortunately, this condition may be easily remedied by going over the winding and cutting down the resistance of any loose joints. These loose joints often may be located by starting the motor and then shutting it down and feeling the winding for any hot or warm joints.

On account of the large current which would be drawn from the line at the moment of starting if full-line voltage were thrown directly on the motor, a lower voltage is first applied and after the motor has reached full speed full potential is applied. This is accomplished by the use of a compensator, which is essentially an auto-transformer. On low- and moderate-capacity motors the self-contained compensator is used, while for large capacities compensator coils and oil switches are used.

Knotty problems pertaining to equipment and material for special purposes are matters of frequent occurrence with electrical and mechanical men at coal mines. These usually require special handling. Send your experiences and solutions, as well as your questions, to Coal Age. The exchange of such ideas makes the most helpful kind of Practical Pointers.

How to Start Synchronous Motors

The standard method of starting synchronous motors is as follows:

(A) Open the field switch completely if the excitation voltage of the motor is 125. If the excitation voltage is higher than 125 the field switch should not be opened completely but left in the clips connected to a discharge resistance. This prevents any high induced voltage across the collector rings. Exception to the above—if the motor is part of a motor-generator set—the field switch should be left in the clips connected to the discharge resistance irrespective of what the field excitation is.

(B) Throw compensator lever to "start" position.

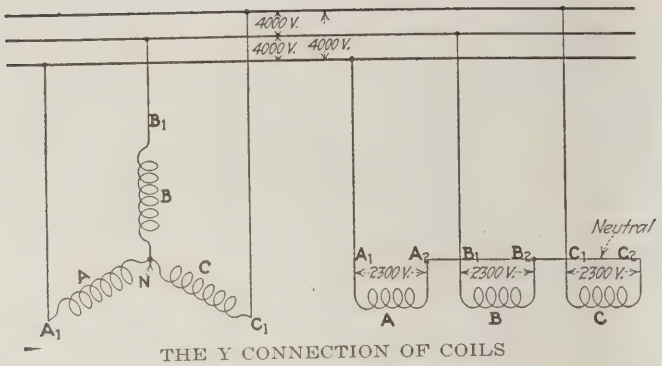
(C) After the motor has reached constant speed close the field switch; the field rheostat having been previously adjusted to give a field current corresponding approximately to no-load normal voltage, with machine running as a generator. This will cause the rotating field to step in and lock with the stator field poles either quietly or noisily, depending upon whether the squirrel-cage winding has brought the rotating field up to proper speed and the relative position of the stator and field poles at the time the field switch is closed, thus changing the motor from an induction motor to a synchronous motor.

(D) Throw the compensator lever quickly to the "run" position.

The Y Connection Made Clear

A VERY common connection used on alternating current three-phase lines is the Y—sometimes called star—connection. As its name suggests, it is in the form of a Y. This, like the delta connection, may be used in connecting three similar coils to a three-phase alternating-current system. It is used for transformers, motor windings, relay connections, etc.

The important point about the Y connection is that the coils to be connected do not have the same voltage rating as the line wires to which they are to be connected, yet the voltage rating of these coils must bear a certain quite definite ratio to that of the line voltage. This value is equal to the line voltage divided by 1.73;



THE Y CONNECTION OF COILS

In this connection one end of each coil is connected to a line wire while the other ends are joined to a common point called the neutral. This neutral point may or may not be grounded, depending on the plan adopted for the system.

for example, transformers or coils to be connected in Y to a three-phase alternating-current system of 4000 volts must have a voltage rating for themselves of $4000 \div 1.73 = 2300$ volts. Therefore, we see that 2300-volt coils may be connected to 4000-volt lines if they are first properly connected in Y.

The drawing shows both a schematic and the usual arrangement of the Y connection. Note that the voltage of the coils is 2300 and the voltage of the lines is 4000.

It is important also to note that the same respective ends of the windings are connected to the neutral wire, while the other end is connected to one of the phase wires. Note also that both ends of no coil are directly connected to the line wires as in the delta connection.

To increase the amount of power which can be transmitted over a given line, without changing the size wire, the voltage frequently is raised. If the equipment connected to the original voltage were all delta connected the line voltage could be increased 1.73 times the original and the delta-connected equipment could be connected in Y. This would allow the use of the same equipment and eliminate the necessity of buying complete new equipment for use on the higher voltage. It is therefore obvious that where a line was originally 2300 volts and all the equipment was delta connected the line voltage could be raised to 4000 and the original delta-connected equipment could be still used if connected in Y. Of course the line insulation and equipment insulation would have to withstand the higher value of test voltage.

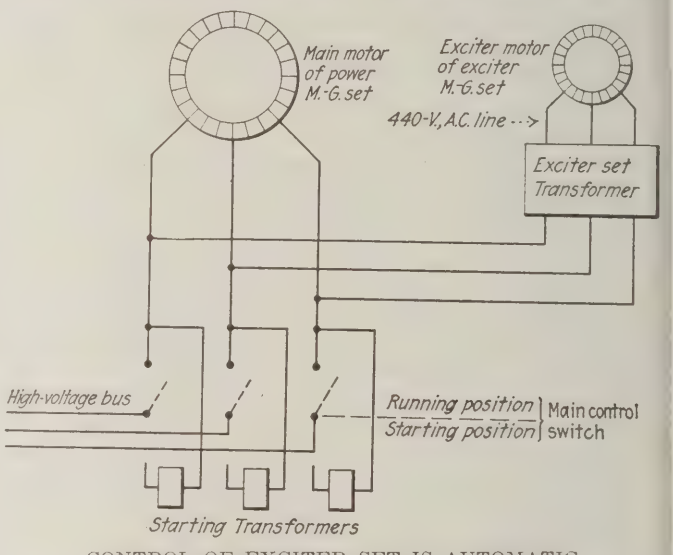
How to Simplify the Control of Exciter Units for Synchronous Motors

OCCASIONALLY a circumstance arises where a synchronous motor-generator set is installed where the generator voltage of the direct-current generator is not suitable for exciting the synchronous field of the motor. This may occur where the mines are quite extensive and the haulages long, thus requiring 500 volts for the trolley system. In this case it is necessary to obtain suitable voltage to excite the synchronous field from some other source than the 500-volt generator, as this high voltage is not practical for excitation wherever it can be avoided.

The motor voltage under these conditions probably would be 2,300, 4,000 or 4,600. Under these conditions it usually is necessary to install a separate motor-generator set to obtain suitable direct-current voltage to excite the synchronous field. Owing to the small capacity of this exciter motor-generator set the alternating-current motor must be operated on 440 volts alternating current or less. This therefore requires a transformer for stepping the main alternating-current voltage down to that required for the exciter motor and also some form of starting and controlling equipment for the exciter motor-generator set.

To eliminate the added expense of starting and control equipment for the exciter set a scheme of connections was developed by a certain large coal company whereby the motor of the exciter set was always directly connected straight through to the secondary of its supply transformer and the primary of the transformer was connected permanently to the motor leads of the motor of the large motor generator set which supplied the haulage system.

The result of this method of connection was that when the starting voltage was applied to the motor of the large motor-generator set the primary of the exciter set transformer received this same starting voltage, which in turn applied a low starting voltage to the exciter-set motor. Later when the large motor-generator set was up to speed and the full line voltage applied to the large motor the exciter transformer also received full line voltage on its primary and thus gave full normal secondary voltage to the exciter motor.



CONTROL OF EXCITER SET IS AUTOMATIC

The starting of the large motor-generator set will also bring the exciter motor generator up to speed without any additional operations of the attendant. When the large machine is across the full line voltage the little machine gets full normal voltage.

The application of the exciter voltage to the synchronous motor obviously was not affected in any way by this scheme and the operation of the complete equipment was made both cheap and simple; in fact, the scheme greatly reduces the equipment to be maintained and also makes the starting and stopping more nearly automatic.

PERMISSIBLE STORAGE BATTERY LOCOMOTIVE.—The design, construction, inspection and test for permissibility of a storage-battery locomotive outfit intended for use in gaseous mines represents a large amount of work, first on the part of the locomotive manufacturer and secondly on the part of the Interior Department. Detailed information of the first investigation of this nature is presented in Serial 2,449, by L. C. Ilsley, electrical engineer, and H. B. Brunot, junior electrical engineer, which may be obtained from the Department of the Interior, Bureau of Mines, Washington, D. C.

Insulation Resistance Can Be Measured by Use Of Ordinary Direct-Current Voltmeter

Electrical Equipment in Coal Mines Must Withstand Adverse Conditions—Numerous Factors Affect Insulation of Equipment—Insulation Resistance Can Be Measured Without Use of a Megger—Suggestions for Maintaining Insulation Resistance

By E. J. Gealy
Associate Editor, *Coal Age*

THE unfavorable conditions under which electrical equipment about the coal mines is called upon to operate are not always seriously considered and fully appreciated. In places the dust may collect on a motor and clog the air passages and vents, may fall upon oil switches and form a heavy carbon conducting surface for current leaks, may enter the transformer case and cut down the insulating quality of the oil. The moisture in mines, having a relatively high humidity, may keep the electrical equipment continually damp, causing parts to rust and insulating material to swell. Even in places where the moisture content of the mine air is not very high considerable moisture may be splashed on the electric equipment by being brought into the mines on a rainy or snowy day. Especially is this true where a hoisting cable is run over the outside surface or where water may leak from pumps or water lines. In some mines the track is continually in a condition comparable only to that prevailing on roads during rainy weather in a muddy country district. Then again sand used on the rails may easily be picked up, due to the low clearances under haulage motors, and may be carried into the bearings of the equipment. Also the mechanical equipment driven by electric motors frequently, of necessity, is of a type that produces considerable vibration.

Electric Equipment Requires Close Inspection

All these conditions make it imperative that electric equipment be given close inspection and supervision in order to avoid breakdowns and detect possibilities of failures that might result in costly delays.

One of the most important things about any piece of electrical equipment is the insulation. Electrical insulation must resist heat, moisture absorption and mechanical breakage. Likewise it must be durable and have a high dielectric strength, or, in other words, a high resistance.

It is therefore necessary to maintain the resistance quality of all insulating material as high as possible in order to prevent breakdowns. It is not only necessary for an electrician or electrical engineer to be able to repair a breakdown to his electrical equipment when it occurs but his most productive efforts are those which result in detecting and avoiding mechanical or electrical breakdowns and thus reducing the expensive consequences which usually follow such breakdowns.

The insulation resistance of electric equipment such as cables, conductors, electric machines and transformers, is sometimes measured and used as a rough indication of the condition of the insulation. It is that resistance measured between the current-carrying parts and the frame of the machine or exterior surface of the conductor. Since large machines or cables have much greater areas of insulation, their insulation resistance will be proportionately lower than for small machines or pieces of cable, yet the insulating material may be in exactly the same condition.

The insulation resistance of any machine will be much lower when hot than when cool, especially when the machine is rapidly heated. A moderate size of low-voltage motor, as usually insulated, when warm from carrying full load, should show an insulation resistance of about 1,000,000 ohms, or, in other words, about one megohm. When cold, the insulation resistance should be many times this amount.

To measure such high values of resistance an electrical instrument called a "megger" is frequently used; it is possible, however, to measure insulation resistance by the use of a supply of direct current from 100 volts or higher and a voltmeter with a reasonably high internal resistance.

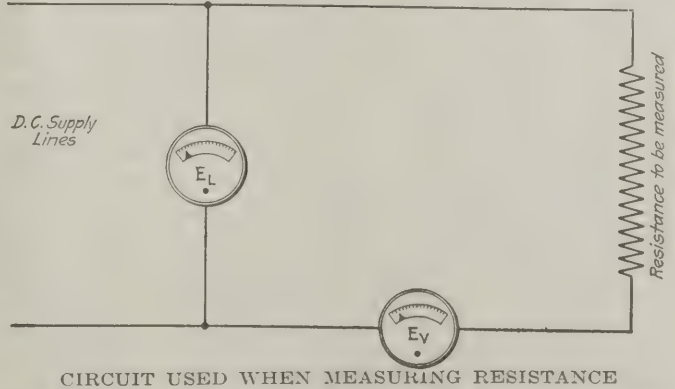
The method of measurement is first to read the voltage of the line, then to connect the resistance to be measured in series with the voltmeter and take a second reading. For measuring the insulation resistance of an armature the positive line would be connected to the voltmeter and then to the winding, while the negative line would be connected to the armature shaft or laminations.

The measured resistance is then calculated by using the following formula:

$$R = \left(\frac{E_L}{E_V} - 1 \right) N.$$

R = resistance in ohms;
E_L = line voltage;
E_V = voltage recorded on voltmeter when in series with the resistance to be measured;
N = resistance of the voltmeter in ohms (this value can usually be found on the cover of the voltmeter box).

The method of connecting the equipment is as shown



CIRCUIT USED WHEN MEASURING RESISTANCE

Voltmeter E_L measures the line voltage. E_V actually measures the small current leakage through the resistance. E_L and V may be the same meter used in the two positions shown by first taking reading E_l, then E_V, being careful to keep voltage E_L constant throughout the test.

in the accompanying figure. An example of making such a test would be to have a 110-volt direct-current supply and an internal resistance of 11,000 ohms in the voltmeter used. The voltmeter reads 110 volts in the first position and 5 volts in the second position.

$$E_L = 110, \qquad E_V = 5, \qquad N = 11{,}000$$

$$R = \left(\frac{110}{5} - 1 \right) 11{,}000 = 242{,}000 \text{ ohms}$$

or approximately ¼ megohm, which is very low.

It is obvious that when making this test with a direct-current supply which operates with one line grounded, the grounded line should be connected to the grounded frame or shaft of the equipment to be tested; otherwise, grounding the ungrounded line from the generator would result in a short-circuit.

Pieces of electrical equipment after standing idle for a time absorb moisture; this is especially true during times of suspension. Before placing the equipment into service it is highly desirable to make an insulation-resistance test. If the resistance is low the best thing to do is to heat the insulation slowly to dry it out.

To maintain the insulation resistance of important pieces of electrical equipment forced to be idle or lay as spares it is advisable to keep the insulation warm and dry by connecting it to a circuit of reasonably low voltage and allow a small amount of current to pass through the windings.

Book Reviews

British Coal Mining Industry in the War

MUCH interest has been evinced in America in the methods adopted by the Government of Great Britain and Ireland for the regulation of the coal industry during the war. The measures of socialism then put in operation formed the basis for much of the legislation enacted here when we also aligned ourselves with the Allies in the conduct of the struggle.

In every man can be found in greater or less degree that sense of social obligation on which the British Government so freely relied. It forms, in fact, the gold in the natures of all of us, but it is so heavily alloyed with individualism that as a rule it can form only a spurious currency on which to conduct business. During the war the percentage of social obligation reached such a high figure that it was almost possible to coin it into a basis for social conduct, yet some, like Whitley, were venturesome enough to believe it might be found, not only during the war but afterward, an acceptable substitute for that individual initiative and personal advantage on which, strange to say, the welfare of mankind has been advanced. Observation during the war and afterward showed how grievous was the mistake of these enthusiasts.

Till Sir R. A. Redmayne published his book on "The British Coal-Mining Industry During the War" no one volume contained a complete review of that subject. Redmayne, as former Chief Inspector of Mines and Technical Adviser to the Controller of Coal Mines, Head of the Production Branch, Chairman of the Coal-Mining Organization Committee, Vice-Chairman of the Central Coal and Coke Supplies Committee and Member of the Coal Export Committee, of the Coal Conservation Committee and of the Fuel Research Board, is well able to give a comprehensive and non-partisan *résumé* of the coal industry of Great Britain both during the war and during the period of control that followed. This he has done on behalf of the Carnegie Endowment for International Peace, in a volume published by the Oxford University Press, of which the local address is 35 West 32nd St., New York City.

In an introductory chapter Sir Richard says that in the United Kingdom at the beginning of the war were about 3,000 mines employing in aggregate 1,110,884 persons, the mines being worked by about 1,500 companies, the royalties being vested in some 4,000 persons. In Great Britain as in America it has been too often the custom for politicians, publicists and the public to ignore the fact that the difference between the cost per ton and the selling price was not the same as profit. Sir Josiah Stamp stated before the Royal Commission on the Coal Mining Industry that the profit in the five years before the war was 59c. on coal costing $1.88—surely a satisfactory return, but unfortunately this made no allowance for depreciation, interest and probably obsolescence, which, if deducted, greatly reduce these profits.

Another interesting table contained in this volume shows the home consumption of coal, and we venture to put alongside it the percentages calculated therefrom, and in the table following a calculation of the percentages of American home consumption.

The war produced at first a stagnation in business and the recruiting of miners was not in any way restricted in 1914. "From no class of the community," says Sir Richard, "did the call of patriotism meet a more spontaneous and conspicuous answer than from coal miners. No less than 191,170 men, or nearly 19 per cent of the total personnel—men, boys and women—employed at the collieries of the United Kingdom, joined the colors during the first seven months of the war. . . . The result is still more eloquent of the patriotism of the miners when it is reflected that these men were drawn only from those of military age—that is, between the ages of 19 and 38. It is estimated that 40 per cent of the miners of military age were absorbed into military service, and by far the greater number of these left the mines in the early weeks of the war—that is, in the autumn of 1914." Their places were partly filled by "50,473 persons from other employments, or approximately 5 per cent of the normal personnel of the coal mines," the output declining 13½ per cent.

It is interesting to note that miners in Great Britain are about as irregular in their working habits as ours. From August to February in 1913, before the war, the absenteeism was 10.3 per cent. After the war commenced, from August to February, 1914, probably owing, we may add, to the fact that coal was not greatly needed for some months, the absenteeism was decreased only to 9.8 per cent. Perhaps 5 per cent of this represented sickness either of the individual or in the home.

The early proposals for the reform of the coal industry were not drastic. The Coal-Mining Organization Committee desired to reduce irregularity of work, to utilize holidays for the production of coal, to suspend the "Eight Hours Act of 1908," under which the men worked barely seven hours; to employ more women, to

TABLE I—BRITISH DOMESTIC CONSUMPTION OF COAL 1913 (CALCULATED)

	Industrial Uses	Short Tons	Percentages
(1)	Railroads	16,800,000	8.00
(2)	Coasting Steamers (bunkers)	2,800,000	1.33
(3)	Factories	67,200,000	32.00
(4)	Mines	21,280,000	10.13
(5)	Iron and Steel Industries	34,720,000	16.53
(6)	Other Metals and Minerals	1,400,000	0.67
(7)	Brickworks, Potteries, Glass Works and Chemical Works	6,440,000	3.07
(8)	Gas Works	20,160,000	9.60
(9)	Domestic	39,200,000	18.67
		210,000,000	100.00

These figures are based on estimates from the Coal Commission's report of 1903 with a *pro rata* increase, except where more definite figures are available. The actual total was 211,783,453 tons.

TABLE II—AMERICAN DOMESTIC CONSUMPTION OF ANTHRACITE AND BITUMINOUS COAL

(Based on F. G. Tryon's table for soft coal consumed in a year of active business, *Coal Age*, Jan. 19, 1922).

Industrial Uses	Short Tons	Percentage
Railroads	153,700,000	24.7
Coasting and Lake Trade Bunkering	3,600,000	0.6
Factories*	206,000,000	33.1
Mines (coal only)	22,360,000	3.6
Iron and Steel Industries†	112,780,000	18.1
Gas Works‡	12,220,000	2.0
Domestic	111,100,000	17.9
	621,760,000	100.0

* Includes categories 3, 6 and 7 in Table I and also public utilities (electric).
† Includes coal for byproduct coke.
‡ Assumes that all the coal made into domestic coke is used at coal-gas plants. Does not include on the other hand any of the anthracite used at gas works.

reduce deadwork and to economize in the use of coal. Holidays were reduced by local agreement, and the eight-hour question, as also that of the employment of women, was solved by local understandings. Only in Lancashire and in Scotland had women been employed. In the other districts women but rarely engaged in mine work. No attempt was made to increase the number for fear of creating trouble with the union.

In the years 1915 and 1916 the government tried to speed up coke production, mainly for the TNT obtainable. "It is on record," says Sir Richard, speaking about conditions prior to the war, "that Germany even occasionally imported coal of high coking quality from Great Britain, extracted the byproducts and exported the coke to England." Soon Great Britain was producing so much coke that she was unable to find uses for it. Byproduct coke could not be burned in open grates or for the raising of steam except under forced draft. Consequently in making arrangements to exchange coal for the materials needed from foreign neutral countries, Great Britain had to stipulate that they take a proportion of coke. This speedily reduced the surplus. Germany also found herself overstocked with the same commodity.

As the war progressed the French began to be short of miners and proposed to the British Government that it send men to operate French mines. But ultimately French miners were brought back from the front. However, the author of the volume reviewed visited France to facilitate the transfer of men and found that many of the mines could be worked only at night as they were being shelled by day and some of the coke workers had to hide in dugouts while their ovens were being bombarded.

Among other extraordinary measures—to us, at least, they seem unusual—was to endeavor to induce the people to use anthracite for domestic heating and cooking. The people believed it could be burned only in a closed stove and took most unfavorably to its use. It had to be started with bituminous coal and when burning should not be poked. Now, an Englishman is never so happy as when he has a poker in hand and is turning over the coals in the grate.

Under the anathematized Dora (Defense of the Realm Act) the Controller of Mines issued an order on March 16, 1918, ordering that no owner of coal mines shall without previous written notice to the Controller incur any expenditure on the following objects: (1) the sinking, widening or deepening of shafts (including shafts that do not come to the surface) or the continuance thereof; (2) the driving of slants or adits for the purpose of hauling coal or the making of cross-measure or rock headings; (3) the opening or reopening of seams; (4) the erection or acquisition of any additional buildings, plant or machinery not strictly required for purposes of repairs or maintenance; (5) the selling or other transferring of the ownership in any mine or part of a mine. This first restriction was seriously considered in the United States and during the war might have been enforced with advantage. It was actually put in effect in Great Britain, and the lack of development considerably hampered production after the war, for England has not for many years had more mines than it needs.

In this review a few of the high lights have been chosen from its 358 pages measuring 5¼ x 9⅝ in. It is an orderly presentation of the events in the coal industry from the somber First of August, 1914, to the glorious Fourth of July, 1921, when the men went back to work after a long and bitter strike.

U. S. Bureau of Mines, Its Legal Status, History, Purpose and Functions

PURSUING its intention of preparing a series of monographs on the various service organizations of the United States Government, the Institute of Government Research has published its third treatise, covering the history, activities and organization of the U. S. Bureau of Mines, beginning with the organization of the Technological Branch of the U. S. Geological Survey, which had its origin in the order of April 2, 1907, of the Secretary of the Interior.

At an even earlier period the U. S. Geological Survey, in accordance with the Act of Feb. 18, 1904, had begun the work of fuel testing, establishing a station at the Louisiana Purchase Exposition in St. Louis and removing later in 1907 to the Jamestown Exposition, at Norfolk, and to Denver, and opening fuel-testing laboratories at Columbus, Pittsburgh and Washington. An immediate cause of the extension of the Technological Branch was found in the terrible coal-mine explosions in December, 1907. Stations for mine-rescue apparatus were established at Pittsburgh, Pa., and Urbana, Ill., in 1908, followed by one at Knoxville, Tenn., and Seattle, Wash. The Bureau of Mines was created by the Act of May 5, 1910.

The U. S. Bureau of Mines has since made co-operative agreements, and in 1920 had thirteen of these contracts with as many public bodies and had greatly extended its activities. These the book undertakes to summarize in detail, giving the laws under which the Bureau operates and a bibliography of the publications dealing with its activities The book contains 162 pages measuring 5¾ x 8⅝ in. The publisher is the Johns Hopkins Press, Baltimore, Md.

THE FRENCH ARMY seems to be something in the nature of a Fact-Finding Commission.—*Philadelphia Inquirer.*



Problems of Operating Men

Edited by James T. Beard



Timbering High Falls on Entries

Old Entries Often Develop High Roof Falls—Timbers Supported on Collar Beams Set in Hitches Cut in Solid Formation Above Coal

IT HAS been with much pleasure that I have read the several letters of contributors to *Coal Age*, written in response to my inquiry, which appeared in the issue March 1, p. 380. We were then retimbering an old slope that had fallen to a great height in many places. I stated at that time that we made a mistake in the start of the work, by attempting to use double timbering, supporting the collar beams on legs set in the entry.

The sequel has proved that I was right in contending that we had made a bad start. Instead of using the legs to support the collar beams, these should have been set in hitches cut in the rib. At that time, I do not seem to have made myself clear in the matter that these hitches should be cut in the solid formation, say 3 ft. above the coal, instead of in the coal, as shown in my previous sketch.

In order to make the situation clear, I am now sending a few sketches that will serve as a little history of

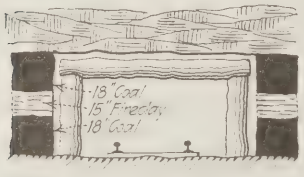


Fig. 1 Slope as first Timbered

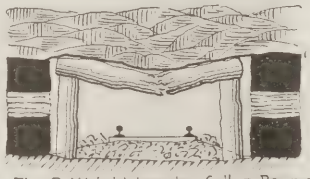


Fig. 2 Weight breaks Collar Beams



Fig. 3 First Form of Timbering High Roof falls

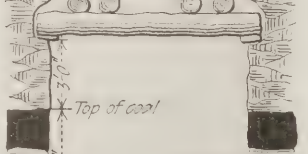


Fig. 4 Final Method that saved Timber and was successful

HEAVY SQUEEZE CAUSES HIGH ROOF FALLS

the work. In my previous letter, I also failed to show that the coal lies in two benches separated by a 15-in. fireclay parting, as indicated in the present sketches.

In Fig. 1 is shown the original slope where the roof supported in the usual manner known as "double timbering." In Fig. 2, is shown what took place some time later and represents the condition of affairs when we started to retimber this old slope.

In Fig. 3, is shown the method we tried first, using double timber with long legs set on the bottom. This was fully explained in my previous letter. Finally, Fig. 4 illustrates what I intended to explain before. Here, the collar beams are shown as supported in hitches cut, in the solid formation, about 3 ft. above the coal. This method has the advantage of doing away with the legs supporting the collar beams in the first plan and avoiding the danger of these legs being knocked out by a derailed car.

In closing, I may add that in places where the coal had been taken out, solid cribs were built on each side of the road and short legs used to support the collar beam in each timber set. These short legs were set on good solid timbers forming the cribs. MAC.

River Herbert West, N. S.

Mine Doors and Safety

Cause of many accidents—Recommendations by the Safety Committee—Standard form of door adopted proves satisfactory—Advantage gained in its use.

SPEAKING of mine accidents to which so many writers have referred in recent letters in *Coal Age*, I am reminded of the action taken by the Safety Committee in one of our mines where a water bailer was killed a short time ago by coming in contact with the top of a door frame. His head was caught between the frame and the top of the car. Previously, in the same mine, a brakeman had been seriously hurt when squeezed between a car and the side of a door frame.

As the result of these two accidents, the Safety Committee took it upon themselves to look carefully into the matter of mine doors, with a view to recommending the adoption of some type of door that would insure greater safety to drivers and to men walking the road when going to and from their work. It was agreed that the usual form of mine door was a source of many accidents that a little study of the situation might avoid.

NEW TYPE OF MINE DOOR INSTALLED

Later, on the recommendation of the committee, we have installed, in our advance work, three doors composed of wood and galvanized tin. By this form of construction, the door is made very light as compared with the common type of door built only of wood. For that reason, the door can be made wider as its weight does not pull the frame out of alignment.

There are two features regarding the form of door adopted that are worthy of mention. First, the width of the door opening is made sufficient to give a good safe clearance between the side of the car and the door frame. Second, the usual 6 x 6-in. lentil of the door frame is replaced by a 2 x 6-in. plank, laid flatways, which gives 4 in. more headroom than before.

In addition to this type of door, the Safety Committee recommended the installation of automatic doors throughout the mine and the replacing of all main doors by overcasts. The latter had already been done in all of our larger mines and the same practice will eventually be followed in this mine.

While the adoption of the new type of door was undertaken as an experiment, the result has proved so satisfactory that it has since been decided to standardize this form of mine door, which will be erected henceforth in all advance work. Everything considered, it has been generally agreed that the new type of door insures greater safety in the operation of the mine.

The advantages gained by the adoption of this door as a standard are briefly the following: No matched or grooved lumber is needed in the construction, and the galvanized "Armco" tin does not rust. There is required a much lighter frame, which permits increased clearance each side of the track and more headroom.

Pikeville, Ky. GEORGE EDWARDS.

Circulation in Safety Lamps

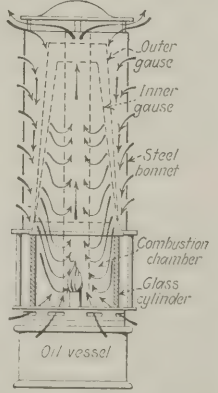
Eloin principle exaggerated—Relates to main air supply entering lamp below flame—Experiments prove that some air enters lamp through gauze chimney.

THE inquiry of Francis Devlin, *Coal Age*, Feb. 8, p. 260, regarding the question of the entry of gas-charged air at the top of the chimney of a safety lamp and descending to the flame, has a direct bearing on the explanation I made, a short time ago, of the cause for the elongation of the flame of a safety lamp in a firedamp mixture.

Some writers have since taken exception to my ideas as then set forth. However, I believe it is wrong to understand that the meaning of the Eloin principle of ascensional circulation within a safety lamp is that no air enters the lamp, except what is admitted through the ports of entry below the flame. My understanding is that the principle of ascensional circulation applies only to the main air supply.

WHAT THE ELOIN PRINCIPLE ACCOMPLISHES

It seems to me that the Eloin principle is much exaggerated. For example, if the lower ports of entry, in the Wolf, the Koehler or other similar lamp, are sealed the lamp becomes at once one of the Clanny type, the air entering the lamp above the glass and descending to the flame.



CIRCULATION IN SAFETY LAMP

The only purpose of providing for the entrance of air at points below the flame is that, by so doing, there is less conflict of the ascending and descending currents, which lessens the tendency of the lamp to smoke and improves the illumination. My belief is that, in every lamp of this type, there is a primary ascending and a secondary descending circulation that partakes, more or less, of the character I have attempted to illustrate in the accompanying figure.

Let me urge any one who may be skeptical of this condition to place a Wolf or Koehler lamp where its chimney will be surrounded by an atmosphere of smoke, while fresh air is permitted to enter the ports of entry below the flame. Removing the bonnet from the lamp will give a better opportunity to observe the result, which will be found quite similar to what I have shown in the figure.

The smoke will enter through the gauze chimney of the lamp and be observed to descend to the flame in the combustion chamber, the current descending in close contact with the cooler surface of the glass, while the ascending current occupies the center of the chimney forming a column above the flame, as indicated by the dotted lines in the figure. It will be observed that this central column has a greater velocity, which is suggestive of a greater degree of heat.

From this center column, extending all the way from the flame to the top of the chimney, the temperature decreases outward toward the wire gauze forming the chimney. This decrease in heat results from radiation and absorption. The annular space between the two gauzes, expanding gradually from the bottom to the top, tends to accentuate the keeping of the gauzes cool. Naturally, the outer gauze is the cooler of the two.

In conformity with the principle of all fluids that movement is always toward a point of lesser pressure, it appears logical to infer that there will be such a movement, however slight, through the cooler part of the chimney to the zone of least resistance surrounding the flame. It is my belief that this movement will be intensified when the lamp flame is lowered to a height suitable for the detection of a flame cap, in testing for gas.

DETECTING THIN LAYER OF GAS AT ROOF

Allow me to suggest that this is the principle involved in the hollow standards of the Ashworth-Hepplewhite-Gray lamp, which is designed to conduct a thin stratum of air, lying at the roof, downward to the flame of the lamp. In my opinion, the annular space between the double gauzes of these lamps serves much the same purpose and provides for the entry of air at or near the top of the lamp.

Undoubtedly, there are conditions under which gas escapes from the roof in such small quantities that its presence cannot be detected by either of the lamps named. However, the fault will generally be found to be owing to the rapid diffusion of the gas, thereby producing too low a percentage of gas to permit of its detection in the lamp.

My conclusion is, therefore, in support of the claim of Mr. Devlin, that under such conditions the gas enters the top of the lamp in sufficient quantities to be detected on the lamp flame, assuming the lamp is constructed on the Eloin principle. I. C. PARFITT.

Washington, D. C.

Foremen, Awake!

Need for special thought in the prevention of accidents in mines—General attitude of foremen toward dangerous practices of miners.

ACCIDENTS occur in so many ways, in the mines, that it requires the giving of special thought and attention to means for their prevention. Observation of conditions, in visiting different mines, leads one to wonder if the general mine foreman is thoroughly awake to his responsibilities, in respect to many dangerous practices that are permitted to go on with little more than a smart reprimand.

The district mine inspector is probably better able to judge fairly, in this respect, because the duties of his office require him to visit a large number of mines, where he is continually afforded opportunities for observing unsafe conditions and practices. Also, as inspector, he must investigate the more serious and fatal injuries of workmen hurt in the mines, and determine

the cause and fix the blame for all accidents occurring in his district.

When an inspector visits a mine, he has no other thought than that of safety in the operations going on about him. His mind is not taken up, or his thought absorbed, in devising means for the more economical extraction of the coal. His whole attention is riveted on the one idea of making the mine safe for work.

It is quite different with the average foreman, who is in charge of the mine and whose thoughts are necessarily divided among the many duties that rest on his shoulders, in reference to maintaining a satisfactory output of coal and keeping down the cost-sheet, which he knows is closely scrutinized by the superintendent and manager. However, the capable foreman can always train himself to meet the responsibilities that rest on him and still have due regard for the practice of safety among his men.

The best proof that the ordinary foreman fully appreciates the true value of safety is shown by his attitude toward workmen who continually follow dangerous practices, day after day. When the attention of the average foreman is called to the matter he justifies himself by saying, "I have told those fellows that they would get theirs one of these days if they didn't change their ways."

It is most remarkable that this type of foreman, however, would not allow a workman to meddle with a machine that he was likely to injure in a way that would cost the company a few hundred dollars or more. At the same time, he will permit a workman to follow a dangerous practice that he knows will, sooner or later, cost the man his life and perhaps obligate the company several thousand dollars in compensation.

Considerations such as these lead me to exclaim, "Wake up, mine foremen!" The wide-awake foreman or assistant foreman will, in the course of a year, find many opportunities to save men from painful injuries or possible death. To do this, however, he must see that every man is following safe practices in performing his work. Only so, can he be a real foreman.

Pikeville, Ky. GEORGE EDWARDS.

Inquiries Of General Interest

Working Coal Seam With Heavy Slate Parting

Lower Bench Worked Out First—Slate Parting Dropped a Short Distance Back From the Face —Upper Coal Taken Out When Retreating

I AM anxious to obtain suggestions as to the cheapest and safest manner to work a double seam of coal, with a view to extracting all of the coal at the least expense for deadwork.

In our mine, the bottom coal has a thickness of 52 in. This is overlaid with 30 in. of slate parting, which we term "middleman." The upper seam overlying the middleman is also 30 in., and is a good quality of coal. Overlying the upper seam is a sandrock, which makes a good strong roof.

While different ways have been proposed for working out these two seams with least expense for handling the refuse, I am confident that we can learn much from the experiences of *Coal Age* and its practical readers. It should be stated that the slate parting is of a nature that it cannot be held up for any length of time.

Staub, Ky. SUPERINTENDENT.

In this case, there is 4 ft. 4 in. of coal in the lower seam and 2 ft. 6 in. in the upper seam, making 6 ft. 10 in. of coal in all. The thirty inches of slate separating these two seams of coal is a large amount of refuse to handle, which makes it important to select some method that will avoid that necessity.

It is stated that this slate cannot be held up for any length of time. Therefore, taking everything into consideration, it would seem that the safest and most economical method of working to adopt would be to take out the lower coal first by driving the entries in that seam in advance of the work above.

As these entries are advanced, the slate must be well posted for a distance of three or four yards back from the face. A little later, these temporary timbers are knocked out and the slate allowed to fall, after which it is gobbed on one side of the road, forming a solid wall on the side opposite to that on which the rooms are turned.

It is assumed that the coal in the upper seam makes a good roof in the extraction of the lower seam or in the first working, both in the entries and the rooms. This 30 in. of coal forming the upper seam is taken out, later, on the retreating plan, or in the second working when drawing back the pillars.

This proposed plan has, of course, only been described in a general way and must be modified to suit conditions in the floor, which have not been stated in the inquiry. Much will depend, also, on the depth of cover and thickness of the sandstone forming the roof in the upper seam. The necessary modifications must be worked out in accordance with these and other data, not given. We hope for many good suggestions from readers.

Juggling Mine Props

KINDLY explain through the columns of *Coal Age*, the meaning of the term "Juggling Props." Has this term any relation or significance in reference to the building of a jugular manway, in a thick anthracite seam where the inclination is steep? As I recall, such a term is used in that instance. M. J. U.

Freeland, Pa.

The expression "Juggling Mine Props" is a new one to us, we never having heard it used in connection with coal mining. The meaning of the word "Juggling" is to resort to an underhanded trick. It is an entirely different word from the word "Jugular," as used in reference to a manway of triangular shape constructed in an anthracite chute, on a steep inclination. A jugular manway is formed by leaning long props against the rib of the chute so as to form a narrow manway by which the miners can enter or leave the chute. The primary meaning of this term has reference to a throat passage, which the jugular manway in a measure represents. The two terms have a very different significance and bear no relation to each other.

Examination Questions Answered

Alabama Foremen's Examination, Birmingham, Jan. 22, 1923

(Selected Second Class Questions)

QUESTION—*What qualifications are necessary to make a successful mine foreman other than those required by the law?*

ANSWER—Besides being of the required age, a citizen of the United States, of moral character, temperate habits and having the necessary experience in mining, the successful foreman must be a good judge of human nature and able to discern the qualities and capabilities of men. In all his dealings he must be just and firm, showing no favoritism, but giving every man a square deal and making no promises that he may not be able to keep. He must be industrious and painstaking in his habits, setting an example for his men to follow and never asking them to do what he is unwilling to do himself.

QUESTION—*(a) What is a water gage and what is it used for? (b) A water gage shows a reading of 3 in.; what is the ventilating pressure per square foot? (c) What is the total ventilating pressure in an airway 8 x 10 ft., in section?*

ANSWER—*(a)* A water gage consists of a bent glass tube having the form of a letter U. The end of one arm of the tube is bent at right angles to permit of its being inserted through a hole in a partition or door separating the intake from the return airway. When thus placed in position on a partition or door between the intake and return airways, in a mine, one arm of the tube is subjected to the greater intake pressure, while the other arm is open to the lesser return pressure. As a result, the water is depressed in the former and rises an equal amount in the latter arm. The difference in water level is a measure of the difference in pressure between the two points, or the pressure required to pass the air from the intake to the return where the measurement is taken.

(b) Each inch of water-gage reading corresponds to a pressure of 5.2 lb. per sq.ft. A 3-in. reading of the gage indicates a pressure of $3 \times 5.2 = 15.6$ lb. per sq.ft.

(c) The sectional area of an 8 x 10 ft. airway is $8 \times 10 = 80$ sq.ft. and a 3-in. water-gage reading for that airway indicates a total ventilating pressure of $80 \times 15.6 = 1{,}248$ lb.

QUESTION—*How can you tell whether or not any obstruction is in an airway or air-course that you have not passed through?*

ANSWER—Any obstruction to the passage of air in an airway will cause a corresponding increase in the pressure or water gage producing the circulation, assuming the ventilating fan is running continuously at a constant speed. Therefore, any observed increase in the reading of the water gage, while the fan is running at its usual speed, would indicate the presence of some obstruction to the passage of air in the airway and the cause should be sought and removed.

QUESTION—*What materials are best for tamping shots and why?*

ANSWER—Clay, sand and dirt taken from the mine roads form the best materials for tamping shots. Such material being incombustible, cannot add to the volume or intensity of the flame produced by the explosion of the charge, and there is less danger of flame being projected from the mouth of the hole when the shot is fired.

QUESTION—*What is the rubbing surface in an airway, 4 ft. high, 9 ft. wide and 1,000 ft. long?*

ANSWER—The perimeter of this airway is $2\ (4 + 9) = 26$ ft. Then, the length of the airway being 1,000 ft., the rubbing surface is $1{,}000 \times 26 = 26{,}000$ sq.ft.

QUESTION—*Under what conditions would you consider the use of mining machines not advisable?*

ANSWER—The use of mining machines is not recommended where the floor of the seam is quite irregular, which may cause an excessive loss of coal in the mining; or when the seam contains boulders or nodules of pyrites that would interfere seriously with the mining of the coal. It may often prove desirable to mine a soft friable coal with picks, rather than to employ machines for that purpose. This can only be determined by experience in the seam in question. Machine mining is not advisable and may be wholly impracticable on certain steep pitches, owing to the difficulty of keeping the machine up to its work.

QUESTION—*What conditions call for the use of puncher machines for mining?*

ANSWER—The use of puncher machines is often found an advantage where boulders or nodules of pyrites abound in the strata where the mining is done. In the use of the puncher, it is possible to direct the fit so as to avoid such obstructions and cut around them so that they can be removed without difficulty. This is not possible in the use of a chain machine.

QUESTION—*What conditions would make the use of chain machines most desirable?*

ANSWER—Chain cutting machines are best adapted to the mining of coal in a generally level seam that is free from boulders and other obstructions that impede the mining.

QUESTION—*Do puncher or chain machines produce the most dust in the mining of coal?*

ANSWER—Puncher machines will produce a larger quantity of cuttings, owing to the greater height of the mining at the face of the coal. On the other hand, the cuttings produced by the puncher are coarse and there is less fine dust than what is produced in the use of chain cutters.

QUESTION—*What dangers arise from blasting coal out of the solid?*

ANSWER—Where solid shooting is practiced, there is a tendency on the part of the miners to employ excessive charges of powder. The charge is often laid too deep with the result that the shot blows its tamping. Solid shooting requires both experience and skill in the placing of shots to avoid danger.

QUESTION—*What dangers arise from lack of judgment in placing shots?*

ANSWER—When the miner lacks judgment and experience he is prone to locate and point his hole in a direction that requires more work than what the charge is capable of doing, and the result is a blownout shot with the production of much heat and flame and a local explosion of dust is very liable to happen, which may or may not be propagated throughout the mines.

Western Kentucky Strike Ends on Owners' Terms; Two-Year Pact Signed

Scale committees of the Operators' Association and District No. 23, United Mine Workers, met May 4 at Madisonville, Ky., and signed a wage contract for a period of two years, the union officials agreeing to accept the operators' contention after an all-day meeting of the district executive board and scale committee of the mine workers. It is understood that the union officials decided to sign a two-year contract provided there was no change in the working conditions.

Five thousand union miners in Christian, Webster and part of Hopkins County, excluding the St. Bernard Mining Co. in the latter county, are involved by the signing of the new wage scale.

The men went on strike March 31. They were ordered out because the union officials favored a one-year contract and the operators stood firm for two years.

Brent Hart, president of the Hart Coal Co., announced that he would not sign the wage agreement unless men he now had in his employ, who had been working since the strike became effective, were taken care of by the miners' union. Mr. Hart is a member of the Operators' Association. Other mines of the Operators' Association are expected to resume work as soon as railroad cars are available.

To Call Governor Small in Herrin Quiz

The Illinois legislative committee which has been investigating the Herrin massacre resumed its sessions in Springfield, Ill., Monday, and if present plans are perfected the committee probably will draft its final report in three weeks. Governor Len Small probably will be summoned to appear before the committee soon and it is probable also that Former Assistant Attorney General Charles W. Middlekauf, who conducted the prosecution of the cases at Marion, also will be called.

When members of the committee returned from a three days' session at Herrin, they expressed the belief that Former Sheriff Thaxton of Williamson County, who was not a willing witness at Herrin, should be brought to Springfield. While it is generally conceded that Thaxton, who is now County Treasurer of Williamson County, will not reveal information to the committee, it is pointed out that if he commits perjury in this county the case could be taken before the grand jury for investigation. If indictments were returned he would be placed on trial in Springfield, not in "bloody" Williamson County.

An effort is being made to locate W. J. Lester, owner of the Williamson County strip mine where the massacre of June occurred. If Lester is located his testimony may be taken at a session of the committee to be held at Chicago.

National Coal Association Intervenes in Petroleum Case Against Mo. Pac.

The National Coal Association has filed a petition with the Interstate Commerce Commission intervening in the case of the Western Petroleum Refiners' Association against the Missouri Pacific R.R. and other carriers. At the same time, the Traffic Bureau of the National Coal Association sent a letter explaining its action and the case to directors, secretaries of local coal associations and members of the Railroad Relations Committee of the national organization. Inclosed was a questionnaire designed to disclose cases in which coal has been displaced by fuel oil.

The complaint of the petroleum association, representing oil producers in the mid-continent field, was filed with the Interstate Commerce Commission more than a year ago. It was amended about four weeks ago.

In the petition complaint is made against alleged discrimination in freight rates against fuel oil and in favor of coal east of the Mississippi River and north of the Ohio. A large number of railroads are named defendants, some of them extending into the South, so that practically the complaint involves all the principal carriers east of the Mississippi. The commission is petitioned either to require a reduction in the oil rates or an increase in coal rates. The general experience has been that in cases where an adjustment in rates has been directed by the Interstate Commerce Commission the railroads, if possible under the order, will make the adjustment by raising the lower rate rather than by lowering the higher one.

The National Coal Association will contend that freight rates on coal are sufficiently high and probably will argue that the competition of the mid-continent oil producers east of the Mississippi is not with coal but with fuel oil from the Eastern seaboard. Facts developed by the questionnaire sent out by the Traffic Bureau as to the extent of displacement of coal by fuel oil are expected to prove valuable to the coal industry in other than this case before the Interstate Commerce Commission.

The increasing use of gasoline is causing an increased volume of the residue, fuel oil, which is seeking a market energetically, it is said.

Union Appeal from McClintic Injunction Heard; Operators Seek Permanent Order

The U. S. Circuit Court of Appeals, sitting at Richmond, during the first week of May heard arguments on the appeal by the United Mine Workers of America from the decision of Judge George W. McClintic, of the U. S. District Court for the Southern District of West Virginia, restraining the collection by the union of money by check-off.

Pending final decision by the Court of Appeals, the decree of the District Court in so far as it affects the collection of the check-off and therefore the agreement between the United Mine Workers and defendant coal companies has been suspended, so that the union is at the present time collecting the check-off money. Following the strike non-union companies obtained the injunction to restrain the companies signatory to a closed-shop agreement with the union from paying over any money collected through the check-off on the ground that the funds so collected would be used to aid in the organization of their mines.

A meeting of about twenty-five operators of the Kanawha field was held last week to consider the steps to be taken in preparing evidence to be submitted to the District Court on May 21 before Judge McClintic. This hearing will cover thirteen restraining orders granted by Judge McClintic during the strike last summer to prevent interference with the operation of non-union mines. The case will consume more than two weeks and will require the testimony of between 200 and 300 witnesses.

The new hearing is on the question of whether the restraining orders shall be made permanent. One injunction will be selected as a test—inasmuch as the various orders are similar in text—and upon the decision will rest the fate of the remaining orders. Companies in the Winding Gulf, New River, Kanawha and Williamson fields are parties to the injunction.

March Tidewater Dumpings Largest of Any Month for a Year

A total of 3,315,000 net tons of soft coal, according to the U. S. Geological Survey, was moved through North Atlantic ports in March, as compared with 2,708,000 tons in February and 3,189,000 tons in January. The aggregate shipments were larger than in any month since March, 1922, when they were greatly stimulated by anticipation of the strike and totaled 3,357,000 tons. The cumulative shipments at the end of the first quarter of 1923 stand at 9,212,000 tons, against 8,307,000 tons in the same period of 1922.

TIDEWATER BITUMINOUS COAL SHIPMENTS FOR MARCH 1923
(In Net Tons)

Destination	New York	Philadelphia	Baltimore	Hampton Roads	Charleston	Total
Coastwise to New England	138,000	48,000	105,000	1,039,000	5,000	1,335,000
Export	.....	29,000	111,000	232,000	12,000	384,000
Bunker	249,000	38,000	28,000	168,000	6,000	489,000
Inside capes	.....	149,000	145,000	71,000	.....	365,000
Other tonnage	537,000	1,000	1,000	203,000	.....	742,000
	924,000	265,000	390,000	1,713,000	23,000	3,315,000

Seek Aid of Chamber of Commerce for Coal Commission; Lay Coal Shortage to Labor and Railroads

At the group luncheon meeting of the Natural Resources Division of the Chamber of Commerce of the United States, which held its eleventh annual meeting in New York City this week, two resolutions were submitted, one by the National Coal Association calling upon the officers and directors of the chamber and its affiliated bodies to assist the U. S. Coal Commission in its work, and the other offered by the Charleston Chamber of Commerce placing the blame for coal shortage on labor, followed by the failure of transportation lines when work was resumed at the mines.

The convention continued its sessions from May 8 to 11, the meetings being held in various places and addresses being made by many noted speakers, including Herbert Hoover, Secretary of Commerce.

Those who spoke at the session of the Natural Resources Division, held on May 9, and their subjects were: "Some Problems of Coal Distribution," J. D. A. Morrow, president, Morrow Callahan Coal Co., Pittsburgh, Pa.; "Labor and Its Effect on the Cost of Industrial Coal," J. G. Bradley, president, Elk River Coal & Lumber Co., Dundon, W. Va.; "Economic vs. Legislative Solution of the Coal Problem," George H. Cushing, Cushing's Survey and Service, Washington, D. C.

National Coal Association Presents Resolution

The resolution offered by the National Coal Association was as follows:

"Whereas since the beginning of the World War the production and the transportation of coal have stood out among the country's foremost industrial problems; and

"Whereas coal is the most essential factor in the production, manufacture and transportation of all commodities and constitutes the indispensable material basis of modern industrial and economic life; and

"Whereas the problems encountered in the coal industry are not peculiar to it alone but are found to a greater or less extent in all industries throughout the country: Now, therefore be it

"Resolved, That this body here assembled, representative of all the business and industrial life of the nation, authorizes and instructs its officers and directors to assist in every possible way the work of the U. S. Coal Commission in its investigation of the coal industry; and be it further

"Resolved, That all local and national associations and organizations affiliated with this body be urged to assist its officers and the U. S. Coal Commission in its work and to aid in obtaining the widest publicity as to the facts developed by the commission."

Stripped of its preamble the resolution of the Charleston Chamber of Commerce, read:

"Resolved, That, first, the continued operation of the non-union fields should be encouraged, and that their field of operation should be increased to the end that they could save the nation from disasters in the future which have threatened in the past.

"Second, that both the coal shortage and high prices from which the public suffered is a result not of the faults peculiar to the coal business but (a) from the periodic stoppage of production by the power of a labor monopoly; and (b) the inability of the transportation system of the country to respond to the extraordinary demands made upon it as a result of the shortage created by the strikes."

Mr. Cushing said that to remove the causes of popular complaint against the coal industry—intermittency of coal supply and the fluctuation of prices—it is proposed to put coal under federal regulation and that raises the question whether popular safety is most assured under private business or under state domination.

The statement that anthracite prices have alone involved the whole coal industry in danger of federal regulation is erroneous, he said. Anthracite prices are only one of the causes. Public utilities and railways, which have the selling price of their services and the maximum earning capacity of their capital fixed by law, cannot pay competitive prices for coal and remain solvent. The alternatives are to release the householders, public utilities and railways from regulation so that they can protect themselves in the open market for coal or to put coal under regulation on the theory that a producer must be equally bound with his customers. If the latter is done then the business of other people who sell other things to these controlled groups also will have to be regulated in time.

Responsibility attaches only to ownership. The operator owns the mines and is responsible for production. He has been able and eager to produce at least 20 per cent more than is needed. He has discharged his obligation. The merchant owns the facilities for distribution. He has 50 per cent more facilities than are required. He is eager to use them. The merchant has therefore discharged his obligation to society.

The miners control the energy and the skill for the production of coal. They have shirked; they have declared local strikes; and twice they have declared nationwide strikes.

The carriers own the facilities for transportating the coal. They have less facilities than are needed. The carriers, however, are literally operated by the state. For the failure of the carriers, the state is responsible. The state alone is responsible for policing the country. It has failed to prevent the miners from conspiring to limit coal production. The two causes of the coal distress are the failure of the railroads to deliver and of the miners to mine the coal. For both of these the state must accept responsibility.

Reforms Proposed for Coal Industry

Mr. Cushing said it is proposed to reform the coal industry by stabilization, community storage, consolidations by districts, and nationalization of the coal mines, all of which will tend automatically and unavoidably to increase the price of coal. His remedies or suggestions were:

(1) The inability of the carriers to transport the needed coal should be removed by lifting from the carriers the cause of their incapacity—too much regulation.

(2) The coal operators should so stagger the expiration dates of wage contracts that nationwide strikes are thereby made impossible. If in violation of contracts a nationwide strike is called depriving thereby the people of fuel, the statutes governing conspiracy should be invoked.

(3) A part of the coal field should be kept perpetually free of union domination to serve as a buffer district between the labor unions and the nation's fuel supply.

(4) The railways should be relieved of all necessity to serve any coal mines until after nine month's notice is given that such service is required.

(5) Wage contracts between miners and operators should be cancelled if the workers refuse to employ labor-saving and cost-cutting machinery.

"If the effect of these recommendations," said Mr. Cushing, "should be to abridge the activities of the Department of Labor; abolish the bureau of mediation and conciliation; and prevent in future the appointment of commissions to meddle with wage settlement, I should find in those occurrences no occasion to modify these suggestions."

Herbert Hoover, Secretary of Commerce, discussed the economic measures needed for "holding on to prosperity" in an address on Tuesday night. Dealing with the present situation, Secretary Hoover praised caution, stressed the need for confidence and courage as well, and marked emphatically the difference between caution and timidity.

The broader and deeper essentials involved in the planning of commerce and industry to keep the nation permanently prosperous constituted the major theme of the address.

He cited the increase in efficiency of production of from 10 to 15 per cent per capita since the period immediately preceding the war as one important phase of the necessity for new standards of business thought. A selection of industries furnishing commodities raising the plane of the

average citizen's comfort and convenience of life in the past decade shows a growth of 60 per cent.

Speaking on coal and transportation he said, "One of the great wastes in our economic machine is the shortage of transportation. It is the most profound and far-reaching deterrent upon our growth. It imposes great costs upon production. I need not point out to you that the periodic car shortage in its real meaning of insufficient tracks and terminals, as well as rolling stock, imposes intermittent stoppages of our industries and intermittent strictures in the law of supply and demand, influences price levels and creates local famines and gluts.

"It imposes burdens upon us which I believe every year create commercial losses equal to the entire capital cost of bringing the transportation system up to national need. It would be easy to demonstrate that in the additional price of coal due to insufficient transportation during the past year we have paid more than the equivalent of a 50 per cent increase in freight rate on coal.

"The causes of shortage are not far to seek. While the war contributed much delay and demoralization, the continued strangulation of railroad finances alone, before enactment of the present transportation law, could have brought us only one result. Nor is this a criticism of the railways, for they have grown in detailed working efficiency with the rest of the country. In a decade they have increased the movement of goods by 15 per cent with an increase of 3 per cent in personnel. Moreover the managers are showing great faith and courage in the undertaking of a large program of expansion. . . .

"There is a matter of immediate importance in which the commercial public can be of the utmost assistance in transportation and at once. Pending a large amount of betterments the railways are overtaxed to handle the vast volume of commodities we are producing and consuming even to-day. The continuance of our prosperity depends upon their handling the full load. With the continuation of business volume their burden will be even greater next fall than ever before. Therefore, a great service can be given if every local Chamber will definitely organize to cooperate with every local railway official toward this end. Particularly can the whole community assist if it stocks its coal between now and September so as to relieve the fall and winter traffic.

"There is another direction in which we have great opportunity to improve national economy. That is in the better functioning of our coal industry. If we can reduce the intermittence of operation of the mines and secure their more even seasonal production we shall by eliminating one-third of the capital and labor involved, accomplish three great things of industrial progress—give greater stability to the industry, give better conditions of labor and reduced costs to the consumer."

Operators Submit Brief on Outlaw Strikes In Anthracite Fields

On May 1 the anthracite operators submitted to the U. S. Coal Commission a brief on Outlaw Strikes in the Anthracite Fields, summarizing suspensions called in violation of agreement to submit grievances to established agencies for conciliation and arbitration.

For more than twenty years the anthracite industry has been working under union agreements with established machinery for conciliation and arbitration, states the brief. That machinery now provides for committees at each mine to adjust matters which are not settled with the foreman; a Board of Conciliation, composed of three operators and the presidents of the three district unions to adjust matters not settled in the colliery; and an umpire, who sits as supreme arbiter in cases where the board cannot agree. In spite of the fact that this machinery, based on agreement between the parties, is in full swing, and operates as a fair safeguard against unfair treatment of the miners, outlaw strikes have grown to enormous proportions.

"The total magnitude of these outlaw strikes, which are violations of agreement and exclusive of general strikes, paints a picture of chaotic conditions which it is our indisputable duty to present.

"In 1919 35,139 different men engaged in outlaw strikes and 235,553 man-days were lost. The lost output was about 377,000 tons, of the value of over $2,250,000.

"In 1920 96,840 different men were idle on outlaw strikes and the man-days lost were 1,815,000. The lost output was about 3,356,000 tons, of the value of over $20,000,000.

"In 1921 52,117 different men engaged in outlaw strikes and the total man-days lost were 823,279. The tonnage lost was 1,372,000, of the value of over $8,600,000.

"One company alone endured about 70 outlaw strikes in one year and nine months, and during two months in 1920 suffered a tonnage loss on such account of over 850,000 of the value of over $5,000,000. When the Wilson Anthracite Coal Commission rendered its award in August, 1920, giving the men an increase of 17 per cent, over half of the industry was tied up about two weeks in a so-called 'vacation strike' as a protest against the award.

"As one views this accumulation of economic waste in an organized industry operating under union agreements with facilities for conciliation and arbitration and the preposterous and frivolous character of so many of these outlaw strikes, there is reason to believe that there is no other industry where this evil has reached such extremes and where union discipline and responsibility has so completely collapsed.

"The difficulty does not lie with the machinery for adjustment which has been repeatedly readopted by the parties but in the irresponsible power of the United Mine Workers which, as in the case of all human institutions, inevitably leads to arbitrary action. Uncurbed human power seldom stops at the portals of justice. The remedy does not lie in discarding or emasculating this organization but in devising some adequate means whereby responsibility, and submission to the machinery for conciliation and arbitration, can be maintained. In order to approach the remedy, which will be the subject of one of our late papers, it is first necessary to review the work of the Board of Conciliation and the general subject of outlaw strikes."

After giving details of button strikes, holidays and other forms of outlaw strikes Walter Gordon Merritt, counsel for the anthracite operators, concludes:

"The underlying cause of this chaotic condition is a moral attitude well exemplified by the boastful and triumphant statement of one of the district presidents at the close of the 1922 strike, when he said:

" 'From time to time as the fight went on, the operators changed their arbitration proposals and dressed them up in many disguises, but the mine workers refused to become parties to any arbitration or approach to arbitration. We refused arbitration from the President of the United States notwithstanding that all the pressure of the government was back of that proposal.'

"Countless victories over the operators in minor matters and continued repression of criticism and insubordination on the part of the rank and file of union membership, have produced an autocratic machine with little or no regard for the rights of others. Numerous demands won through infliction of great financial and economic losses for which the unions have never been made answerable, with a resulting disregard of legal and moral responsibility, finally reached their consummation in this boasted rejection of the proposals of the Chief Executive of the nation, who desired only to protect the public from privations.

"No moral or legal restraint having been operative, these organizations, placed in the strong strategic position because of steady employment of the miners at high wages, have become imbued with a sense of power which heedlessly violates contracts and exults over resistance to the proposals of the chosen representative of our people. To reverse this condition, to encourage democratic administration of union affairs, and to impose a sense of responsibility, some system must be devised which will justly bring home to these organizations the burden of their wrongdoing. The operators have in mind a definite proposal to meet this problem and will submit it to the commission as soon as their papers diagnosing the situation have been completed and filed."

Commerce Commission Begins Hearing on Complaint of Dock Operators for Adjustment of Illinois Rates

Will coal rates into the Northwest be changed this summer? The question arose during the great rate battle in the Interstate Commerce Commission hearings in Minneapolis and St. Paul, Minn., which started May 2 and were scheduled to end May 8, and in which the Northwest Dock Operators' Association hoped to prove that Illinois rail rates into the Northwest were unreasonably low. No official statement from the commission was made on the point, but the impression became firmly fixed in many minds that a decision will be made within two months. In the hearings the dock interests asserted that present rates debar dock coal from much territory it had learned to regard as its natural market. Illinois replied that what the docks really want is a fabric of rates that will continue the dock monopoly on Northwest trade.

Five complaints were on the list for hearing. The first was I. C. C. Docket 14476, a complaint of the Northwest Dock Operators' Association attacking past adjustments of rates from Illinois, more particularly southern Illinois, to points in Iowa, Minnesota and North and South Dakota as being unreasonable. The second case was I. C. C. Docket 14622, a complaint of the Board of Railroad Commissioners of South Dakota seeking rates on fine coal to South Dakota destinations. The third was I. C. C. Docket 14533, a complaint of the Traffic Bureau of the Sioux City (Ia.) Chamber of Commerce seeking changes in rates from Duluth and from Illinois to that city. The fourth was I. C. C. Docket 14477, in which the C. Reiss Coal Co. asks that the Holmes and Hallowell scale be applied to coal from Illinois to Wisconsin. The last was I.C.C. Docket 14142, a complaint of the Illinois Coal Traffic Bureau on inequalities in rates to local stations in Wisconsin from Lake Michigan docks and from the northern Illinois field.

It was evident on the first day that the commission expects to make as quick a job of the case as is consistent with careful consideration of evidence. C. I. Kephart, examiner for the commission, at the outset told the assembled lawyers, traffic men and lay representatives that the briefs and oral argument must all be in and the hearing finished by May 8, and that on June 8 final communications must be in the commission's hands.

On the first day the dock case presentation was completed—after some seesawing. Wayne Ellis, secretary of the Northwest Dock Operators' Association, under questioning by Attorney Frank Lyon, for the association, declared early in his testimony that the interests he represented did not care whether the commission raised rail rates on coal from Illinois or lowered rail and lake rates so long as an equalization to Northwest points was obtained. What the dock men want, he said, is an extension of the Holmes and Hallowell scale. This brought a stiff rejoinder from F. S. Keiser, traffic manager for the Duluth Chamber of Commerce, who protested that the dock men ought to have the interests of the consumers of the Northwest closer to heart than that. Lower coal rates is what the people of the Northwest want and need, he insisted. After a recess the Ellis statement was withdrawn and the dock association was recorded as not favoring a change that would add to the ultimate cost of coal in the Northwest.

Most of the testimony for the dock association in the first complaint—I. C. C. Docket 14476—was contained in a thick pamphlet prepared for the commission and filed as an exhibit. This and the bulk of other evidence introduced by the complainant dock interests made an exhaustive argument to show that present rail rates from Midwestern coal fields to points in Iowa, Minnesota and North and South Dakota are unreasonably low as compared with rates from Duluth and West Superior, that this enables rail competitors practically to deprive the upper Lake docks of their natural and normal business, thus endangering an investment of $25,000,000 or more in dock facilities; that the long haul of empty cars from the Northwest back to Illinois mines is a handicap to transportation and ought to be discouraged, and that the storage service the docks are able to perform for the Northwest ought to be encouraged. The case has been presented in most of the principal details in the press during the past month or so.

In 1917 the Interstate Commerce Commission increased freight rates 15c. per ton on the rail hauls of rail-lake-rail coal. Thus the total addition was 30c. on lake coal whereas the same advance added but 15c. to the Illinois rate. In further orders of the commission since then total advances on coal going into the Northwest by rail and lake have been $1.74, and on Illinois only $1.17. This difference of 57c. to the advantage of the Illinois shippers is the cause of the present complaint of the dock interests.

The dock complaint cites the steady decrease in coal handled by the docks and the steady increase of shipments of Illinois coal into the Northwest as proof that rates are so badly out of line in favor of Illinois that fair competition is disturbed. In 1913 lake shipments to Duluth totaled 11,000,000 tons of Eastern coal and the increase by years had been averaging 10 per cent. But in 1921 the total was only 7,500,000 tons, of which 3,750,000 are said to have been carried over after the winter season. In 1922 the total was about 6,500,000 tons and dock men prophesied the 1923 total would be less. The Illinois answer to this was that the drop in dock business was partly due to the decrease in total production of the country during the past two years and partly to the fact that the pool system of shipping Eastern coal to the Northwest has lowered the quality of dock coal.

Says Dock Interests Seek Monopoly

Fred H. Harwood, traffic manager for the Illinois Coal Traffic Bureau, in presenting the arguments for the Illinois and Indiana operators, declared that the petition for an adjustment of rates clearly shows that the dock interests are seeking to reduce the amount of coal coming into the Northwest and thereby set up a monopoly. He presented testimony to prove his claims and showed that rates from Illinois and Indiana are even too high now to give the Middle Western producers the opportunity for competition in the Northwest they ought to have.

"The members of the Illinois Coal Traffic Bureau are favorable to and consider that rates on bituminous coal should be made and maintained on the group basis of adjustment, both as to origin and destination, except there are situations where this might be modified to fit conditions as to short-haul points, such situations, however, to take into account all conditions," he said.

Mr. Harwood said that rates on coal from Illinois and Indiana to the Northwest have already been advanced during the last 10 years, while rates on Eastern coal to the docks have remained unchanged. This, he declared, was a discrimination and hurt Illinois and Indiana competition in the North.

The rail defendants expressed surprise that the dock case was put in so briefly—with such lack of detail—and they suggested an elaborate hearing was a waste of time. The dock men's case was made up largely of records and was based upon the theory of rate making adopted by the commission in its own decisions on cement rates. They said the records themselves furnished case enough to convince anybody that rail charges from the docks inland are discriminatory.

J. W. Goodman, for the Commercial Club of Grand Forks, N. D., said dock rates to that city were too high as compared with Montana and Wyoming rates. This started an argument as to whether the dock interests want to reopen Western rates which have just been established after exhaustive study. J. L. Browne, of Sioux City, Iowa, said that rates from the docks to Sioux City are too high and that Illinois rates to the Northwest are so inequitable that variations of 300 miles make no difference in charges. He favored distance rates. Belleville (Ill.) operators inter-

vened in the Sioux City case, asking that the Standard mining district get the same rates to Sioux City as does the Springfield (Ill.) district, though it is 80 miles farther away. Commissioner Kelley, of the South Dakota Railway Board, said that a general revision downward on rates from all points into that state is needed.

On Monday morning the hearing was transferred from the Federal Courts Building to the Minnesota Senate Chamber, in St. Paul. Several intervenors with local interests were heard, urging generally that no increase be made. F. H. Harwood was heard in rebuttal. The Western railroads cut some of the ground from under the dock men's feet Monday afternoon when B. B. Beidelman, of the Great Northern, the carriers' spokesman, opposed any reduction of the Holmes and Hallowell schedule for coal going off the docks. He denied the dock operators' statement that there is a balanced movement of box cars loaded west with coal and east with grain, saying the roads have to haul great numbers of empties from the Twin Cities and elsewhere back to the dock. Public-utility men disclaimed any preference for either dock or Illinois coal rate changes.

Rocky Mountain Fuel Co. Explosion Takes Toll of Ten Lives

An explosion Saturday afternoon, May 5, in the Southwestern Mine of the Rocky Mountain Fuel Co., at Aguilar, Colo., caused the death of ten miners entombed in the workings. The ten bodies were removed from the scene of the disaster at 10 o'clock Sunday morning after continuous work by rescue crews composing eighty men from adjoining mines under the direction of rescue forces from the Bureau of Mines.

Investigation disclosed that the electric current that operates the fan stopped and was off for fifteen or twenty minutes. It was during this interval or when current was restored that the explosion occurred. Three miners managed to escape death by only a narrow margin. If the disaster had not occurred on an idle day sixty miners ordinarily on duty might have been trapped.

Kansas Will Try to Open Its Mines

Out in Kansas they are trying to remedy the coal market and the curse of mine idleness by some kind of official and public action. Just what the method will be may be determined May 10 at a general conference of coal mine operators, mine-union officials, wholesale and retail coal men and railroaders in Topeka. Governor Jonathan Davis called the conference after Ed. T. Hackney, the Governor's special representative, filed a report following his recent study of mine idleness. The investigation was made after the miners had begged the Governor to do something to save their jobs but not to turn the matter over to the hated Kansas Court of Industrial Relations.

In his report Mr. Hackney states that Kansas miners averaged only $1,000 total earnings in 1922 and face a period of suffering if they cannot work this summer. He says railroads are ready right now to do a good job of coal moving; that bins, both domestic and industrial, are empty and that retailers and wholesalers have nothing to do. If these bins are not filled during the summer, he prophesies there will be a panic for coal next autumn, which "will bring joy to the profiteer."

"The miners," says the report, "at this season of the year, when they are not rushed, should be able to produce coal with less slack, that would be suitable for domestic consumption.

"The operators, who say they are taking heavy loss on overhead on idle mines, should reduce the profit on this storage coal to a minimum. The railroad coal-holding companies, to save their industry, should reduce the royalty and rental on storage coal to the minimum. The railroads should utilize their equipment and get tonnage at this slack time, and save the coal industry, with its ever valuable freight revenue tonnage. This would avoid overtaxing their equipment while they are moving the crops and livestock to market."

Union "Soaks" Miners to Limit Output, Says Brief of Anthracite Operators

In spite of the formal agreement between anthracite operators and miners that there shall be no limitation of output, a brief filed May 7 with the U. S. Coal Commission by the anthracite operators asserts that "there is concerted effort on the part of the unions to curtail production by the passage of resolutions fining miners for producing more cars than a specified maximum."

The statement, signed by Walter Gordon Merritt, counsel for the General Policies Committee of Anthracite Operators, says in part:

"Typical cases serve to illustrate the practice. Before the suspension of 1922 it was customary with one company for a miner to load from eight to twelve cars a day. Following the suspension the union imposed a restriction of four to six cars for the various veins, with the result that thereafter the highest output of any man is six cars. One contract miner desiring to make more money and exceeding the union limit in January, 1923, is informed by the union president that he has been fined $25 for loading an excess of seven cars. Finally the fine is reduced in amount and paid, with a warning to the miner that if he again loads more than six cars a day they will 'soak' him.

"Two men are fined in another mine for loading more than two cars of coal a day, and a strike is threatened to enforce collection of the fine. The union president admits the existence of a rule to that effect and declares that any man violating it will be fined. He further states that the reason for the restriction is that the union does not wish the operators to be able to show a large wage earned by individual miners on certain days, and that the union has as much right to fine men for loading too much coal as the law has to fine men for speeding.

"In another case the union demands that the company collect the fine and a strike is ordered because it refuses. The company is punished for refusing to collect a fine imposed on a man doing what the company believes he ought to do.

"Some unions impose a rigid arbitrary limit for all mines and veins regardless of varying conditions. Another local makes the miner forfeit the price of each excess car. Checkweighmen employed by the union to check car weights sometimes are obliged by the union to keep a check on the number of mine cars produced and to report excessive cars to union headquarters.

"When men are asked by the foreman why they do not load more coal, they reply, 'What is the use if we have to pay a fine for loading an extra car.' They frankly state their desire to do more work, but fear union discipline.

"In one mine a normal day's output for a miner will be four cars, but union restrictions keep the production down to not more than three cars, with the result that the breaker has to be shut down on alternate days for lack of an adequate coal supply. A strike is thereupon called to force the breaker to operate every day although its intermittent operation is due to union restrictions on output.

"The direct losses due to outlaw strikes and the economic waste flowing from inefficiency and limited output represents a substantial addition to the total cost of coal production without benefit to anyone."

Coal Bids Sought for Naval Stations

Bids will be opened at noon on May 23 by the Bureau of Supplies and Accounts of the Navy Department, in Washington, for furnishing and delivering about 382,950 gross tons of bituminous coal for the various naval stations from Boston to Pensacola, Fla., and to the Great Lakes Station, Ill. Deliveries are to extend from July 1, 1923, to June 30, 1924. Among the tonnages called for are the following: Boston Navy Yard, 30,000; Brooklyn Navy Yard, 57,500; Philadelphia Navy Yard, 45,000; Annapolis Naval Academy, 35,100; Washington Navy Yard, 50,000; Naval Powder Factory, Indian Head, Md., 33,000; Hampton Roads Naval Base, 22,000, and Norfolk Navy Yard, 45,000.

Coal Commission Has Courage to Say What Is Needed, But Seeks Support of Conflicting Factions

By Paul Wooton
Washington Correspondent of *Coal Age*

There is handwriting on the wall which says that the American people intend to have a coal supply that is constant and which sells at a decent price. The coal-producing and distributing agencies will be well advised if they take note of the public temper and cease their constant warfare and inclination to charge all the traffic will bear before the people take charge of their industry. These are deductions from statements made by Thomas R. Marshall, of the President's Coal Commission.

"There are two broad principles," said Governor Marshall, "which the American people are not going to give up without making a lot of trouble. One is to work when, where, how and for what one pleases. The other is to combine and bargain collectively on wages and working conditions. Those concerned are being requested prayerfully to furnish the means by which these principles can be kept alive and outbreaks or disturbances stopped or be punished."

Continuing, Governor Marshall said: "One of the things much needed in this situation is for the individual citizen to take care of himself. Unless the general government is going into the coal business and is going to make the President a mine boss, the individual citizen must pay attention to his own business and avoid being skinned by coal or other dealers. If the individual will do his part, it will help to rectify matters. Moreover, is there any doubt as to the power of a municipality to issue licenses to those who retail coal? If I were living in Washington and coal costing $8 at the mine was offered for sale at $15, I would hire a hall and start a community coal yard. I would not curse the President. Anyone has the right to pay $1,000 for a spavined horse. Consumers do not have to pay excessive prices if they have backbone enough to take the necessary initiative.

"We need a revival of patriotic impulse in America. There must be a revival of what is fair and square and decent. The law prescribes certain limits but the gospel sets up others. There is need for a new light which will make plainer the duties owed to the people. As far as he can each should forget his legal rights. All concerned should meet the commission in a spirit of conciliation to bring the coal industry to a substantial and continuing basis, insuring a constant supply at a reasonable price, which will allow a fair return on investment and the payment of American standards of wages.

"The commission has nerve enough to tell Congress what ought to be done, but it prefers to have the warring elements back of the plan that is submitted to Congress so that it will not be involved in legislative controversy. In the meantime there may be another coal shortage, another cessation of work and the people may say 'a plague on both your houses'."

Chairman Hammond said that the commission is very much pleased at the settlement reached in the State of Washington. He said the commission could not take much credit in that connection, but that at least it had introduced the contending interests to each other and may have broken the ice for the preliminary discussions. Mr. Hammond again indicated that public hearings are to be resorted to only when the irreconcilable points have been clearly and positively established.

As a result of the commission's suggestion that efforts be concentrated on concrete suggestions as to how peace may be maintained in the industry, it was stated that such views already are reaching the commission. "It would seem," said Dr. George Otis Smith, "that the commission is to have more help and the newspapers less material. It is evident that all are making a new effort to be constructive."

The anthracite operators are to appear soon before the commission in executive session. The commission also expects an early call from John L. Lewis. The returns on the cost questionnaire are being received at a much more rapid rate than those on earnings. Dr. Smith stated that the commission realizes that the earnings questionnaire placed a heavy load on the operator, but that the returns covering large blocks of production are promised in the near future. All returns are being tabulated as rapidly as they are received.

Miners and Operators of Southwest Want Rates on Coal Lowered Materially

Arguments for a reduction of freight rates on coal from the Kansas field to the Missouri River will be heard by the Interstate Commerce Commission in Kansas City, May 17. The hearing will be in answer to a petition by coal operators of the state, based on the claim that rates on steam coal from Illinois to the Missouri River are discriminatory against the Kansas mines. Two attempts have been made by railroads of the affected district to lower rates, but in both instances the new tariffs were suspended by the Interstate Commerce Commission.

Supporting the operators in their attempt to obtain rate reductions are the miners and business men of Kansas, and the State Public Utilities Commission. It is the first time in many years that operators, miners and the public have been on the same side of the fence in Kansas.

In a request to the Public Utilities Commission to intervene in the hearing, United Mine Workers officials declared that between eight thousand and ten thousand miners in the state are out of work because of lack of market for the product of the mines. The assertions of both the operators and miners concerning conditions in the field are supported by the report of E. T. Hackney, special representative of Governor Davis, who recently investigated conditions.

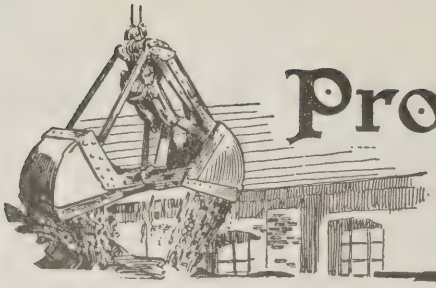
Discriminatory and unjust rates on coal to the great consuming markets along the Missouri River are protested by the Colorado and New Mexico Coal Operators Association in a complaint filed with the Interstate Commerce Commission April 23, in which a 25-per cent reduction on freight rates is sought to points in Kansas, Nebraska and in South Dakota west of the Missouri River. F. O. Sandstrom is traffic manager for the complainant.

The association declares that business amounting to more than 200,000 tons of coal a year is lost by the operators of Colorado and New Mexico because of excessively high rates. The present rate to most Missouri River markets is $5.26 a ton. The attorneys for the operators hope to show that $4 per ton would be a sufficient charge and would not stifle competition.

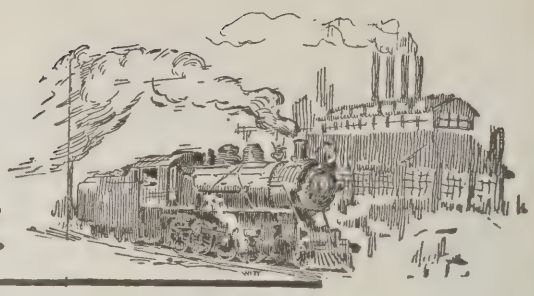
Western coal rates were submitted to the Interstate Commerce Commission a year ago when it made an investigation on its own initiative of the rates in Colorado, Wyoming and west to the Pacific coast.

Citing inequalities in rates from various regions, Harry F. Nash said that from Bevier, Mo., to Broken Bow, Neb., 622 miles, the freight rate on lump coal is $4.01 per ton. From Walsenburg, Colo., to Broken Bow, 440 miles, the rate is $5.27, or $1.26 per ton higher with a 182-mile shorter haul. From Herrin, Ill., to Beatrice, Neb., 642 miles, the freight rate is $4.50 per ton. From Walsenburg, Colo., to Beatrice, 578 miles, the rate is $5.27, or 77c. per ton higher for a 64-mile shorter haul.

To Superior, Neb., from Kirby, Wyo., a 760-mile haul, he said the rate on slack coal is $3.96 per ton. From Walsenburg, Colo., to Superior, 572 miles, the rate is $4.27 per ton. The haul is 197 miles less but the rate is 31c. per ton higher.



Production and the Market



Weekly Review

May opens auspiciously for the coal trade, both hard and soft. Independent producers of anthracite have a market for domestic sizes as high as $11 and week after week there is hung up a 2,000,000-ton production record. It is true steam sizes are moving much less readily, but that is to be expected. Bituminous-coal production holds around 10,250,000 net tons per week, and prices, though gradually easing off, are well above those a year ago both before and after the strike began. There is a definite movement on foot to build up storage piles of coal this summer in order that when the fall rush hits the railroads there will be no jam caused by essential coal traffic. This drive for summer buying of coal, energetically fostered by the Department of Commerce, is gaining momentum. Thus, although there has been no visible buying movement such as was expected the first week in May, inquiries are numerous and producers and shippers are hopeful.

Production Exceeds that of Active Years

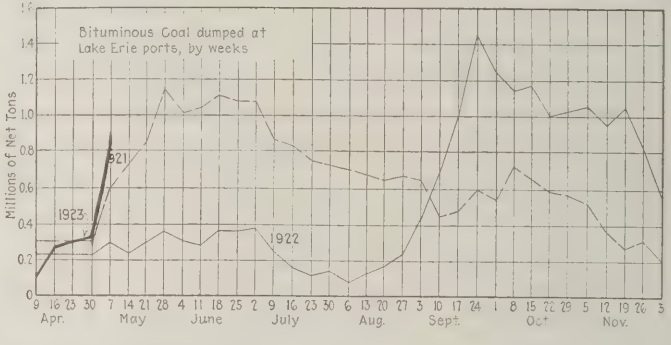
Production of soft coal in the first four months of 1923 was 179,630,000 net tons, about 1 per cent greater than in the corresponding periods of 1917, 1918 and 1920, years of marked business activity, and about 30 per cent more than for the same periods of 1919, 1921 and 1922, years of depression and strikes.

Production of anthracite remains around 2,000,000 tons per week, with 7,850,000 tons as the April output. The output for the first four months of 1923 was 33,718,000 tons, or nearly 55 per cent more than in the corresponding period of 1922.

Nearly all coal with the exception of Standard Illinois and Fourth and Fifth Vein Indiana show small price recessions from last week. *Coal Age* Index of spot prices for bituminous coals was 220 on May 7, as compared with 224 for the previous week, with the average price at $2.66. Lack of business and lower prices caused additional soft-coal mines to close. Midwestern coals are at a low point. There is a lack of active spot demand in central Pennsylvania.

Railroads and utility corporations are the heaviest buyers, taking on good sized tonnages at current prices. Bids received last week by the U. S. Shipping Board for furnishing about 2,500 gross tons of either Pool 9 or 71 coal f.a.s. New York harbor brought tenders ranging from $5.77 to $6.90. A tender of $5.91 was received for furnishing 1,700 tons of similar coal t.i.b. Philadelphia. The New York Custom House bought 400 gross tons of Pool 11 alongside at $4.25, plainly distress coal since not characteristic of the market.

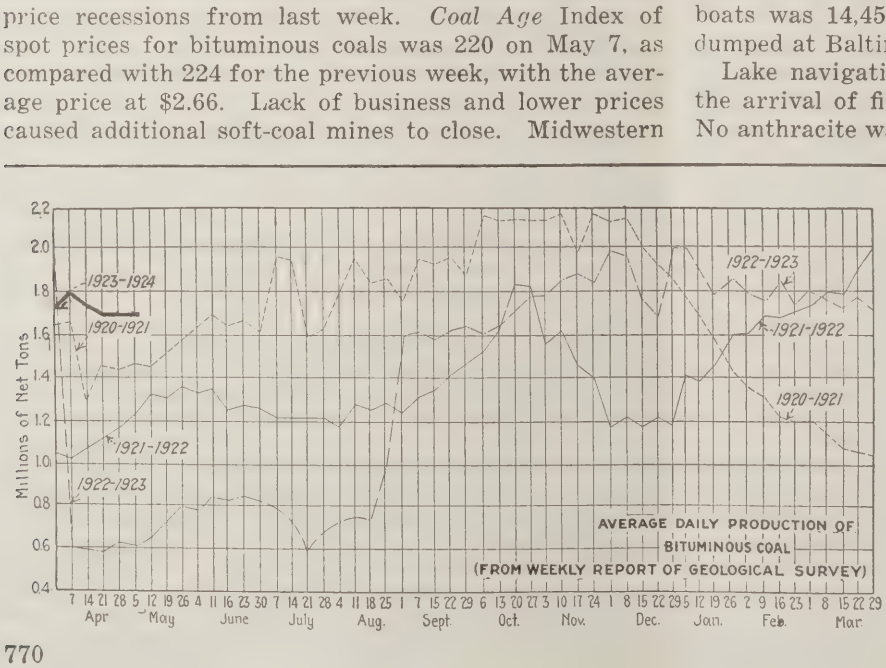
The export market remains quiet, the only feature being a reported inquiry involving about 40,000 tons of



Southern coal. Some chartering of vessels on old business was reported.

During April thirty-five vessels left Baltimore carrying 218,185 tons of cargo coal and thirteen boats carried 66,419 tons of cargo coke. Bunker coal on foreign trade boats was 14,459 tons, making the total coal and coke dumped at Baltimore in April 299,063 tons.

Lake navigation into Duluth opened on May 5 with the arrival of fifteen boats containing bituminous coal. No anthracite was received, although the situation there



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
April 14	3,656,000	10,401,000
April 21 (*b*)	3,575,000	10,223,000
April 28 (*a*)	4,175,000	10,235,000
Daily average	696,000	1,706,000
Calendar year	144,529,000	179,630,000
Daily av. cal. year	1,438,000	1,783,000
ANTHRACITE		
April 14	6,000	2,067,000
April 21	6,000	2,065,000
April 28	5,000	2,116,000
Calendar year	21,803,000	33,718,000
COKE		
April 21 (*b*)	94,000	437,000
April 28 (*a*)	89,000	424,000
Calendar year	2,305,000	6,419,000

(*a*) Subject to revision. (*b*) Revised from last report.

regarding hard coal is serious. Heavy ice is reported in other sections, notably at the "Soo" and difficulty is expected in getting boats through. Many loaded vessels are waiting at the lower Lake ports for the ice to break before venturing outward.

"The production of soft coal during the last week of April," says the Geological Survey, "was practically the same as in the week preceding. The total output was estimated at 10,235,000 net tons against 10,223,000 tons the week before, and 4,175,000 tons in the corresponding week in 1922. Preliminary reports of cars loaded in the week April 30-May 5 indicate declining production. This was due to the partial observance of the May Day holiday at some mines. Loadings on that day totaled 27,359 cars against an average of about 31,000 on recent Tuesdays."

Dumpings at Hampton Roads for all accounts during the week ended May 3 was 355,271 net tons, as compared with 323,855 net tons the week previous.

Demand for the domestic sizes of anthracite continues undiminished. Producers are heavily booked and some are refusing further orders. There are many buyers from Canada in the mining fields ready to pick up any spot domestic coals that may be available.

Midwest Trade Still Slow

Trading in almost all midwestern coals in Chicago remains at a low point. The May 1 boost in prices of domestic sizes of southern Illinois coal had the expected effect: A few more mines shut down for lack of business. But this further reduction of the fuel supply of the region did not hoist the rock bottom price of screenings. Steam buyers take what is offered at the low quotations and placidly decline everything else. Railroads have begun to buy some lump because those mines which are running must have a place to put sluggish domestic sizes.

Coal equipment from some of the central western lines is trickling eastward into service between Kentucky and the Lakes. There car supply has been improving over the past week with the swell in Lake traffic.

St. Louis Market Is Soft

Down around St. Louis steam demand has shown a slight pick-up. Carload screenings are moving a degree easier though the trade in steam coal in small lots is as dead

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

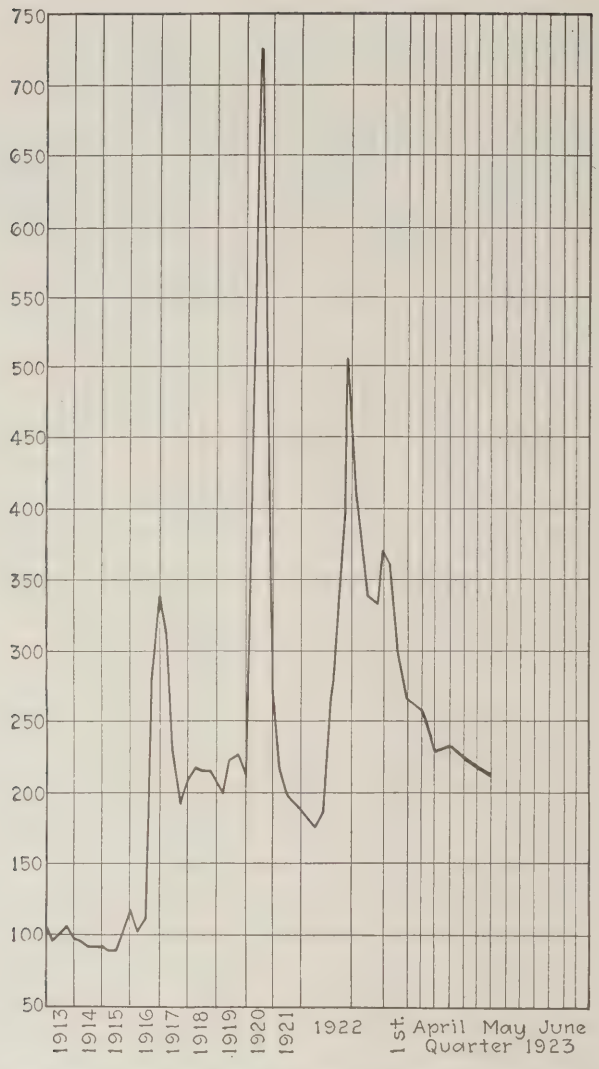
Low-Volatile, Eastern	Market Quoted	May 8 1922	Apr. 23 1923	Apr. 30 1923	May 7 1923†
Smokeless lump	Columbus	$2.85	$6.15	$6.10	**$6.00@$6.35**
Smokeless mine run	Columbus	2.40	4.25	4.10	*3.75@ 4.25*
Smokeless screenings	Columbus	2.20	4.10	4.00	*3.50@ 4.00*
Smokeless lump	Chicago	2.90	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	2.25	3.85	3.85	3.75@ 4.00
Smokeless lump	Cincinnati	2.90	6.35	6.00	6.00
Smokeless mine run	Cincinnati	2.60	4.25	3.85	3.75@ 4.00
Smokeless screenings	Cincinnati	2.40	4.00	3.85	3.75@ 4.00
*Smokeless mine run	Boston	5.65	6.25	6.35	6.25@ 6.50
Clearfield mine run	Boston	3.15	2.75	2.60	*2.00@ 3.00*
Cambria mine run	Boston	3.50	3.35	3.35	*2.75@ 3.50*
Somerset mine run	Boston	3.40	3.15	3.00	*2.25@ 3.25*
Pool 1 (Navy Standard)	New York	3.75	3.85	4.00	*3.50@ 4.00*
Pool 1 (Navy Standard)	Philadelphia	3.75	3.95	4.05	*3.85@ 4.25*
Pool 1 (Navy Standard)	Baltimore	3.90	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.50	3.10	3.10	*2.60@ 3.00*
Pool 9 (Super. Low Vol.)	Philadelphia	3.40	3.20	3.10	*2.85@ 3.30*
Pool 9 (Super. Low Vol.)	Baltimore	3.40	2.90	2.90	*2.75@ 2.85*
Pool 10 (H.Gr.Low Vol.)	New York	3.25	2.50	2.60	*2.25@ 2.75*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.20	2.55	2.50	*2.25@ 2.65*
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.25	2.50	2.50	*2.25*
Pool 11 (Low Vol.)	New York	3.00	2.05	2.25	*1.90@ 2.50*
Pool 11 (Low Vol.)	Philadelphia	2.85	.....	2.10	*1.90@ 2.15*
Pool 11 (Low Vol.)	Baltimore	3.20	2.15	2.15	*2.00*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	2.70	1.85	1.80	1.60@ 2.00
Pool 54-64 (Gas and St.)	Philadelphia	2.65	2.20	2.05	*1.75@ 2.00*
Pool 54-64 (Gas and St.)	Baltimore	3.00	1.95	1.95	*1.80*
Pittsburgh sc'd gas	Pittsburgh	.....	3.10	2.85	2.75@ 3.00
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	2.10	1.60	**1.75**
Kanawha lump	Columbus	3.15	3.75	3.60	*3.25@ 3.75*
Kanawha mine run	Columbus	2.65	2.25	2.25	2.00@ 2.50
Kanawha screenings	Columbus	2.20	2.40	2.10	*1.90@ 2.20*
W. Va. lump	Cincinnati	2.50	3.85	3.75	*3.00@ 4.00*
W. Va. Gas mine run	Cincinnati	2.90	2.50	2.40	*2.00@ 2.75*
W. Va. Steam mine run	Cincinnati	2.70	2.50	2.40	*2.00@ 2.75*
W. Va. screenings	Cincinnati	2.50	2.25	2.25	*2.00@ 2.25*
Hocking lump	Columbus	3.15	2.85	2.85	2.75@ 3.00
Hocking mine run	Columbus	2.90	2.00	2.00	*1.85@ 2.10*
Hocking screenings	Columbus	2.25	1.70	1.70	*1.50@ 1.75*
Pitts. No. 8 lump	Cleveland	3.25	2.90	2.85	**2.35@ 3.50**
Pitts. No. 8 mine run	Cleveland	3.00	2.15	2.15	2.10@$2.25
Pitts. No. 8 screenings	Cleveland	3.00	1.95	1.80	*1.75@ 1.85*
Midwest					
Franklin, Ill lump	Chicago	3.45	3.65	3.65	**3.50@ 4.10**
Franklin, Ill. mine run	Chicago	3.00	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	3.00	1.95	1.85	1.75@ 2.00
Central, Ill. lump	Chicago	2.75	2.70	2.70	*2.25@ 2.35*
Central, Ill. mine run	Chicago	2.75	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	2.00	1.55	1.55	1.50@ 1.65
Ind. 4th Vein lump	Chicago	3.15	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	2.50	2.85	2.85	*2.75@ 3.00*
Ind. 4th Vein screenings	Chicago	2.25	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	2.60	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	2.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.40	1.55	1.55	1.50@ 1.60
Standard lump	St. Louis	.....	2.50	2.50	2.50
Standard mine run	St. Louis	.....	1.85	1.85	1.75@ 2.00
Standard screenings	St. Louis	.....	1.10	1.10	**1.50**
West Ky. lump	Louisville	2.90	2.50	2.60	2.50@ 2.75
West Ky. mine run	Louisville	2.65	2.10	1.95	*1.85@ 2.00*
West Ky. screenings	Louisville	2.65	1.90	1.85	*1.65@ 1.85*
West Ky. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.50	2.50	**2.70**
Big Seam mine run	Birmingham	1.70	2.10	2.10	*1.85@ 2.25*
Big Seam (washed)	Birmingham	2.15	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	4.00	3.75	3.50@ 4.00
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.90	3.85	4.00	**3.75@ 4.50**
S. E. Ky. mine run	Louisville	2.80	2.60	2.75	*2.15@ 2.75*
S. E. Ky. screenings	Louisville	2.60	2.20	2.25	*1.80@ 2.00*
S. E. Ky. lump	Cincinnati	2.60	4.00	3.50	*2.75@ 4.00*
S. E. Ky. mine run	Cincinnati	2.60	2.25	2.25	2.00@ 2.50
S. E. Ky. screenings	Cincinnati	2.50	2.10	2.00	1.75@ 2.25
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.15	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.65	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	April 30, 1923 Independent	April 30, 1923 Company	May 7, 1923† Independent	May 7, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.00	8.00@ 8.35	$8 50@11.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@ 11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.25	6.00@ 6.30	6.30@ 7.25	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.25@ 3.50	3.50@ 4.15	2.25@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.75@ 2.50	2.50	*1.60@ 2.50*	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	1.50@ 1.60	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 220, Week of May 7, 1923. Average spot price for same period $2.66. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

as ever. The demand for everything else in that market is light, indeed. Anthracite and smokeless are beginning to go into storage in a small way, however. Mt. Olive and Standard are slow in this direction. Retail prices did not increase on May 1 when the field price of southern Illinois domestic advanced from $3.85 to $4.10. Evidently there is a good deal of coal on hand at April prices to be cleaned up before any changes are made to householders.

Kentucky Gets Busy

There has been some fair movement of coal from eastern Kentucky the past week, due to better car supply. It is reported that the Hazard field established a one-day loading record on April 25, when a good car supply was set in. Prepared sizes are in better demand as a result of Northern stocking movement, but increased production of prepared is making for a weaker market on screenings, in spite of fair industrial consumption.

At Duluth only screenings are left on the docks. Dock men assert that all other coal has already been contracted for. With this condition dealers and consumers are holding off buying, waiting for whatever change in price the new coal may bring.

According to the most authoritative reports obtainable the Youghiogheny and Hocking coal will reach Duluth at $675@$7. This is $1.50 lower than the last price and is $2 lower than the price two months ago. Run of pile, it is said, will open up from $6 to $6.25, and screenings will be between $4.50 and $4.75. Screenings are now quoted at $4, but those offered contain much old stock that is damaged. There has been no price yet on Pocahontas lump, but mine run will probably open up from $7.50 to $7.75. The present price is $8.50. It is felt that these lower prices will give the docks here a better chance to compete with coal brought all rail from southern Illinois all rail, but dock men hold to their position that unless some adjustment is made not more than half the usual supply of coal will be brought up this year.

There has been no anthracite loaded out of lower Lake ports as yet. The situation at the Head-of-the Lakes is serious. There is no hard coal left on the docks, and public restaurants and other consumers who must have coal for their stoves are bringing some in all-rail.

Beginning with May 1 at Milwaukee a radical reduction was made on all bituminous coal, the cut varying from $1.25 to $3 per ton. Anthracite is held unchanged in price. The wholesale price of Pocahontas screened was advanced 25c. per ton. Coke was cut $1.10 per ton on all sizes.

West Drones Along

Nothing is disturbing the calm of the Western coal trade just now except feverish activity to find markets on the part of those companies whose mines are still running three or four days a week. In the Kansas, Oklahoma, and Arkansas region, union officials estimate between 8,000 and 10,000 men are idle. In Colorado May prices to encourage storing have put a little coal in cellars but the market is dull. Best bituminous lump is selling for $5.15. Slack ranges from $1.75 to $2.50. Lignite lump is offered at $2.75. Another landslide has choked tunnel No. 52 on the Moffat road, thus shutting Routt County coal out of the Denver market for a week or more.

In Utah there is a movement to eliminate certain "superfluous" sizes. Two or three of the biggest operators have announced new low prices on the four sizes they expect to make in the future. This circular reads: Lump, $4.50; domestic lump, $4; stove, $4, and slack $1.75. This is a decrease in mine price, but retailers have not yet dropped their price to consumers.

Ohio Markets in Doldrums

Quality of coal offered is playing an important part in the Cincinnati market. Houses with the grades wanted by the trade are getting what little business there is to be had. There was a slight note of weakness running through the smokeless trade. At Columbus the lateness of the Lake season put a damper on the trade. Steam buyers are holding off and while some are putting in a supply of coal others are playing a waiting game. Utilities and railroads are the best buyers of steam coals, while iron and steel plants are showing a tendency to come into the market. Domestic trade shows some signs of revival and dealers are looking for high-grade coals. Although a fair tonnage of Pocahontas is coming into this market, it is scarce. Contract making continues slow in the eastern Ohio field with commercial steam-coal users, while operators and jobbers are indifferent because of the low prices prevailing in the spot market.

The West Virginia market reports a growing demand for low-volatile coal with prices steadily advancing, smokeless mine-run ranging $3.75@$4.25, f.o.b. mine. There has been little demand in West Virginia for high-volatile mine-run.

There has been a further curtailment in production of high-grade gas coal in the Pittsburgh district because producers were not able to get in the spot market what they considered the real value for their product. The railroads. and line consumers are well supplied with their contract coals, resulting in spot trading being light. Business at Buffalo is slow.

Few Developments in New England Market

The market in New England drags along with few developments. A relatively small tonnage of central Pennsylvania coal that was placed during the week netted very low prices, about as low as producers could be expected to

operate on the present wage scale. The territory has been combed over by sales agents to such extent that buyers are reluctant to buy more than small lots. Each week sees even the choicest grades on an easier price basis and some shippers are willing to extend delivery through the summer on present spot quotations. There is little comprehensive business in sight, and the trade is settling down to what promises to be a dull season.

At Hampton Roads there is ample coal on hand for all requirements. Current demand coastwise is light, but there are indications that Pocahontas and New River will be held on higher levels than a year ago.

For inland distribution at Boston, Providence and Portland the best grades continue to offer at $8.25 per gross ton on cars, with seconds at $8 or less. Only moderate tonnages are available, for shippers without their own rehandling facilities are disposed not to risk sending coal forward unsold.

Discriminating buyers near tidewater who last year bought Hampton Roads coals are somewhat puzzled this year to know whether to wait for reduced prices on Pocahontas and New River or to accept deliveries all-rail from central Pennsylvania at current quotations which at present are somewhat more favorable to the purchaser.

A small tonnage of Pennsylvania grades is coming forward by water from Philadelphia, but it is for the most part destined to shoal-water points where Hampton Roads rates of freight are not competitive. Railroad fuel also is being shipped from Philadelphia as well as from Baltimore from usual sources on season contracts. Fairmont coals are being offered at prices well down to $2 per net ton at the mines.

Trade at New York Optimistic

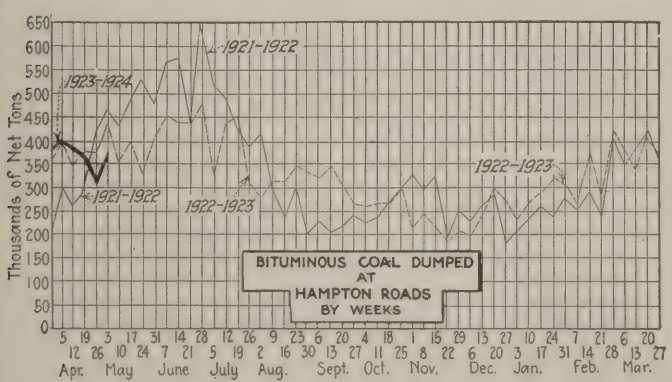
There is considerable optimism among the trade at New York and an active summer with higher prices is anticipated. Conditions at tidewater were weaker. There were 3,994 cars at the local piers on May 4, and some sales at low prices were reported. Many inquiries were received and some shippers contended the situation was in better shape generally than for the past few weeks. Buying was slow at Philadelphia.

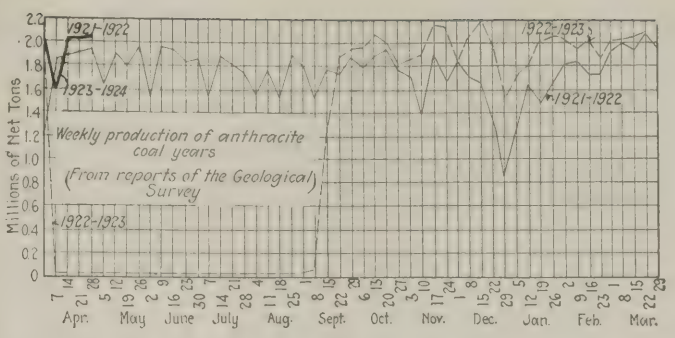
The market at Baltimore was slow. Prices for last week show a slight decline. Wagon mines and small operations in the Alabama field are beginning to feel the pinch of the limited demand for steam coal.

The first cargoes of coal arrived at Lake Michigan and Lake Superior docks last week in spite of an ice crush blown in by the wind above the "Soo" in Lake Superior. By the end of the week 500,000 tons had reached Milwaukee and vessels were putting into the Duluth harbor. However, considerable ice continues in the upper parts of the Lakes and it is not expected the season will fully open for at least another week. Meanwhile shippers are picking up odd lots at bargain prices. During the week ended May 7 there were dumped 788,227 tons of cargo coal and 28,365 tons of fuel coal, making the dumpings for the season 1,005,556 tons of cargo coal and 70,752 tons of fuel coal.

Consumers Press for Domestic Anthracite

Consumers continue to press retail dealers for their winter supply of anthracite domestic sizes, with the result that scarcely any of the dealers have been able to start filling their own bins. All of the domestic coals move





quickly although in the New York market egg and stove are in heaviest demand.

"Well-sustained activity marked the reports of anthracite shipments in the week ended April 28," says the Geological Survey, "and for the eighth consecutive week, excluding only the week of the Eight-Hour Day holiday, the output passed the two-million ton mark. Reports from the anthracite carriers show that 40,458 cars were loaded during the week. On this basis it is estimated that the total output was 2,116,000 net tons, including mine fuel, sales to the local trade, and dredge and washery output. This was an increase over the figure for the preceding week of 51,000 tons. In the corresponding week of 1922 there was practically no production of anthracite owing to the miner's strike.

Beehive Coke Production Recedes

The production of beehive coke in the week ended April 28 is estimated at 424,000 net tons, according to the Geological Survey report, a decrease of about 13,000 tons from that of the week before. The decrease, says the report, occurred in Pennsylvania and Ohio. The cumulative output of beehive coke for the year to date is placed at 6,419,000 tons, as compared with 2,305,900 net tons in 1922, 2,850,000 net tons in 1921, 7,374,000 net tons in 1920 and 7,403,000 net tons in 1919.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Apr. 21, 1923 Inclusive	Week Ended April 21, 1923
U. S. Total	55.7	...	...	...
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	32.5	54.6
Panhandle, W. Va.	51.3	57.3	55.6	56.2
Westmoreland	58.8	65.8	56.0	68.5
Virginia	59.9	55.7	55.7	63.5
Harlan	54.8	22.1	23.5	28.6
Hazard	58.4	16.4	22.6	29.7
Pocahontas	60.0	36.6	38.2	40.7
Tug River	63.7	28.8	35.5	42.8
Logan	61.1	26.2	31.0	32.4
Cumberland-Piedmont	50.6	31.7	48.8	60.4
Winding Gulf	64.3	30.4	34.8	44.1
Kenova-Thacker	54.3	42.4	34.9	45.2
N. E. Kentucky	47.7	28.4	27.9	26.0
New River	37.9	31.6	36.3	41.5
Oklahoma	59.6	59.1	43.5	49.1
Iowa	78.4	75.9	76.7	40.7
Ohio, Eastern	46.6	40.8	35.8	41.5
Missouri	66.8	76.3	73.5	37.3
Illinois	54.5	49.9	46.4	35.8
Kansas	54.9	55.9	46.8	39.5
Indiana	53.8	37.7	51.1	42.0
Pittsburgh†	39.8	41.2	35.5	52.6
Central Pennsylvania	50.2	53.4	48.1	64.9
Fairmont	44.0	35.5	35.9	52.8
Western Kentucky	37.7	32.4	32.9	32.1
Pittsburgh*	31.9	56.1	59.4	56.6
Kanawha	13.0	15.6	23.4	29.3
Ohio, Southern	24.3	38.1	32.0	26.1

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended April 21, 1923	957,743	179,762
Previous week	946,759	182,356
Same week in 1922	706,137	63,364

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
April 22, 1923	11,062	2,582	44,299	20,725
Same date in 1922	371,764	229,892	...	...
April 14, 1923	14,241	3,259	48,584	21,025

Foreign Market And Export News

British Coal Output Again Exceeds Record

The mines of Great Britain continued their record breaking production. During the week ended April 21 the output was officially reported as 5,825,000 tons according to a cable to *Coal Age*. This was 48,000 tons more than the output for the previous week and a new high record for the year, as well as topping all weekly production figures for 1922.

British Board of Trade statistics received by the Bankers Trust Co. of New York place the production for the first three months of 1923 at 71,042,500 tons, as compared with 62,201,700 tons in the corresponding period of 1922, and also 2,000,000 tons greater than the production for the final three months of 1922.

It is also reported that several contracts have been made in the South Wales market for South America deliveries during the second half of 1923 and that Germany has been freely placing orders for July-September delivery at less than current prices on some coals.

Quotations eased slightly last week. Congestion at the ports was said to have been slightly reduced during the past couple of weeks and it is expected to disappear entirely soon.

French Coal Situation Easier

The settlement of the Lorraine miners' strike somewhat eased the situation as regards French industrial coals.

Reconstruction of the devastated colleries continues uninterrupted and production is steadily increasing. During March the Lens Co. produced about 100,000 tons and the Couttieries Co. about 150,000 tons.

Efforts made by the French authorities to increase the deliveries of Ruhr coke to French blast-furnaces met with some success. During the first sixteen days of April, 33,400 tons of coke went to France through the Ehrang sorting station. Increased shipments are reported since then, the Societe des Cokes de Hauts-Fourneaux receiving about 4,500 to 5,000 tons daily since that time. By the end of April it was hoped that 9,000 to 10,000 tons of coke would be loaded daily from the stocks seized in the Ruhr, 10 per cent going to Belgium and 90 per cent to France. It is estimated that the coke in storage in the Ruhr district aggregate about 900,000 tons and coal about 1,800,000 tons, but the measures taken by French authorities for seizing part of these tonnages only apply to 500,000 tons of coke and 400,000 tons of coal. On April 21 it was said that 10,370 tons of coke and 5,090 tons of coal were shipped from the storage piles.

The first shipments of American coke have arrived at Antwerp and Dunkirk. The percentage of dust and small coke as the result of the long journey and the handlings is said to have been large with the result that the coke will only be usable after being mixed with others.

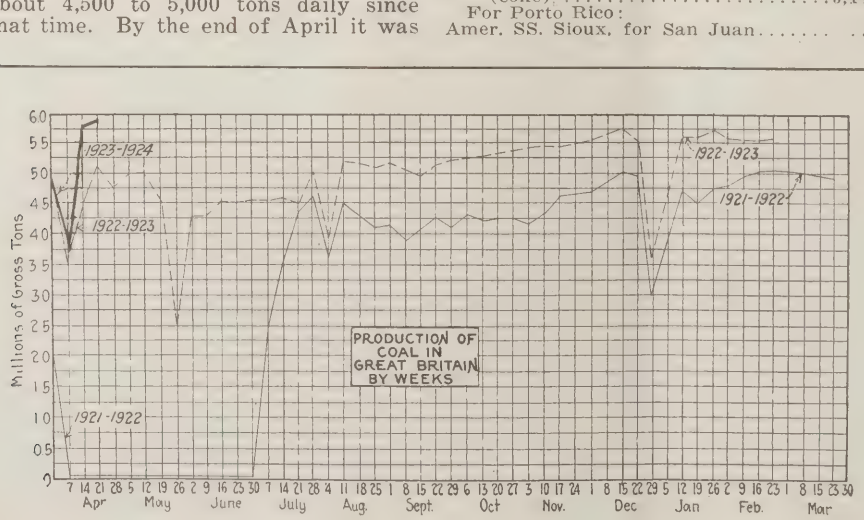
Export Clearances, Week Ended April 28, 1923.

FROM HAMPTON ROADS

For Brazil:	Net Tons
Br. SS. Nilemede, for Rio de Janeiro	5,364
Amer. SS. Orient, for Rio de Janeiro	5,754
Du. SS. Hilversum, for Buenos Aires	5,861
For Cuba:	
Nor. SS. H. K. Waage, for Cienfuegos	2,400
Amer. Schr. Mary Bradford, for Cienfuegos	1,601
Nor. SS. Almora, for Havana	3,552
For France:	
Br. SS. Clan Buchanan, for Marseilles	7,243
For Holland:	
Du. SS. Gemma, for Rotterdam	11,234
Du. SS. Dubhe, for Sluiskill	4,974
For West Indies:	
Nor. SS. Bratland, for Curacao	2,953
Dan. SS. Nordst Jernen, for Port Castries	3,363
Dan. SS. Haderslev, for Bridgetown	3,113

FROM PHILADELPHIA

For Belgium:	
Dan. SS. Marie Maersk, for Antwerp (coke)	...
Br. SS. Paris City, for Antwerp (coke)	...
Br. SS. Naperian, for Antwerp (coke)	...
For Cuba:	
Nor. SS. Munorway, for Havana	...
For France:	
Swed. SS. C. F. Liljewalch, for St. Nazaire	...
Belg. SS. Gasconier, for Dunkirk (coke)	3,149
For Porto Rico:	
Amer. SS. Sioux, for San Juan	...



United States March Domestic Coal Exports

(In Gross Tons)

	1922	1923
Coal—		
Anthracite, gross tons	294,753	399,563
Value	$3,124,345	$4,405,493
Bituminous, gross tons	1,187,313	1,219,970
Value	$6,311,540	$7,880,657
Coke, gross tons	25,435	97,521
Value	$236,703	$1,124,789

	Nine Months Ended March 1922	1923
Coal—		
Anthracite, gross tons	2,781,951	2,447,385
Value	$30,204,764	$27,027,146
Bituminous, gross tons	11,380,704	9,901,230
Value	$59,622,414	$63,545,598
Coke, gross tons	218,130	536,000
Value	$1,903,718	$5,743,121

Stronger Market at Hampton Roads

Business at Hampton Roads was better last week. Though there was less activity at the Norfolk & Western piers, the general trade was brighter.

Export business improved, showing signs of passing the peak of March foreign trade. Coastwise business was lighter, but the bunker trade held firm. The tone of the market was strong, and the outlook very promising.

Prices of domestic coal were reduced, Pocahontas egg coal selling for $12 instead of $14, and run of mine selling for $9 instead of $11. Anthracite dropped from $17 to $16 temporarily.

Absence of contracts was one of the features of the market, but the trade was looking forward to railroad contracts which are expected to be let June 1.

Hampton Roads Pier Situation

	April 26	May 3
N. & W. piers, Lamberts Pt.:		
Cars on hand	1,307	1,178
Tons on hand	88,783	76,049
Tons dumped for week	95,033	89,758
Tonnage waiting	10,000	.....
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,623	1,641
Tons on hand	94,830	94,660
Tons dumped for week	117,747	126,152
Tonnage waiting	3,989	10,500
C. & O. piers, Newport News:		
Cars on hand	2,526	1,927
Tons on hand	135,560	101,900
Tons dumped for week	76,377	101,297
Tonnage waiting	9,955	13,185

Pier and Bunker Prices, Gross Tons

PIERS

	April 28	May 5†
Pool 9, New York	$6.00@$6.45	*5.75@ 6.25*
Pool 10, New York	5.25@ 5.75	*5.20@ 5.70*
Pool 11, New York	4.50@ 5.00	*4.25@ 5.00*
Pool 9, Philadelphia	6.25@ 6.70	*6.20@ 6.70*
Pool 10, Philadelphia	5.30@ 5.70	*5.25@ 5.65*
Pool 11, Philadelphia	4.30@ 4.70	*4.20@ 4.65*
Pool 1, Hamp. Roads	6.40	*6.25@ 6.50*
Pools 5-6-7, Hamp. Rds.	5.30	**5.50**
Pool 2, Hamp. Roads	6.40	6.25@ 6.50

BUNKERS

Pool 9, New York	6.30@ 6.75	*6.05@ 6.55*
Pool 10, New York	5.55@ 6.05	*5.50@ 6.00*
Pool 11, New York	4.80@ 5.30	*4.55@ 5.30*
Pool 9, Philadelphia	6.65@ 6.80	*6.60@ 6.75*
Pool 10, Philadelhia	5.55@ 6.10	*5.50@ 6.00*
Pool 11, Philadelphia	4.60@ 5.05	*4.50@ 5.00*
Pool 1, Hamp. Roads	6.50	6.50
Pool 2, Hamp. Roads	6.50	6.50

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	April 28	May 5†
Admiralty, large	40s.@42s.6d.	*38s.@40s.*
Steam, smalls	30s.@31s.	*26s.@30s.*
Newcastle:		
Best steams	35s.	*34s.6d.@35s.*
Best gas	30s.@32s.6d.	**33s.@35s.**
Best bunkers	34s.@35s.	**34s.@36s.**

† Advances over previous week shown in **heavy** type; declines in *italics*.

News Items From Field and Trade

ILLINOIS

The Bradbury-Scullin Mining Co., a new concern at Herrin, has just acquired the Prosperity Mine, near Carterville, and will operate the property in addition to the Lady Lucky Mine No. 1, which was taken over by the company some time ago. The company was recently formed by a group of Williamson County men headed by the two whose names the company bears. **L. C. Meid**, of St. Louis, recently joined the company as head salesman.

The Paradise Coal & Coke Co. announces that its mine at Paradise will be idle for a period of four weeks or longer. During the time the plant is shut down, repairs will be made in and around the mine, including retimbering the shaft and making changes in other parts of the property.

The strike of linemen, electricians and construction men of the Central Illinois Public Service Co., **has been settled.** The company, which furnishes power for over 75 mines in the district, has had its power supply curtailed for six weeks or more as a result of the strike. Many mines were heavy sufferers to the extent of having to close down and towns and business in general suffered heavy losses and inconveniences.

The Old Ben Coal Corporation announces the reopening of its Mine No. 15, at Christopher, May 1. This mine was one of five which were shut down by the company several weeks ago for repairs while the market was at its lowest ebb.

The hoisting record of the Bobby Dick mine near Freeman was shattered recently when a total of 2,892 tons of coal was brought to the surface in eight hours. The day's work totaled 1,166 dumps and loaded 62 railroad cars. The mine employs 310 men, 221 of whom are loaders, making **an average of 13 tons per loader** on that day and 9.3 tons per man in the mine.

No. 1 Mine of the **St. Louis & O'Fallon Coal Co.**, the Lenzburg mine of **Columbia Coal Co.** and **Eureka No. 1 Mine** at Marissa have been closed on account of no markets.

Mine No. 1 of the **Jewel Coal & Mining Co.**, at Duquoin, has been closed for an indefinite period. The mine operated by the **Madison Coal Co.** at Tilden, which suspended operations temporarily a few weeks ago, will resume soon.

A contract for extensive improvements, the cost of which will be in the neighborhood of $30,000 on the mine operated by the **West End Coal Co.**, located one mile west of Springfield on the Baltimore & Ohio R.R., has been closed and the mine shut down May 1 to enable the repair work to start, according to an announcement made by the officials of the company. A shaker screen of all steel construction will be installed, together with new conveyors and elevators. The Wisconsin Bridge & Iron Co. is to furnish the structural steel and the Link Belt Co. will furnish all other material. The present structure has been in service since 1903 and while the equipment is still serviceable, the operators of the mine believe it best to install more modern equipment that will meet the demands of an expanding business with greater efficiency.

The **Sheridan Wyoming Coal Co.**, 910 South Michigan Ave., Chicago, is now selling Kathleen coal for the Union Colliery Co. in the Illinois and Wisconsin territory.

Mine No. 6 of the Peabody Coal Co., at Springfield, went after the coal-hoisting record for the district and broke it by 289 tons for eight hours' work one day recently. The 620 men employed in the mine brought a total of 3,122 tons to the surface, sufficient to load sixty-eight railroad cars. The best previous high mark was 2,833 tons.

The following coal companies were incorporated recently: **Colonial Collieries Co.**, 38 South Dearborn St., Chicago; capital, $500,000; incorporators, Thomas J. Mylet, Edward G. Sternberg and Herbert Lanigan. **The Paramount Fuel Co.**, 343 South Dearborn St., Chicago; capital stock, $30,000; incorporators, J. F. O'Malley, Joseph J. Lelivelt and F. W. J. Sexton. **The Chicago Norfolk Western Coal Co.**, 343 South Dearborn St., Chicago; capital, $20,000; incorporators, L. C. Sieber, C. B. Sieber and J. L. Johnson.

W. C. Schroeder has been made vice-president of the Sebastian Coal Co., of Chicago.

INDIANA

Declines ranging from 25c. to $2 a ton in the retail prices of practically every variety of coal were announced recently in spring revisions of quotations by Indianapolis coal dealers. The new prices are intended for quantity buying of coal for use next winter, merchants said. Indiana lump coal dropped 50c. a ton on the top grades, the range being $5.95@6.75, while Indiana egg and Indiana mine run coal dropped $1 a ton to $7.50. Pocahontas mine run is down 50c. to $1.50 a ton to $9, and Pocahontas lump fell $1 to $2.50 to $11. Eastern Kentucky lump and West Virginia lump dropped $1.50 a ton to $9, and cannel declined $1 to $13. New prices of coke are about $1 a ton cheaper. No changes were made in prices of Blossburg smithing and anthracite.

Bids for a year's supply of coal, approximately 150,000 tons, for state institutions **will be opened by the state purchasing committee soon.** Last year the committee bought 84,675 tons of mine-run coal at an average price of $2.60 a ton; 32,300 tons of pea and slack at an average of $2 a ton, and 29,000 tons of egg size at an average of $2.75 a ton. Lower prices for the next year's supply are expected.

Charters were granted recently to the following coal companies: **Williams Coal Co.**, Evansville; capital, $300,000; directors, Robert R. Williams, Joseph Wastjer and William W. Gray. **Midland No. 4 Coal Co.**, Jasonville; capital, $50,000; directors, Roy E. Price, W. F. Ellis and Wilbur S. Hays. **John H. Scott Coal Co., Inc.**, Linton; capital, $5,000; directors, John H. Scott, James D. Scott and John O. Travis.

The Indiana Coal Dealers' Association has under consideration a **proposal to change its name to the Indiana Coal Service Bureau, Inc.**, and to make its service statewide. Statistical information and other data would be provided in a more comprehensive way than at present.

IOWA

Appanoose County in 1922 for the first time in history, led the state in coal production, according to the yearly report of **L. E. Stamm**, secretary of the state board of mine inspectors of Iowa. The county's production was approximately a million tons. Mines in that county employ 3,527 men, the largest number employed in mining in any county in the state. Monroe county, with more than 2,500 miners, followed, while Polk county, third, had a total of approximately 2,000. A total of 13,155 men were engaged in mining in Iowa in 1921 while this number was slightly increased in 1922. Mine accidents in Iowa during 1922 took a toll of eighteen lives. Falls of slate caused twelve of the deaths.

In order **to promote thrift and neatness among its tenants**, the **Madison Coal Corporation**, has announced a list of cash prizes for the best-kept and best-appearing yards of its employees, and another list for the best kept vegetable gardens. The first prize for each contest is $35, the second $30 each, and down to $5, which is the seventh and lowest cash prize offered, a total of $140 for the best kept and best appearing yards and $140 for the best vegetable gardens, or a grand total of $280 in each mining town of the company.

KENTUCKY

News was received April 25 from Madisonville that **workers have again been fired upon as they were leaving the plant of the Pontiac Coal Co.**, near Earlington, where five workers were fired upon from ambush on April 17. The company has offered a reward of $1,000 for arrest and conviction, and county authorities are starting an investigation. These two outbursts at the one plant have been the only ones in the strike field.

Double-tracking of the Louisville & Nashville from Pineville to Harlan, approximately 40 miles, completing the double track of the Cumberland Valley division, from Corbin to the center of the rich southeastern Kentucky coal fields, has been announced. The new double track up the Harlan road will increase the capacity, giving the road sufficient trackage to haul all the coal that can be loaded on the division. Double track beyond Harlan is hardly necessary, in the opinion of coal men, with the road dividing there into the Poor Fork branch, going to Benham and Lynch, the Clover Fork branch and the Martin's Fork branch.

The Ferndale Mining Co., Bell County, capital $3,000, has been chartered by J. M. Lunce and J. C. Knuckles, of Ferndale, and E. A. Smothers, of Pineville.

The Rex Harlan Coal Co., Whitley County, capital $100,000, has been chartered by T. J. Roberts, T. E. Mahan and B. F. Cheely, all of Williamsburg.

The Ellser Coal Co., of Clark, has reduced its capital stock from $125,000 to $100,000.

The fight to prevent an increase in tax assessment from $13,000,000 to $18,600,000 **has been dropped by the officials of Perry County, Ky.**, following conferences with the State Tax Commission, and an agreement to withdraw the injunction suit that was filed. The **county officials have agreed to try to increase assessments for 1923** as directed by the state commission. Most of this increase will fall on the coal interests, as Perry is one of the largest coal counties of the state and hasn't much else to tax. Coal operators had made a hard fight against the increase, and had appeared before the argument.

Judge A. M. J. Cochran, of the Federal Court, Eastern Kentucky division, has set for **hearing on May 21**, at Lexington, the **suit of T. F. Fuller against the F. S. Peabody Coal Syndicate**, the Fordson Coal Co. interests and the Semet Solvay Co. and others, a special session of the court being held to hear the arguments. **Fuller alleges that the lands sold by the Peabody syndicate to Henry Ford** are worth $15,000,000 and that he holds an interest in the property valued at $2,500,000.

The coal mining town of Combs, in Perry County, was fire swept on May 1. The Superior Coal Co. lost a commissary store, while a picture theater and other buildings were burned.

The St. Mohiel Coal Co. of McCreary County, has filed amended articles, increasing capital from $25,000 to $40,000.

Guy H. Sowards, who for the past several years has been with the traffic office of the West Kentucky Coal Bureau, on May 1 became resident manager in charge of the Louisville office of the Southwestern Fuel Co., sales agents for the Black Diamond Coal Co., of Drakesboro. B. A. Word, an independent traffic expert, will look after traffic matters for the West Kentucky Coal Bureau.

The coal mines of **the Hazard field** with a loading of 1,177 cars on April 25 **broke all previous records** for a day's loading on the Eastern Kentucky division of the Louisville & Nashville R.R.

At Jeffersonville, Ind., work of setting up six all steel coal barges from fashioned steel was started recently, the six barges being for the E. T. Slider Co., of New Albany and Louisville, operating yards at both points and towing coal and sand and gravel on the Ohio River.

NEW YORK

H. G. Stenersen has been appointed assistant to the president of the Coal & Iron National Bank of New York. Mr. Stenersen was formerly with the National Bank of Commerce as assistant cashier in charge of business development in the First and Second Federal Reserve districts. In 1917 he was the pioneer in introducing the use of acceptances among New England cotton mills in financing the purchase of cotton.

E. W. Rockafellow, formerly assistant general sales manager of the Western Electric Co., resigned May 1 to accept the office of **vice-president of the National Pole Co.**, of Escanaba, Mich. He will represent the latter company at 220 Broadway, New York City.

W. H. Bradford & Co., Inc., have removed their New York office from 17 East 42nd St. **to the Barrett Building, 40 Rector St.**

OHIO

The Pocahontas-Kanawha Coal Co., established in Dayton, has opened a Cincinnati office with Fred Dunker, formerly sales manager for the Western Coal Co., in charge.

The Republic Iron & Steel Co. has awarded a contract for the construction of **a 60-oven byproduct coke plant** at Youngstown.

The Kearns Coal Co., of Cincinnati, has been incorporated under the Ohio laws with a capital of $200,000. The incorporators are Eugene Buskirk, George M. Kearns, R. H. McCormick, Howard Ragland and P. T. Foley.

The Maple Grove Coal Co., Columbus, has been chartered with a capital of $25,000 to mine and sell coal. Incorporators are: Edward E. Riley, S. C. Longby, S. W. Krumm, Walter Mulby and Charles E. Belcher.

Sealed proposals will be received at the office of the Clerk of the Board of Education, eighth floor, Denton Building, Seventh and Race Streets, Cincinnati, Ohio, until 12 o'clock noon, Monday, May 28, 1923, **for supplying the various public schools in the school district of Cincinnati with coal** in accordance with specifications on file in the office of the Visiting Engineer of said Board of Education, at No. 511 West Court Street.

The Ohio Legislature has passed a bill over the veto of Governor Donahey reimbursing coal producers and shippers for coal furnished various state institutions more than a year ago on contracts which were later declared illegal by the courts. In their appeal to the Legislature the various coal companies contended that they were not a party to the illegality in the contracts and should be paid for the coal furnished. The Legislature saw it that way and passed the bills which were vetoed and later passed over the veto. About $100,000 will be distributed to about a dozen coal companies in Ohio.

The Valley Coal Co. closed its Cincinnati office on May 1.

The Cincinnati Coal Trade Golf Association was recently launched at a meeting of sales representatives, wholesalers and producers at a meeting held at the Highland Country Club and its organization was completed at a further meeting that was held at the Ft. Mitchell Country Club. The association will be modeled along the line of those established in Chicago, Philadelphia and New York.

PENNSYLVANIA

Orders for coal that will keep the mines of the **Bechly Coal Co.**, at Portage, **busy for a year**, have been received by the officials of the company. The company has the assurance of the Pennsylvania R.R. that all assigned cars necessary will be supplied. From 200 to 300 men will be required.

T. Stanton Davis and W. C. Schiffer, both of Ebensburg, **plan to open a mine** near the Chickaree school house, along the William Penn Highway, west of Ebensburg to supply Ebensburg direct with fuel. The mine taps the "B" or Miller seam and Davis and Schiffer control more than one hundred acres. The coal will be hauled over the William Penn highway by truck.

The Jefferson & Clearfield Coal & Iron Co. reports for 1922 a balance for common dividends of $382,521, equal to $25.50 a share on the 15,000 shares outstanding. This compares with a deficit of $153,099 in 1921. On December 31 last the profit and loss surplus stood at $5,867,554, as compared with $5,785,034 on December 31, 1921. At the end of last year current assets were $3,906,144, and current liabilities $1,244,412, leaving net working capital of $2,661,732.

Westmoreland Coal Co. has declared a stock dividend of 33⅓ per cent on the outstanding $7,500,000 capital stock, payable May 15 to stockholders of record April 28, from the undivided profits of the company in capital stock of the company, which was increased at the shareholders' meeting April 4.

A deal was closed last week at Ebensburg, Cambria County, whereby the **Pennsylvania Coal & Coke Corporation becomes the owner of 277 acres of "B" seam coal** located in Barr township. The purchase was made from the Carrolltown Coal Co. The consideration was $520,000. The entire tract is adjacent to the lines of the Pennsylvania R.R.

State charters have been issued recently for the following coal mining companies at Harrisburg: **Blanchard Zanesville Mining Co.**, Pittsburgh, capital, $450,000; treasurer, William Wieman, 426 Fulton Building, Pittsburgh. Incorporators: William G. Blanchard, P. W. Ranier and R. E. Allen, Pittsburgh. **Bowman Coal Co.**, Pittsburgh, $10,000; incorporators, Ralph D. McKee, Avalon, treasurer, Frederick E. Milligan and Elwood B. Hawarth, Jr., Pittsburgh. **Beadling Mining Co.**, Pittsburgh, $20,000; incorporators, Charles E. Kitchen, 3222 Middleton Road, Pittsburgh, treasurer, Vincent R. Beadling, Pittsburgh and John Barufaldi, Morgan. **Windber Fuel Co.**, Windber, $50,000; incorporators: L. L. Faust, Windber, treasurer, L. R. Ashenfelten, Philadelphia, and Fred J. Balch, Springfield, Mass.

The Acme Coal Mining Co. has declared a dividend of 20c. a share, payable June 5 to shareholders of new stock only, of record May 26. Stockholders have been notified that the old stock of $1 par value can be exchanged for stock of $10 par at the Empire Trust Co., New York City.

The Bertha Coal Co. of Pittsburgh, is to have a Roberts and Schaefer preparation and loading plant at its Dinsmore mine.

Slattery Bros., Inc., are making preparations **to open a new mine** in the Schuylkill Valley, east of Port Carbon. Wade M. Reed, consulting mining engineer, will have complete charge of this development work together with this company's Bell Colliery operation.

The Traylor-Dewey Contracting Co., of Allentown, has recently been reincorporated under the name of **The Cement-Gun Contracting Co.** and under that name will continue to specialize in construction and repair by means of the cement-gun and in addition will construct reservoirs and other plain or reinforced concrete structures.

The Pittsburgh office of the central district **of the Cutler-Hammer Mfg. Co.**, Milwaukee, **will move** on May 1 from the Farmers' Bank Building **to Room 950 to 953, Century Building**, located on Seventh Street between Penn Avenue and Duquesne Way. A. G. Pierce is manager of the central district.

The Penn Central Power Co., a subsidiary of the Penn Central Light & Power Co., **has become the owner of 2,600 acres of valuable coal land** in the Broad Top township (Huntingdon County) district. The land was purchased from the Kay Mining Co., of Everett, Bedford County. The Penn Central Power Co. is erecting an immense power plant along the Raystown branch of the Juniata River at Saxton. There is plenty of water for power now, but the company has acquired the coal, which opens out right at the plant, in case fuel is needed to replace the water power at some future time.

A state charter has been issued to the **Conlan-Pace Coal Mining Co.**, Pittston, which has a capital stock of $45,000. Bernard J. Conlan, 42 Church Street, Pittston, is treasurer, and one of the incorporators, the others being Daniel P. Price, Scranton, and Ellen M. Conlan, Pittston.

Bert E. Holifield recently opened an office in the Miners' Bank Building, Wilkes-Barre, and is manufacturers' agent in the anthracite region for the **Chicago Pneumatic Tool Co., the Ironton Engine Co. and the Bennington Scale Co.**

Angus W. Louther, who was assistant to W. H. Kramer, general manager of the Consolidation Coal Co.'s Pennsylvania division, has resigned his place **to accept the managership of the coal mines of the Bethlehem Steel Co.** in West Virginia. He succeeds **Samuel Steinbach**, also formerly of Somerset, who has been promoted to a higher position in the Bethlehem operations in Pennsylvania.

The Anderson Fuel Co., Arrott Building, Pittsburgh, has been organized with G. D. Anderson as manager, to deal in coal and coke. Mr. Anderson, who recently resigned as sales manager for Marvel & Marvel, formerly was with the Poland Coal Co., Reilly-Peabody Fuel Co. and Straub-Atkinson Coal & Coke Co., all of Pittsburgh.

J. H. Klinck has been appointed assistant supervisor of production of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, according to an announcement by R. L. Wilson, works manager. Mr. Klinck has had wide experience in electrical and general engineering and sales work. He is a member of the American Society of Mechanical Engineers, having been active in the organization of both the Birmingham and Washington sections of the society, and is a fellow of the American Institute of Electrical Engineers.

UTAH

By agreement with counsel for both sides in the equity suit of the Quemahoning Creek Coal Co. vs. John Brophy, president of District No. 2, United Mine Workers, and other officers of the union, **the hearing of the temporary injunction** recently granted the coal company by Judge John A. Berkey **will be heard on Friday, May 11.** In the meantime, the preliminary in junction remains in force. The union officials declare the injunction too drastic, but the coal company contends that it is necessary to protect its rights and interests and the welfare of its employes.

The State Securities Commission has **approved the application of the Great Western Coal Mines Co., of which Jack Dempsey is president, to offer for sale $1,500,000 worth of stock.** The stock will be divided into 100,000 shares of preferred at $10 per share and 500,000 shares or common at $1. The company has increased its capital from $3,000,000 to $4,000,000.

Richard L. Bird has relinquished his claim to 160 acres of coal land in Carbon County, between Standardville and Clear Creek, and an application to lease the land has been made by the Great Western Coal Mines Co. In an impending suit for cancellation the Bird holding is alleged by the United States to be unlawful in that "claimant did not file on the lands in good faith."

VIRGINIA

The Seaboard Air Line Ry. is asking bids on something over 1,000,000 tons of coal for distribution over its entire system. Specifications have not been made public, according to announcement at the company's offices at Norfolk.

The Consolidated Coal Co., with headquarters in Roanoke, **has transferred its general offices to Norfolk,** with J. C. Davis in charge. H. E. Halstead, formerly of Hasler & Co. and recently with the Consolidated at Roanoke, will return to Norfolk with the change in offices.

WEST VIRGINIA

Daniel Howard, well known in mining circles in northern West Virginia, in association with D. T. Quinn, J. R. Quinn, Margaret Heitz and Joseph Burr, all of Clarksburg, **has organized Daniel Howard & Co.**, for the production and selling of coal. The principal office of the new enterprise to be at Clarksburg.

The Bowman Fuel Co., which recently acquired large acreages and several mining plants in Monongalia County, has been organized with a capital stock of $150,000. Morgantown is to be the headquarters for this company, the principal stockholders in which are Fred Tropf and Frank L. Bowman, both of Morgantown.

The following West Virginia coal concerns have increased their capital stock: **Logan Thin Vein Coal Co.**, from $50,000 to $100,000, also **changed name to Stollings Island Creek Coal Co.**, and headquarters moved from Logan to Huntington; **Burning Creek Coal Co.**, from $50,000 to $100,000; **Atlantic Smokeless Coal Co.**, from $250,000 to $300,000 The Haywood Coal **Mining Co. has reduced its capital stock** from $150,000 to $37,500.

The Consolidation Coal Products Co., organized under the laws of the state of Delaware and of which H. H. Warfield, of 67 Wall Street, New York City, is secretary, has been granted authority to do business in West Virginia, as has the **Fordson Coal Co.**, chartered under the laws of the state.

The South Fork Coal Co. has changed the location of its principal office from Huntington to the Kanawha Valley Bank Building, Charleston.

The Morrow Coal Co. has just been organized with a total capital stock of $50,000 for the purpose of producing coal in the Mercer County field. The office of this company is at Bluefield. Indentified with the new concern are James F. Morrow, Carl B. Short, A. D. White, W. E. Belcher and T. V. Belcher, all of Bluefield.

The Snake Hill Coal Co., has been organized by Daniel Howard and associates with a view to operating in the Harrison County field, the new company being capitalized at $100,000. Clarksburg is to be the location of the principal office of the company. Associated with Mr. Howard in the new concern are J. R. Quinn, D. T. Quinn, Margaret Heitz and Joseph M. Burr, all of Clarksburg.

The Colcord Coal Co., of Montcoal, is getting picking tables and loading boom equipment for its various mines near Montcoal, W. Va. from Roberts & Schaefer of Chicago.

Lloyd Bailey, who for fifteen years or more has been connected with the Clark Coal & Coke Co., of Fairmont, **has been named as manager of the New England office** of the company and will have his headquarters at Worcester, Mass. The Clark company expects to specialize in coal for public utilities.

Illegal strikes continue in northern West Virginia, the latest one being at the Hutchinson plant of the Consolidation Coal Co., where 140 miners were out for a time dur-

ing the first week of May, when a committee objected to a company official. The belief prevails that many of the strikes which have taken place since April 1 can be attributed to bad feeling which developed during the election of miners' officials. Whatever may be the cause, many of the members of the mine workers' organization are apprehensive of the effect of so many illegal strikes on future negotiations with the operators. Failure of the miners to live up to their contract is creating a good deal of sentiment unfavorable to the union and to collective bargaining in the northern part of the state.

The Kentucky & West Virginia Power Co., at Logan, is installing three Westinghouse new model underfeed stokers to heat three 1,000-hp. Edgemoor boilers to furnish additional steam to generate electric power.

The Elm Grove Mining Co. of Elm Grove, has contracted with the Roberts & Schaefer Co., for a steel tipple which will include picking table screens and loading booms.

The Standard Thacker Coal Co. of Charleston, has reported a capital increase from $25,000 to $150,000.

WASHINGTON, D. C.

A report just made to the Department of the Interior by the Bureau of Mines, which has technical supervision of these operations, discloses that **the royalty value of oil, gas and gasoline produced from operations on government lands in January was $1,074,512.** In comparison with the figures for July, 1922, an increase of 65 per cent is shown. During March two new oil wells were brought in on government lands in Montana. Actual drilling operations were commenced in March in the Cold Bay oil field on government lands in Alaska. On April 1, a total of 10,608 permits for prospecting for oil and gas on government lands had been received from the General Land Office. A total of 334 leases for oil and gas production operations had been issued on the same date. Total net royalties for the production of oil, gas and gasoline on government lands, submitted up to April 1, amounted to $11,684,904. This figure represents operations in the States of Wyoming, California, Montana and Colorado. During March, 37,980 barrels of oil were produced on Naval Petroleum Reserve No. 3 (Teapot Dome), Wyo., on which the royalty barrels amounted to 6,252.74 and the royalty value to $13,175.71. Production for March on government lands in the Winnett, Mont., district amounted to about 166,000 barrels of oil.

Rudolph P. Miller, of New York, has been reappointed representative of the Federated American Engineering Societies on the National Board for Jurisdictional Awards. Mr. Miller's reappointment was officially characterized as evidence of the Federation's confidence in what he has accomplished. His efforts, it was stated, have been "earnest and constructive." Mr. Miller's present term expires in August. **President Mortimer E. Cooley has been authorized to appoint a committee** of the Federation **to look into the subject of basic wage rates.** The committee will report to the Executive Board as to what action, if any, the Board should take toward making such a study. President Cooley has also been authorized **to appoint a delegate to a conference on the problems of the rising cost of construction materials,** providing such a conference is called by Secretary Hoover.

Appointment of four members of the committee to conduct an investigation of the storage of coal is announced by the Federated American Engineering Societies. They are P. F. Walker, dean of engineering, University of Kansas; S. W. Parr, professor of applied chemistry, University of Illinois; H. Foster Bain, Director of the U. S. Bureau of Mines; L. E. Young, Union Light & Power Co., St. Louis. The chairman is W. L. Abbott, chief operating engineer of the Commonwealth Edison Co., Chicago. Four or five additional members of this committee are yet to be selected. Consideration is being given to recommendations by member organizations, and it is probable that the committee will be completed in the near future.

A. W. Ambrose, assistant director of the Bureau of Mines has resigned to take an executive position with the Empire Gas & Fuel Co., chief petroleum subsidiary of Cities Service Co. Mr. Ambrose will direct certain geological, land and lease, and scouting activities for the Empire company.

WISCONSIN

Retail prices on coal and coke at Milwaukee May 1 were: Anthracite—Egg, $15.75; stove, $16.10; nut, $15.95; pea, $14.20; buckwheat, $11.50 (75c. for carrying). Bituminous — Pittsburgh, Hocking and Youghiogheny, $9; pile-run, $8.25; screenings, $7.50; West Virginia screened, $9.75; pile-run, $8.50; screenings, $7.25; Pocahontas screened, $15.25; mine-run, $12.50; screenings, $12; smithing, $13.25; Kanawha gas mine-run, $8.75; Illinois and Indiana screened, $10.50; pile-run, $9.50; screenings, $8.50; coke, large sizes, $14.90; pea and nut, $11.90.

Jobbers of Illinois coal are endeavoring to maintain the advantage gained in Milwaukee during the period of scarcity of Eastern coal. They **have requested the city authorities to modify the specifications** for supplying 65,000 tons of coal to municipal institutions by making them broader and more uniform. They declare that the specifications in past years have been discriminatory in that they favored Eastern coal to the disadvantage of the Western product.

The precarious situation in the coal industry, which hampers the consumer in obtaining fuel and power, was advanced as an **urgent reason for a survey of the water-power resources in Wisconsin,** in a hearing before joint committees of both houses of the Wisconsin legislature. The bill would appropriate $25,000 for the survey.

Julies J. Goetz was appointed **receiver for the Kanawa Fuel Co.,** Milwaukee, April 23, on petition of the Penwell Coal Mining Co., which cited a civil court judgment for $607.77 obtained March 1. The officers of the company are A. S. Austin, president, A. S. Austin, Jr., vice-president, and E. W. Morrison, secretary and treasurer. On the same day John C. Post was named **receiver for the A. S. Austin Sons Co.,** coal dealers, on petition of the Plankinton Packing Co., owners of dock property. The Austins in the latter company are identical with those in the Kanawa company. **The Kanawa company apparently was preparing to reopen its Old Abe mine near DuQuoin., Ill.**

CANADA

The Canadian Collieries (D) Ltd. is doing some diamond drilling near the No. 5 Mine, Cumberland, and **a new seam has been struck** which, it is said, promises to develop into the best coal measure for domestic demand in the Comox field of Vancouver Island. This seam will be worked from the No. 5 shaft, from which a tunnel is being driven through rock in order to escape the heavy expense of a new pit head.

A. R. Braine, representing Tatham Bromage & Co., Ltd., a shipbroking firm of London, England, which sold large quantities of British coal in Canada last summer, has returned to Canada with the view of **establishing a permanent market for the British product.** He has booked some orders from eastern Canadian industrial concerns especially with pulp and paper mills.

Premier E. H. Armstrong recently announced to a delegation of miners that arrangements would be made whereby the **Eastern Trust Co. would operate the Minudie coal mines,** River Hebert, Cumberland County. The company owning the mine went into liquidation owing the miners about $15,000.

Alexander Lewis, M. P., told the members of the Kiwanis Club, of Riverdale, recently that **Nova Scotia coal is being used as far west as Cornwall,** but owing to present shipping facilities it is impossible to compete with the American coal west of that point. The cost of bringing coal from Alberta would be reduced one-third, he said, if larger vessels were able to enter the lakes and bring coal in cargoes of from 10,000 to 15,000 tons from the Head of the Lakes.

A Vancouver syndicate wants the right to mine coal it claims to have struck in the edge of Stanley Park, a natural park near the city, the property of the Dominion Government, that has been leasd to the city for 99 years. The syndicate is promising the City Council it will not disturb the park surface in any way and will completely electrify the mine to avoid the smoke nuisance. The City Attorney is expected to report to the council on the question soon.

The Ontario Cabinet, it is stated, will soon **rescind the various orders issued in connection with the fuel situation,** abolishing the offices of City Fuel Controller and Provincial Fuel Controller, together with all orders controlling the distribution and prices of fuel in the province.

In an address before the Empire Club of Toronto, **Prof. E. S. Moore,** formerly dean of the school of mines, at Pennsylvania State College and now of the University of Toronto, declared that **overcapitalization and overmanning were the twin causes of the troubles which have beset the continent's coal-mining industry** during the past few months. He stated that Canada would be unable to obtain Pennsylvania anthracite longer than twenty-five or thirty years.

Toronto civic authorities are having a shipment of a variety of Welsh anthracite not hitherto tried out sent to the city. It will arrive in May and the price to the city will be $14.50. It is stated that the city can pay overhead expenses and **sell it to the public at $15 per ton.**

Association Activities

Indiana Retail Coal Merchants Association

Honesty on the part of the Indiana retail coal dealers was urged April 25 and 26 at the **state convention of the Indiana Retail Coal Merchants' Association** at Indianapolis, Ind. In a letter from Marshall E. Keig, vice-president of the Consumers' Company, Chicago, Ill., a leader in the retail coal field, was an admission that the probe now being made of fuel conditions by the federal government disclosed that in many sections the fault lies with the retailers. More than 400 members of the association attended the session. Reports giving the belief of the coal dealers that prices will not fall during the remainder of the season were given at the convention. The probable shortage of coal cars and a lack of reserve coal stocks were cited as reasons.

Cincinnati Coal Exchange

A meeting of the Cincinnati Coal Exchange was held at the rooms of the Old Colony Club, on Thursday, May 3, at which President Robert Magee presided. Most of the talk was given over to the discussion of the Fact Finding Commission's questionnaire and the means and methods for filling out the information that is desired. Talks were made by Ernie Howe, of the Pocahontas Fuel Co., R. A. Gillham, of the Campbell Creek Coal Co.; R. A. Volter and George Hill, of the Chesapeake & Virginian Coal Co. Arrangements were concluded for the annual convention of the Michigan-Ohio-Indiana Retail Coal Association, which will be held in Cincinnati on May 23 and 24.

Winding Gulf Operators Association

At the regular quarterly meeting of the Winding Gulf Operators Association, held at White Sulphur Springs the latter part of April, matters of routine and questions affecting the district were given consideration. E. E. White, president of the association, presided over the meeting, which was fairly well attended, and at its conclusion a luncheon was served. Among those in attendance were E. E. White, W. P. Tams, A. J. King, W. B. Beale, A. W. Laing, C. R. Stahl, W. A. Phillips, B. H. English, W. H. Ruby, T. H. Wickham, Fred G. Wood, Enoch Ellison, B. E. Smith, J. B. Nowlin, S. M. Miller, William MacTaggart, S. B. Avis, Albert Belcher, Roy T. Wright, W. Gaston Caperton and L. Eperly. George Wolfe acted as secretary of the meeting.

Obituary

Joseph Oliver, formerly head of the Oliver Coal Co., which he founded at Bokoshe, Okla., died at his home in Louisville, Colo., April 6, 1923, aged 67.

Mr. Oliver was born in Newtown, North Wales, and came to America in 1887. He located first in Arkansas, where for many years he was prominently identified with mining operations. For eight years he was general superintendent of the Prairie Creek Coal Co., of Forth Smith, Ark.

Mr. Oliver later moved to Oklahoma, where he became general superintendent for the Bokoshe Smokeless Coal Co., afterward leasing the mines and forming the Oliver Coal Co., of which he was the head for several years.

During his active life he was prominent in public affairs, taking a leading part in the campaign for good schools and educational advantages in the early days of Oklahoma's statehood. He left a wife, four sons and four daughters.

Publications Received

Saward's Annual for 1923 is at hand. The standard form and contents of this book make it a familiar sight. There is, it appears, more than the usual amount of text matter in this volume, which makes it the more difficult to find the figures for which Saward's Annual and the Coal Trade before it has been chiefly valuable. A book of half the size with statistical contents better arranged would more than double the value of this little book, which after all is the only available statistical annual on coal other than government reports.

Tenth Annual Report of the Secretary of Commerce. Pp. 229; 6x9 in.; tables. Price 25c.

Traffic News

The Southern Pacific R.R. has announced a reduction in coal rates from Utah and Wyoming points to Lone Pine, Cal., to become effective about June 1. This reduction will make it possible for Utah and Wyoming operators to place their coal on the market in competition with coal from other sections of the country.

The Car Service Division of the American Railway Association announces the appointment of **R. W. Edwards** as district manager at Toledo, Ohio, with supervision of the following territory: Michigan, lower peninsula; Indiana, north of line from Michigan City through Wanatah, Fort Wayne and Decatur; Ohio, north of line from Decatur, Ind., through Mansfield and Cortland, Ohio, including cities named.

Rates in effect during federal control from June 25, 1918, on iron ore, coal, coke and limestone **from producing points in Alabama to various blast furnaces in that state were not unreasonable** or unduly prejudicial, according to a decision issued by the Interstate Commerce Commission April 28. The complaint filed by the Alabama Co., and other manufacturers, accordingly was dismissed. While the rates were intrastate, the commission had jurisdiction during the period of federal control, but said that it has no authority to deal with the present rates or to prescribe rates for the future.

In order that they may be able to compete in the Northwest with operators of southern Illinois **coal producers of the southern part of Ohio intend to launch a fight before the Interstate Commerce Commission** meeting in Minneapolis **in an effort to obtain a readjustment of freight charges.** Production in Ohio fields is at a low ebb, railroad men declare. This is due to the fact that Northwestern dock operators are reluctant to enter into contracts until the outcome of the conference has been announced and because the lakes are tied up by ice later this year than they have been for 30 years, it has been asserted. However, no difficulty with the mines is anticipated this summer, the agreement now in effect having a year to run. Before leaving for Minneapolis, W. D. McKinney, secretary of the Southern Ohio Coal Exchange, expressed hope that operators of the state would be granted at least an even break. Under the prevailing rates, he said, southern Illinois producers have a 46c. advantage. Freight charges for Ohio total $3.98 a ton, while those from southern Illinois are $3.47.

With the Virginian and the Norfolk & Western both believed to be knocking at the door of the Logan field there is every **prospect of an impending conflict for rights of way in that field.** That either one road or the other is seeking entrance to Logan territory is the deduction of operators as a result of the proceedings instituted in the Circuit Court of Logan County by the Conley's Creek R.R., asking for the appointment of appraisers to condemn a railroad right of way from Stirrat to Gilbert through the large holdings of the late Devil Anse Hatfield and others.

In an effort to obtain joint car service at its plants near Winding Gulf, W. Va., **the Winding Gulf Colliery has instituted proceedings before the Interstate Commerce Commission.** The company points out in a brief filed in the case that a number of the mines adjacent to those of the Colliery Company have been enjoying and are now enjoying joint car service as between the Chesapeake & Ohio and the Virginian Ry. but that the plants of the complainant have not been accorded such a privilege.

Lower railway rates on coal from Alberta and the maritime provinces were promised by Sir Henry Thornton, president of the Canadian National Railways, in a telegram to Senator J. S. McLennan May 6. The telegram said the railways would quote a rate of $9 a ton on coal from Alberta to Ontario.

It will now be possible for the **Monongahela Ry. to proceed with construction work on its large yard at Maidsville,** in Monongalia County, W. Va., at the junction point of the Morgantown & Wheeling Ry. with the Monongahela Ry., an agreement having been reached recently. The county road will be moved to the embankment of the Monongahela River and the space between the old county road which ran alongside the railroad tracks will be utilized for thirteen yard tracks, each a mile in length, giving the railway thirteen miles of yard space between Maidsville and the Bertha mine and enabling the company to relieve congestion and handle much more coal than is now possible.

The Southwestern Interstate Coal Operators' Association and the Oklahoma Coal Operators' Association are actively supporting **proposed changes in the rates on slack coal from points in Arkansas and Oklahoma on the Frisco to destinations on the same line in Texas.** These destinations include Dallas and Fort Worth. The proposed rates are opposed by the Colorado & New Mexico Coal Operators' Association on the ground that they will create an unlawful discrimination and disadvantage against the producers of coal in the Trinidad and Walsenburg districts of Colorado and the Raton and Dawson districts of New Mexico. A large amount of testimony was given with respect to screening practice in the Colorado and New Mexico fields, and in the Henryetta group. The Southwestern operators, however, contend that this testimony is pertinent only for the purpose of indicating that "nut coal" means one thing in the Colorado and New Mexico territory and an entirely different kind, size and grade of coal in Oklahoma, and that the 3-in. nut coal produced in Colorado and New Mexico and what is denominated nut coal in group 15 in Oklahoma are not used for the same purposes and are not competitors in the destination territory involved. The Southwestern Interstate Coal Operators' Association and the Oklahoma Coal Operators' Association urge that the protest of the Colorado & New Mexico Coal Operators' Association be overruled and the proposed rates be permitted to become effective.

Rates on slack and run of mine coal from mines in the Bon Air (Tenn.) group to Richard City, Tenn., are unreasonable, in the opinion of J. P. McGrath, an examiner for the Interstate Commerce Commission. In a report made to the commission, he also holds that **rates on slack and run of mine from Orme, Whiteside, Etna and Slope Wall, Tenn., and Montague, Ala., and from mines in the Tracy City group to Richard City, are not unreasonable.**

The Utah Terminal Railroad has been given a writ of convenience and necessity to operate a railroad in Carbon County and the **Utah Railway Company** is given the status of an interstate carrier, in a decision just rendered by the I. C. C. **The Utah Railway now plans to purchase the Utah Terminal's property** which will give it all connection from the coal mines in Spring Canyon to Provo where, as an interstate carrier, it may receive and exchange cars with other lines. The decision reverses a previous one rendered in the fall of last year. At that time the D. and R. G. Western Railroad opposed the application on the ground that it was itself adequately equipped to furnish cars for the normal requirements of shippers. In addition to the petition of the railroads referred to the present application for the certificate was supported by The Spring Canyon, Peerless and Standard Coal companies. The D. and R. G. company pleaded this time that the railroad shopmen's strike several months ago had handicapped it. The Utah Terminal Railroad is a Spring Canyon line 32 miles long connecting with the Utah Railway at Mohrland. The Utah extends from Mohrland to Provo.

An injunction restraining the State Railroad Commission from putting into effect a lower rate on coal between Morganfield and Hopkinsville, Ky., was granted to the Illinois Central R.R. April 21. The order passed by the Railroad Commission, March 14, according to the petition, changed the rate on coal from $1.38 a ton to $1.07 and ordered a refund of money paid the railroad company on 2,666,660 tons of coal delivered in 1921. The order stated that the rate was "extortionate, unjust and unreasonable."

Coming Meetings

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting May 23 and 24 at Wilmington, Del. Secretary, W. M. Bertolet, Reading, Pa.

American Association of Mechanical Engineers will hold its spring meeting at Montreal, Quebec, Canada, May 28-31. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

National Association of Purchasing Agents will hold its eighth annual convention and Informashow at Cleveland, Ohio, May 15-18. Convention headquarters, room 219, Hotel Winton, Cleveland.

The National Association of Manufacturers will hold its 27th annual convention at the Waldorf-Astoria, New York City, May 14-16.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24, Secretary-treasurer, J. G. Crawford, Chicago.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Michigan-Ohio-Indiana Coal Association will hold its annual convention at the Hotel Sinton, Cincinnati, Ohio, May 22-24. Secretary, B. F. Nigh, Brunson Bldg., Columbus, Ohio.

West Virginia Coal Mining Institute has tentatively set June 5 and 6 for its annual meeting, to be held at Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Retail Coal Dealers' Association of Texas will hold its eighteenth annual convention at Galveston, June 11 and 12. Secretary, C. R. Goldmann, Dallas.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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An Opportunity

TIME-HONORED are the complaints of the employer that he has a man of the necessary power to lead and get things done and with ability to think, but that the state perniciously refuses this man a certificate though he knows more than all the "muddled oofs" who have passed the examinations and have certificates of competency.

These complaints have been joined to others. The average employer has men who would make good repairmen—steady, reliable, clever—but not grounded in their art. It is wonderful what they can do, but they lack training.

During these summer months is the time to arrange to get these men the training they need. Provision can be made at some one of the many mining schools in the country, most of which have a short summer course for students who want to be grounded in mining but have not had much scholarship as a basis for collegiate training. The right way to get the minor executive or mechanic sought is to hunt up a man who has all the requisite qualities except technical education and give him such training, be it more or less, as the office he has to fill requires more or less scientific accomplishments.

Easier Not to Mix Than to Unmix

NATURE has segregated more or less satisfactorily coal, bone, clay and slate. Once mixed they are hard to unscramble. Preparation at the tipple or washer is well, but far better is it to take care not to let the impurities get mixed with the coal. Large pieces of slate, it is true, can be removed by picking, but smaller pieces must be separated by washing or on an air table. Even then soft clay from the floor, gathered up by the shovel, can be removed only with difficulty. It cannot be picked, and though washing will remove much of it, a large quantity of fine coal will go with it.

Consequently it would be well not to disturb the clay in undermining or loading the coal. A machine that digs too low will pick up much clay and thus befoul the undercuttings and hence the whole product. Shoveling on steel plates will keep the clay from mixing with the coal, and leaving a little coal in the floor will do the same but will make shoveling less easy.

Drawslate is likely to fall, and sometimes only by prompt propping can it be kept out of the run-of-mine. Sometimes a thin film of coal left in the roof will serve the same purpose. The cuttings, if made in a parting will remove much of the impurity, especially if proper disposition is made of them. If made in clean coal, the product thus obtained may be loaded separately and will give a fuel of extra quality for metallurgical purposes and one that will not need washing. Proper shooting methods also will give a large product well fitted for the picking table.

It would pay any operator to make a careful study of his working faces to see where the impurities are and what means can be taken to provide that they are kept out of the coal, and if removed with it are kept of such size that it is easy in the tipple to separate the clean coal from refuse. An inspector or two in the mine may save a picker or two outside, may make it unnecessary to pay the miner for refuse as if it were clean coal, may enable the operator to obtain a larger and cleaner product and may help in the administration of the mine both as to safety and efficiency.

Electricity and Increased Production

ELECTRICITY is rapidly replacing man, animal and even direct-connected steam power in the coal mines. It is estimated that at the present day there is a total of about 4,370,000 hp. in electrically-operated motors in the coal fields and that this total represents about 48 per cent of the rated horsepower of all types of drivers used.

A remarkable feature of this rapid progress is that it has all been accomplished within the last thirty years. During this period there also has been an increase in coal production of almost 500 per cent and no one will doubt that the application of electricity has been the prime factor in bringing about this high rate of increase in production.

With the advantages of electrical energy so apparent it is not difficult to understand why the industry is turning to its more general use, thus opening up a greater market for all types of electrical equipment and electrically-operated machinery.

The facility and ecenomy with which electrical energy may be transmitted to places which could scarcely be reached by any other method is its paramount advantage. In using hydraulic, steam or pneumatic transmission of energy the losses are unusually high due to unavoidable pipe losses and leakages, while with electrical transmission the losses, even at great distances, are only a few per cent.

A comparatively long transmission system for electricity presents no particular difficulties, and for this reason the location of the generating station may be determined not so much with reference to the point at which the energy is to be used as to where it can be most economically generated. This makes it possible to develop water works for generating electric current, to utilize blast-furnace gases, refuse from coke ovens or low-quality fuels from coal mines. One of these sources of power that formerly was considered a waste product is available in nearly all mining districts; especially is this true in the anthracite field, where it is possible to use old culmbank fuel mixed with the smaller sizes, as the case may require.

In addition to the advantage of utilizing so-called waste products for power purposes, the electric central

station and the attendent centralization of the loads makes the engine load more constant and provides a means of securing the most favorable steam and fuel consumption. This matter of load factor is so important that a recent survey of seven large coal mines, each furnishing its own power—mostly for steam-driven equipment—revealed a total boiler capacity in continuous operation equivalent to twice that necessary to operate a central station of sufficient size to operate the total connected power load electrically.

Such central-station systems are gaining in favor in the coal fields, both in the way of large central power plants for individual coal companies and public-utility companies. At present it is estimated that the total amount of electrical energy used in the coal fields is about equally divided between power plants owned by coal companies and public-utility companies.

Putting It Up to the Fan

WHEN a mining engineer wants to double the length of his trips, all he has to do is to double the weight of his locomotive and double the power of its motors. If his rails and the couplings will stand the load he can readily get the locomotive or use two in tandem. Increasing the tonnage of his trips does not increase his power cost per ton and, as it saves labor, may actually reduce his whole cost for haulage. Besides, if he hauls in one trip what he formerly has hauled in two he removes the possibility of the trips interfering with one another.

He may have to increase the capacity of his feeders and may have to enlarge his central station, if he has one, and increase the size or number of his substations. He may have to pay more for power if he uses so much in hauling his long trip as to heighten the peak load. Barring that last possibility the factor of increase of every item is two or less than two because it may be possible by having longer trips to get some help in overcoming unfavorable grades, for some cars may be on a more satisfactory grade than others, thus helping the locomotive to perform its work. A long trip often is a gradient equalizer.

Operators frequently forget that it is different with a fan. With a given length and size of airway, doubling the volume of the air current means not doubling but multiplying by eight the power of the fan needed, an increase not to be dismissed without careful consideration. It means increasing the leakage of brattices and stoppings, which may make the factor of eight insufficient. It should be remembered that the mine will take only the number of cubic feet that the pressure of the fan acting on the resistance of the roadways will permit to pass through the working. To increase the flow of air the pressure of the fan must be increased.

Consequently the operator, seeing the roadways get longer and longer and in some cases lower and lower as the bottom rises toward the roof due to squeeze and also the airways become more and more cluttered with fallen rock, if it is not removed, will do well to plan carefully when he opens his mine.

He will do well to watch his intake carefully. If it must be a single airway and if he cannot add another later he should make it large, remembering that it has to take an unsplit current. If it is a shaft he should design it not merely to suit the needs of hoisting but with a view to the future requirements for ventilation. He will be well advised if he splits his current as early as possible and avoids curves and offsets as much as he can in such airways as carry the unsplit current. He will watch closely the return, especially where all the various splits have rejoined and are coursing along in one narrow pathway together. The reunited return should be short as is the unsplit intake.

Whatever he does let him not "put it up to the fan maker." He may buy a fan that will deliver enough air and create enough pressure to satisfy his notion, but if his mine will not carry that much air with that pressure the fan will not deliver it. His only hope may be to make a new shaft for the intake or the return or both, or to drive new roadways if the pillars will permit it. Let him remember that the laws of nature are unalterable, and with a badly planned mine a fan will not deliver the required quantity of air except with excessive water gage, and a misuse of power well nigh appalling. He will do well to listen to advice in this respect lest in arguing he find he is trying to combat laws of physics with which none can parley.

Pumping Replaces Ditch Drainage

GRADUALLY the bituminous-coal mines above water level are being worked out. They, like the anthracite mines, are getting deeper year by year. It is true that at most soft-coal mines only one seam is being worked, but such seams are being completely extracted, which is not always the case in the anthracite region.

If we could believe Fayol and the old school of mining men we could feel confidence that the deeper mines would be fed only with "ground water," which when exhausted would be replenished only slowly, but experience shows that the old school is wrong, that the whole area above an extracted coal bed does subside and in subsiding stresses, strains and breaks the rock cover, leaving crevices down which water can percolate more or less freely.

The extraction of one bed, as is the rule in the bituminous-coal region, is not so disturbing as the removal of several, as in the anthracite coal field, but when only one bed is worked the area undermined is greater for any given tonnage, and the water to be handled per ton of coal mined may be little if any less. When the mine is below water level all this water must be pumped. The weakest spots are where the cover is least—that is where the streams are biggest.

For this reason we can look for big influxes of water and an increase in the volume to be pumped. Consequently the pumping load in the soft-coal mine will increase and ultimately it may be no less than in the anthracite region.

Subsidence, therefore, becomes an important problem. How close can an excavation be made to a stream? We are clear that it is not well to mine under it, but it is questionable how near it is well to approach it. In fact the point of approach that will give security against flooding by streams will indicate how far cracking of the surface extends beyond the excavated area.

This is one of the reasons that makes the inquiries of the committee on ground movement of the American Institute of Mining and Metallurgical Engineers so vitally important. To keep down pumping expenses the coal under and near streams should be left intact till the final pillar drawing is commenced, provided the stream is large and the water it carries accordingly is menacing.

Equipment Layout for Washery to Clean Coal as Prelude to Making Metallurgical Coke*

Finding Out What Size Coal Most Needs Cleaning—Three-Quarter Inch Crushing Usually Fine Enough—Equipment Needing Little Screening a Desideratum—How to Avoid Dewatering of Coal—Some Formulas

AS IS IMPLIED in its title, this article will deal strictly with coal that is to be washed for use in the manufacture of metallurgical coke. It now is being generally recognized that the areas in which coal having sufficiently low percentages of ash and sulphur for the manufacture of good metallurgical coke is found are being depleted rapidly, and that, in consequence, coal washing before long will have to receive the attention it deserves from mining, metallurgical and chemical engineers.

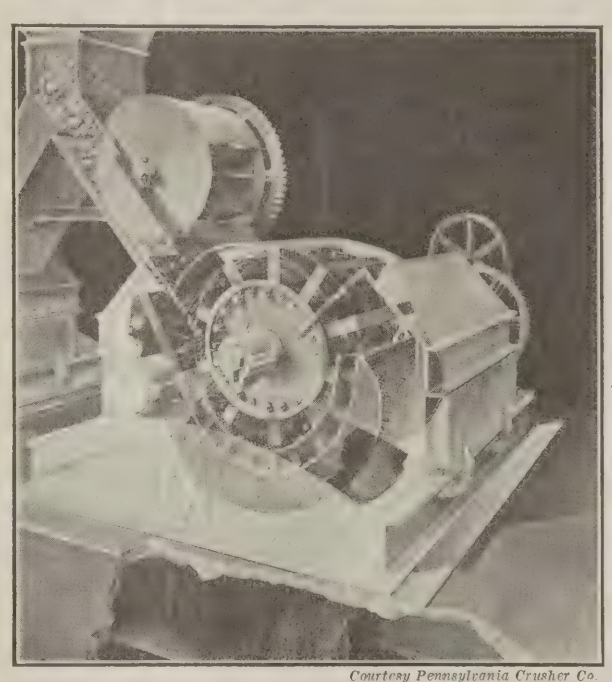
Up to the present time coal washing has been looked upon somewhat as a necessary evil to be avoided like a pestilence, and when coal has been washed at all it has been done only in a half-hearted or desultory manner. Lately, however, the problem has been receiving much attention at meetings of coal-mining men, where it often forms the topic of lively discussions of absorbing interest. Moreover, from time to time, new and improved schemes are being developed that put coal washing on a higher plane than heretofore. It will be the purpose of this article to formulate a general plan, or layout, of coal-cleaning equipment that will enable the prospective owner of a mining plant to install equipment that will clean his particular coal in the most efficient and economical manner.

To illustrate the point a flow sheet (Fig. 1) has been prepared which is intended to cover the subject but in a way permitting of modifications. The different steps and combinations will be discussed in the order of their importance.

Preliminary Investigation.—The importance of a preliminary investigation of the coal to be washed cannot be too strongly emphasized. This has been indicated forcibly by Messrs. Fraser and Yancey, co-investigators at the Engineering Experiment Station of the University of Illinois. It will pay every coal operator who contemplates the installation of coal-washing equipment to read their published opinions on this subject, for they are sound in logic and afford good advice. After all experimental data have been collected, the interpretation of the results is important and should be done only by a competent and level-headed engineer—one who is unprejudiced when it comes to the installation of the proper kind of coal-cleaning equipment.

It probably is a statement of fact to say that the burden of the investigative work is carried out by crushing and screening tests, coupled with the so-called sink-and-float examination and by chemical analysis of the various products. Table I shows the results of such an examination on a certain coal the treatment of which is in need of determination.

On examining the results in the above tabulation it will be noted that the character of the coal is much the same in all the sizes, which makes the cleaning of it difficult. It will be further noted that the sink-and-float tests indicate that the percentage of sulphur in the float coal is nowhere low. This float should correspond with the washed coal.



Courtesy Pennsylvania Crusher Co.

PHANTOM DRAWING ON HAMMER CRUSHER AT WORK

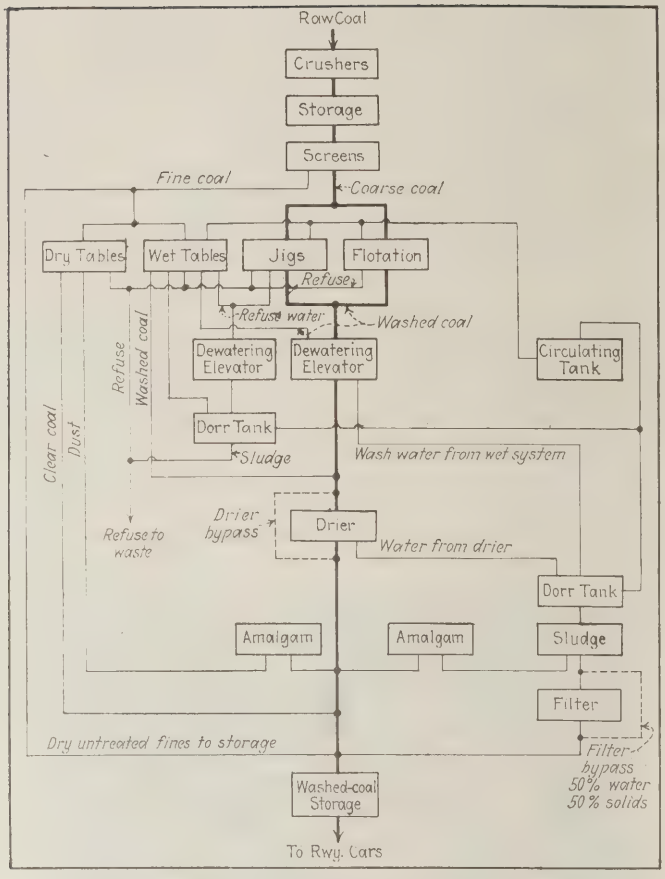
In the upper left-hand corner is the chute, the discharge from which is regulated by a retarding and distributing feeder, the coal passing into the hammers at about the level of the diameter of the axle. The hammer lifts the coal and drives it against the casing. Whatever is friable enough to be thus broken, including all the clean coal, is passed through the screen openings on the underside of the crusher. Whatever is not, whether slate, bone coal or tramp iron, is ejected beyond the screen.

This experimental indication has been borne out in the washing of this coal, but, as the writer has pointed out in a previous article on the subject, the actual sul-

*Contributed.

TABLE I—TESTS AND ANALYSES OF A COAL WITH IMPURITY WELL DISTRIBUTED AMONG SIZES

Screen Sizes		Raw Coal			Float			Sink		
Passes Through	Held on	Percentage of Given Size in Coal Tested	Ash Percentage	Sulphur Percentage	Percentage	Ash Percentage	Sulphur Percentage	Percentage	Ash Percentage	Sulphur Percentage
.....	1 in.	12.09	12.69	3.07	77.22	7.14	2.11	22.78	31.50	6.31
1 in.	¾ in.	13.22	13.37	3.91	76.68	6.92	2.21	23.32	34.56	9.50
¾ in.	½ in.	20.09	11.62	3.24	81.71	6.66	2.23	18.29	33.77	7.77
½ in.	¼ in.	19.18	11.05	3.41	81.79	5.73	2.20	18.21	34.93	8.83
¼ in.	⅛ in.	14.98	10.88	3.29	81.02	5.08	2.15	18.98	35.60	8.16
⅛ in.	10-mesh	2.39	10.35	3.05						
10-mesh	20-mesh	7.03	11.93	3.26						
20-mesh	30-mesh	3.40	13.66	3.19	N.B.—The separation by float-and-sink test of the coal larger than ⅛ in. was in a medium of a specific gravity of 1.35.					
30-mesh	40-mesh	1.39	14.05	3.32						
40-mesh	.....	5.30	14.56	3.27						
Loss in manipulation		0.93	.....	.....	.....	.....	.....	.....	.....	.....
Original sample		100.00	12.00	3.34	.....	.....	.....	.....	.....	.....



SUGGESTED FLOW SHEET FOR WASHERY

This illustration is a broad generalization which may be modified to meet the special needs of any given installation. The coal is crushed to ¾ in. diameter. The storage is placed between crushers and screens although it may be conveniently located elsewhere.

phur in the washed coal from a well-designed and properly operated washery will be lower than the sink-and-float tests would indicate. As a matter of fact, also, the percentage of loss in weight in washing is lower, the ash percentage is higher, and the percentage of sulphur lower, than the tests would indicate. To illustrate further the necessity for preliminary investigation, another example is cited in Table II.

TABLE II—TESTS AND ANALYSES OF COAL HAVING MOST OF ITS IMPURITY IN THE COARSE COAL

Constituents	Raw Coal Per Cent
Volatile matter	18.60
Fixed carbon	72.45
Ash	8.95
Total	100.00
Sulphur	0.84

Passes Through	Held on	Percentage of Given Size in Coal Tested	Percentage of Ash
....	1 in.	1.14	44.20
1 in.	¾ in.	2.70	29.00
¾ in.	½ in.	4.66	20.96
½ in.	⅜ in.	7.11	14.38
⅜ in.	¼ in.	7.40	10.72
¼ in.	⅛ in.	19.88	7.93
⅛ in.	.....	57.11	6.48
		100.00	

On referring to the analyses of the screening tests in Table II, it will be noted that the impurities for the most part are found in the larger sizes. In this case it would be unwise and uneconomical for the coal operator to figure on cleaning any size below 8-mesh. This side quite properly may be allowed to bypass the coal-cleaning equipment, and be added untreated to the clean coal. This is readily accomplished by means of screens.

This feature is important in the cleaning of certain kinds of coal, and advantage should be taken of it whenever possible, for it means a big saving in equipment and cost of operation. Care is taken of it in one of the layouts shown on the flow sheet. The same characteristic is not shown in the first example cited, Table I, in which the fines could not be added untreated to the clean coal without a considerable increase in the ash and sulphur contents of the final product.

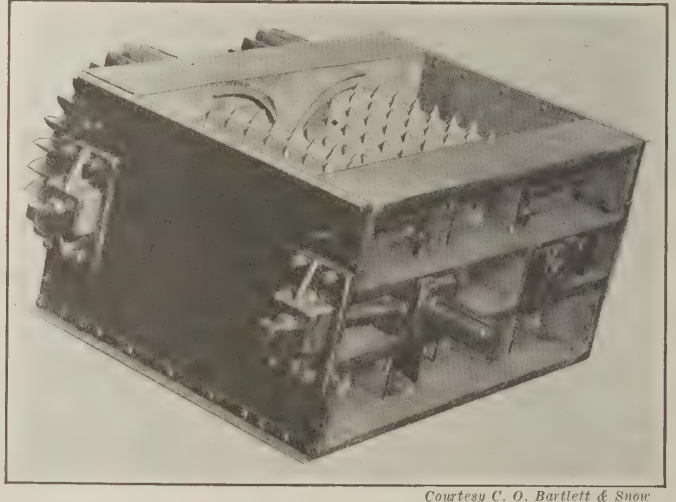
Crushers.—As to crushers the types to be installed will depend largely upon the character of the raw coal and its impurities. Generally speaking, it is found in practice that when the coal is crushed to ¾ in. it will be fine enough to free the impurities for commercial operation. In certain layouts fine crushing is objectionable, as it results in the production of a large percentage of excessively fine coal. In fact it may be said that when the crushing equipment is chosen this possibility should be kept in view. In wet washing it is difficult to handle fines successfully.

Among the types of primary crushers may be mentioned the toothed-roll crushers, the Hammermill and the Ring crushers. Sometimes, as in the making of amalgam, to be described later, ball or rod mills may be used. These are designed to powder coal to 100-mesh and under. If the amalgam method ever has any wide application, these mills, of course, will be more than auxiliary crushers.

Storage.—What storage is provided will be determined largely by the operating conditions. In the flow sheet it is shown as being placed between the crushers and the screens, although it may be located conveniently elsewhere. Under certain conditions it may be even omitted.

Screens.—In a well-regulated coal washery producing coal for the manufacture of metallurgical coke, a screening plant would seem to be absolutely necessary, as higher efficiencies are obtainable when more or less sizing is done. The coal should be screened thoroughly or not at all; otherwise the efficiency of the washery will be much impaired. Where a jig designed for handling coarse coal is used for cleaning a mixture of fine and coarse coal an excessive quantity of good coal, chiefly fines, is almost certain to be lost in the refuse.

The flow sheet shows two general heads—fine coal and coarse coal. By fine coal is meant coal under ¼ or ⅛ in.



Courtesy C. O. Bartlett & Snow

TWO-ROLL TOOTHED CRUSHERS FOR BREAKING COAL

These crushers are designed to break rather than crush the coal. The action is more like that of a series of picks than that of a steam roller, which latter starts cracks everywhere and makes a powder rather than a granular material. The segments of the rolls can be made of cast-steel, chilled cast-iron, or manganese steel. The crusher measures 26x24 in.



Concentrating Table

The fine coal with the aid of water and the reciprocating motion of the table passes over the riffles and is taken off at the side of the table. The sluggish slate is not so agile in hurdling the riffles, and lands at the end of the table.

Courtesy Deister Concentrator Co.

or thereabouts. Coarse coal is above that and may be conveniently divided into two sizes before going to the jigs or other cleaning equipment.

As to the screens themselves great care should be exercised to select that type which will give the greatest efficiency for a given area of floor space. Apparently the tendency of late has been toward the use of vibrating screens of some sort, although there are efficient screens of the shaker-gravity and anti-gravity types.

Method of Cleaning Coarse Coal.—The flow sheet shows two general methods of handling coarse coal—jigs and flotation. There probably is no better or faster method of cleaning coal than by the use of jigs. No attempt will be made to discuss the merits of the different types of jigs on the market. When tuned up properly, any of them will do fairly efficient work on coarse coal, if the coal is accurately sized. It always seemed to the writer that a single-cell jig was the most logical one to use when at all possible, and in no instance should a jig having more than two compartments be used.

Flotation is shown in the flow sheet as a method of handling coarse coal, as lately at least two methods have been developed for this purpose, and both are being used by a well-known company in the anthracite district. In fact no less than seven flotation plants of one of the two types mentioned have been installed. Sand pulp or a similar material is used for the flotation medium. If flotation can be developed for use on bituminous coals, it appears, at least at first sight, that it would have a rather wide application even to the point of supplanting the use of jigs under certain conditions, on account of the process being faster and more economical. In the light of present knowledge the process seems to imply efficient screening, or the removal of the extremely fine coal and the prevention of abrasion afterwards, because when fines have become mixed with sand pulp they are separated with more or less difficulty.

Method of Handling Fine Coal.—Fine coal, say below $\frac{1}{8}$ or $\frac{1}{4}$ in., may be handled in many ways: (1) Direct or untreated to the washed coal proper; (2) on dry tables; (3) on wet tables. The handling of untreated coal has been described somewhat in detail already.

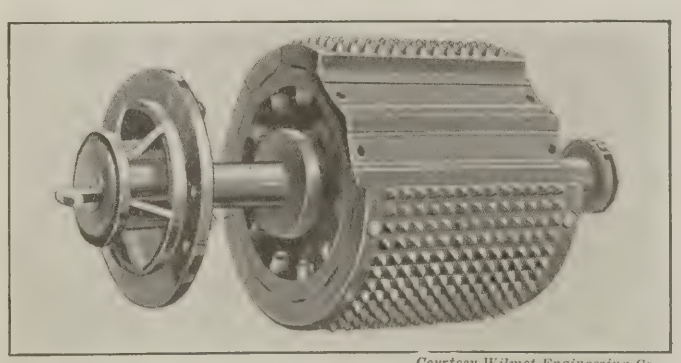
Dry Tables.—Of late coal operators have been giving dry cleaning more than passing attention, as it has many advantages over wet methods, chief of which, when the coal is used in the manufacture of metallurgical coke, is the elimination of water in the washed product. This process not only saves freight on water but helps out at the byproduct oven by a reduction in the coking time. It also has other desirable features. Several dry tables are on the market. Some already have been developed commercially and some are merely in process of development.

One type of dry table requires close sizing. The sponsors for another type assert that it will handle unsized coal below $\frac{1}{4}$ or $\frac{1}{8}$ in. It may be remarked here that in most cases grading in eight or ten sizes is objectionable. It would seem more logical to treat the fine coal unsized, as is the practice on wet concentrating tables. Dry cleaning undoubtedly will play an important part in the coal-cleaning equipment of the future, and it will be to the manufacturer's advantage to develop dry tables that will be as simple as possible and that can be operated with maximum economy.

Wet Tables.—Little need be said about tables of this type, as they are already in successful operation. Like jigs, any of them will do good work when properly adjusted. The choice made will depend largely upon their cost, tonnage and ability to withstand heavy usage.

Dewatering Elevators.—Close attention should be paid to the design of dewatering elevators both for the washed coal and for the refuse, particularly the former. If the perforated buckets are well designed and proper pitch and speed are maintained, they will remove a large quantity of water. In fact if only coarse coal is being handled on the dewatering elevators and if the dry fine coal is added afterward, it is unnecessary to provide any other way of eliminating water. In other words, the centrifugal driers may be bypassed.

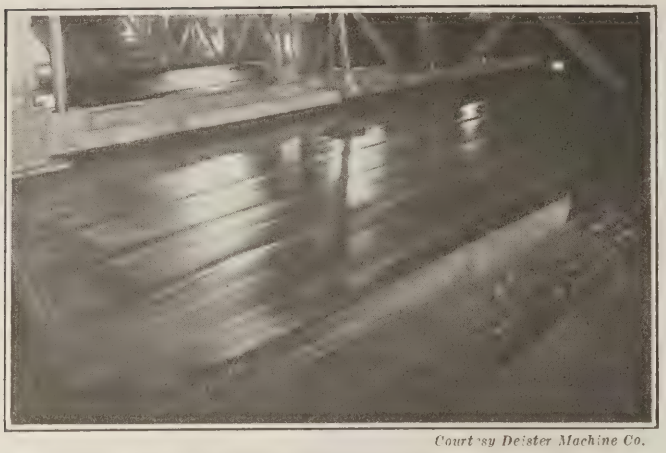
Mechanical Driers.—The tendency in coal-washing equipment is to use mechanical driers, or centrifuges, inasmuch as they are comparatively inexpensive to operate, do their work efficiently and occupy little floor space



Courtesy Wilmot Engineering Co.

TOOTHED ROLL WITH TWO SEGMENTS REMOVED

The body of the roll is planed on the surface on which the toothed segments rest. In consequence the tongue-and-groove construction holds the segments securely in place, the only stress on the bolts being that caused by the speed of the periphery.



Courtesy Deister Machine Co.

TWO COAL-WASHING TABLES AND THEIR FEED

The quiet flow of water contrasts greatly with the disturbance in the older types of jig. It is better suited to the fineness of the material with which it has to deal. The table is being agitated along the lines of the ripples. The table feed should be less than $\frac{3}{4}$ in. in diameter. Water is added to equal 50 per cent of the weight of the solids, and from 15 to 20 gallons of dressing water per minute are admitted in two boxes or hoods, one immediately in front of the feed box and one about halfway down the side of the table.

as compared with drainage bins. The cost of operation is less than 2c. a ton. There are two well-known types of mechanical driers on the market. Here again the problem is determined largely by the first cost and floor space.

Sludge Recovery.—No matter how careful has been the attention given to the washery layout, particularly the crushing equipment, a certain quantity of fines always will be produced. In this sense the fines are the powdered coal produced by grinding and abrasion; they usually are about 100-mesh material. The percentage varies, depending upon the character of the coal, but usually it is not less than 5 per cent of the input of the washery. In the old days a large part of this fine coal was lost, due to imperfect sludge tanks.

There is no longer much excuse for permitting that loss, if the coal operator is willing to spend the money for an approved method of handling wash water and the sludge from it. As no other type of apparatus is on the market, reference is made in the flow sheet to the Dorr thickener, which serves as a mechanical means of handling the wash water and sludge.

The effluent from these tanks may be so regulated as to contain only a few tenths of one per cent of solids, the quantity averaging probably one quarter of one per cent, consequently it is amply pure for re-use in the washery. The underflow can be thickened down to approximately 50 per cent of solids and 50 per cent of water. Practically the same remarks apply to the use of Dorr tanks for handling refuse water, although here the underflow has to be wasted because of its chemical analysis.

Handling Sludge.—The sludge can be disposed of in several ways: First, where there is no objection to water, it may be pumped directly on top of the washed and dried coarse coal proper, which eliminates it from the circulating system altogether. Second, the underflow may be put through a filter of some kind to reduce the moisture in it before it is added to the washed coal. The use of a drum, or disk, filter probably will reduce the moisture 50 per cent. The cake thus obtained is easily handled. Third, it has been proposed to make an amalgam of the sludge with oil, a process by which, it is asserted, not only the moisture but also the impurities of ash and sulphur are reduced.

According to the claims made for the process, the moisture of the amalgam runs from 10 to 15 per cent, the ash is reduced at least 50 per cent, and the sulphur is lowered to a point near the organic sulphur content of the coal. Furthermore, in the byproduct process the oil is said to be recovered in the form of additional heat value in the gas and in an increase in the tar and motor fuel thus obtained. Although this process is not completely developed, yet in so far as it applies to handling sludge it deserves careful attention and investigation on the part of coal operators.

The same remarks apply in general to making amalgam from the dust of the dry tables, as it has practically the same characteristics as the sludge from the wet washery. In the case of dust, water would have to be added in making the amalgam. In passing it may be remarked that the dust may be recovered from dry tables by means of an exhaust, or blower, system, which seems just as necessary as the Dorr tank in wet concentration.

Mathematical Formulas.—It already has been pointed out that there are formulas based on chemical analyses by which the various problems that arise in coal-washery management can be solved. For instance, in the analysis of the raw coal, washed coal and refuse, the percentage of loss may be calculated even more accurately than by using actual weights. Some of these formulas are as follows:

If H equals the raw coal; W, the washed coal; and R the refuse,

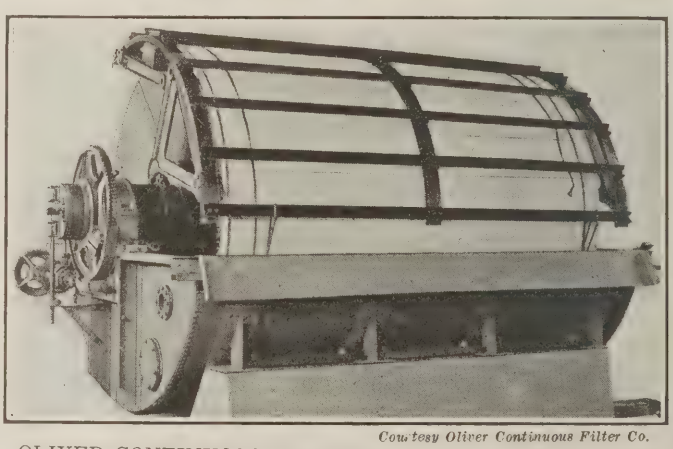
$$\text{Then } \frac{R\text{-}W}{H\text{-}W} = \text{Ratio of Elimination.}$$

Dividing 100 by this figure gives the percentage of refuse, and of course 100 per cent minus the percentage of refuse = the percentage of washed coal.

In a similar manner

$$\frac{}{(R\text{-}W)H} = \text{Percentage of Elimination of Ash or Sulphur.}$$

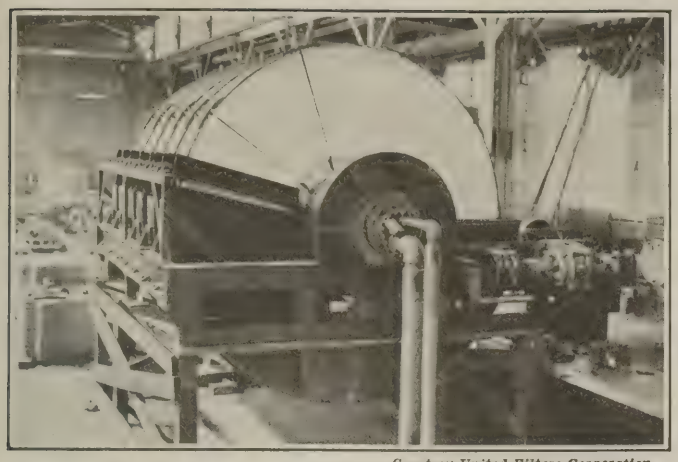
The work of the Dorr tanks may be investigated from the following formulas: If A equals the specific gravity of water; B, that of coal (say 1.35) and X that of the solution under consideration



Courtesy Oliver Continuous Filter Co.

OLIVER CONTINUOUS FILTER FOR DRYING FINE COAL

The filter removes water by sucking the wet coal onto its outer permeable surface and subjecting the layer thus formed to the action of a vacuum within the filter. It consists of a drum or cylinder rotating on a horizontal axis with the lower portion submerged in a tank containing the material to be filtered. The surface of the drum is divided into compartments or sections, the dividing partitions being parallel to the main shaft. These sections are covered with a screen for supporting the filter medium, which is held in place by a wire winding. Each of these sections is connected by means of pipes passing through a hollow trunnion to an automatic valve, which controls not only the application of the vacuum for forming and drying the cake but the admission of air which permits the cake to be scraped loose.



Courtesy United Filters Corporation

AMERICAN CONTINUOUS FILTER WITH DISK SECTIONS

Each section consists of eight to ten separate sectors, each consisting of wood corrugated like a washboard and covered with filter cloth. The shaft is hollow and the moisture in the coal is drawn by the action of this vacuum through the cloth into the corrugations and down these through an orifice in the shaft to the shaft center. By the use of disks a larger area is exposed to the action of the vacuum. The cloth bag on each sector is separate and can be renewed without renewing the covering of other sectors.

Then $\frac{B(X\text{-}A)}{X(B\text{-}A)} \times 100 =$ Percentage of solids in solution.

This formula is particularly valuable in investigating the character of the underflow and, if necessary, the water consumption of the plant, based on the quantity of underflow during any given time.

As to formulas for calculating the efficiency of a coal washery not much can be added to what Messrs. Fraser and Yancey have said in their bulletin on "Interpretation of Coal-Washery Results." These equations are known as the Drakeley formulas, and are given below:

$$\text{Qualitative Efficiency} = \frac{\text{Washed coal float—Raw coal float}}{\text{100—Raw coal float}}$$

$$\text{Quantitative Efficiency} = \frac{\text{Raw coal float—(Refuse float} \times \text{percentage of refuse}}{\text{Raw coal float}}$$

The general efficiency of the washery is considered to be the product of the qualitative and quantitative efficiencies. Objection might be taken to the Drakeley method of obtaining the general efficiency of a washery. For instance, if the washery operator wishes to show a high general efficiency, all that is necessary is to produce a washed coal with only a small percentage of sink in it, which gives him a high qualitative efficiency. But this procedure in all probability would cause an unduly high percentage of good coal to enter the refuse.

G. R. Delamater some years ago published formulas for determining the efficiency of coal washeries which have been subjected to more or less criticism, but after all it seems, according to Messrs. Fraser and Yancey, who have made an exhaustive study into the question, that he was fundamentally right. These authorities have combined the ideas expressed by Drakeley and Delamater into new formulas for showing the general efficiency of a coal washery. These are as follows:

$$\frac{\text{Actual Yield}}{\text{Standard Yield}} \times \frac{\text{Actual ash reduction}}{\text{Standard ash reduction}} \text{ or}$$

$$\frac{\text{Yield of washed coal}}{\text{Yield of float coal}} \times \frac{\text{Raw coal ash—Washed coal ash}}{\text{Raw coal ash—Float coal ash}}$$

Delamater was undoubtedly a pioneer in the literature of coal washeries and in the development of formulas, and as such deserves full credit for his work, even though he made mistakes, as all men will who do original thinking or investigative work.

Applying the principles of Drakeley's formulas, a modern up-to-date coal washery should show a qualitative efficiency of 75 per cent and a quantitative efficiency of 97 or 98 per cent, which will give a general efficiency of 73 or 74 per cent, although Prochaska in his book on "Coal Washing" says 65 per cent may be considered average coal washing practice. He also says that 75 per cent general efficiency is excellent work, but it would appear to the writer that this figure is about what ought to be expected of modern equipment.

Aside from the coal-washing equipment shown in the flow sheet, it may be remarked that there are cases where coal may be cleaned sufficiently by picking tables, picking screens and certain types of revolving screens and disintegrators. These various machines have merit and should be used whenever it is found that they will do the work efficiently.

Ontario and Quebec to Entertain American Institute of Mining Engineers

BEGINNING at Toronto, Aug. 20, and ending at Montreal, Aug. 30, the American Institute of Mining and Metallurgical Engineers will visit several of the mining regions of Ontario while holding its annual fall meeting.

The tentative itinerary contemplates meeting in Toronto and registering on Monday morning, Aug. 20. After a luncheon, entertainment will be offered by Toronto members of the Canadian and American institutes. The party will leave Toronto in the evening on a special train, arriving at Sudbury on the following morning, and will devote the day to visiting the mines of the district, including the Creighton, and the smelting works of the Mond Nickel Co. at Coniston.

Wednesday, Aug. 22, will be devoted to inspecting the mines and mills at Cobalt, and on Aug. 23 the company will be divided into two sections, one going to South Lorrain by automobiles, the other making a boat trip on Lake Timiskaming, visiting the Wright silver mine (Canada's oldest mine) and Ville Marie, one of the oldest Canadian settlements in Ontario.

On Friday the party will be at Kirkland Lake and spend the day in visiting the mines and mills of that district.

On Saturday morning the first stop will be made at Iroquois Falls, where is located the Abitibi Pulp & Power Co.'s plant, one of the largest paper mills in Canada. In the afternoon the party will proceed to Porcupine, where it will be entertained that afternoon and the following day.

On Sunday evening the special train will start toward Quebec over the Canadian National Lines, reaching that city Monday afternoon. While in Quebec the party will be quartered at Château Frontenac.

Tuesday, Aug. 28, will be devoted to technical sessions, the program of which will be announced later. On Wednesday the party will be driven in automobiles to points of interest in and near Quebec, and in the evening a formal dinner will be served, at which short addresses will be given by members of both the Canadian and American institutes. After the dinner the party will return to its sleepers and will reach the Thetford asbestos mines early Thursday morning. The morning will be spent here and at Black Lake, the party taking the train again at noon for Montreal, where a smoker will be held, concluding the program of the meeting.

Bunker and Cargo Coal Destroy Many Ships; Suggestions to Reduce Hazard

THE seriousness of fires on ships due to spontaneous combustion in bunker and cargo coal has led the Department of the Interior to undertake a study of causes and means of prevention, the results of which are given in Technical Paper 326, written by H. H. Stoek and just issued by the U. S. Bureau of Mines, from which source it can be obtained.

A tabulation of casualties from fires on British ships shows that the number of fires caused annually by spontaneous combustion ranges between 50 and 100. The average number of American steamers totally destroyed by fire each year is over 60. In addition, about 140 vessels of miscellaneous types are destroyed, a total of 200 per year. Property losses by fires on ships run into the millions of dollars. The loss of life has been considerable. What portion of these totals should be attributed to coal fires has not been ascertained.

Loss Is Not Limited To Actual Fires

The money losses listed do not include those due to delays in sailing incident to the heating of coal cargoes or to the cost of removing cargoes that have heated. In New York harbor, coal that has heated to 120 deg. frequently is refused for bunker and cargo purposes and other disposal must be made of it. Within the last few years coal handlers in several South American ports have required extra pay for handling coal that has heated.

As a result of its investigations, the Bureau of Mines considers that the danger of loss of life or of a total loss or damage to vessels from coal carried in bunkers or as cargo is sufficient to justify unusual caution in choosing, handling and watching coal placed on ships either for bunker purposes or as cargo.

Undoubtedly certain coals are more liable to spontaneous combustion than others, but the information available at this time does not permit a classification of coal to be made upon this basis. Hence when a choice is possible, a coal that, as shown by its past record, is particularly liable to spontaneous combustion should not be put on a ship. If choice is not possible, and coal with a bad record must be used, it should be carefully stowed and sedulously watched.

Liability to spontaneous combustion is greatly reduced if fine coal and dust be removed by screening, but usually this is not practicable with present coaling methods. Run-of-mine coal generally is furnished to ships, particularly at American ports, both for cargo and bunker purposes. With coal of mixed sizes such as this extra precautions must be taken. If possible, the least friable of the coals available should be chosen, and care should be used in handling the coal in order that breakage and crushing may be reduced to a minimum.

Even Low-Sulphur Coal May Give Trouble

It is wise to select a low-sulphur coal, if possible; but it must not be taken for granted that because of that quality it will be free from spontaneous combustion.

The evidence in regard to the chemical action of moisture in coal in aiding or retarding spontaneous combustion is extremely contradictory. As vessels usually must be coaled promptly, no attention can be paid to weather conditions, and it seems to make little difference as to the tendency to fire whether coal is loaded in wet or in dry weather.

Practice and opinions vary widely in regard to the ventilation of bunkers and holds. Many advocate keeping the coal spaces as nearly airtight as possible by battening down the hatches, but others advocate taking off the hatch covers, when weather conditions permit, to admit air to the surface. Adequate ventilation throughout a coal cargo by pipes or by chimneys built of coarse coal through the pile, as is advocated by some, is impracticable, and it seems better to distribute the coal uniformly and to prevent as far as possible segregation of the sizes, as such segregation tends to produce areas favorable to heating. Moist air circulating through a coal pile seems to cause it to ignite at a lower temperature than it would if the air were dry.

Bunkers and holds should be provided with ventilating funnels to carry off the explosive gases which some coals give off, and great care should be taken in opening a bunker or hold that has been tightly closed to test for explosive gases. In closed spaces where coal is stored, open lights should be prohibited.

Further recommendations of the Bureau of Mines' investigators are as follows: When coal is loaded trim it, if possible, in horizontal layers to avoid separation of the sizes, rather than dump it on a cone and thus permit large lumps to roll to the bottom of the cone and the fine coal to collect near the top of the pile, just under the hatches, where fires are often known to start.

Thoroughly clean out bunkers and holds before fresh coal is put in, and closely inspect coal as it is being loaded, removing from it any waste or pieces of wood, paper, or similar combustible material which may assist spontaneous combustion. The placing of fresh coal on old coal that has been in the bunker for some time is generally considered unwise.

Protect Coal From Boiler Heat

Keep the coal as cool as possible, and avoid placing it in contact with outside sources of heat, such as steam pipes and hot-air ducts. Protect bunkers from the heat of boilers and engines. Take the temperature of the coal at regular intervals, the oftener the better, if there is any tendency to heat. If the temperature reaches 100 deg. F. and is rising rapidly, move the coal to cool it off by contact with air, steam, or, in extreme cases, water. If water is used, burn the coal as soon as possible and keep it separate from the other coal, as the application of water to hot coal breaks it up and by thus exposing fresh surfaces renders it more liable to spontaneous combustion.

Provide an adequate steam supply, hose, pumps and other fire-fighting equipment, and always keep them ready for use. Some automatic fire-detecting apparatus in the pilot house or engine room is advisable.

Provide for the egress, before men enter places where coal is kept, of explosive and other gases that are given off by coal, and avoid open lights in cargo and bunker spaces. Clean the vents leading from bunker or cargo spaces after coal has been put in place.

Clean out thoroughly, when the ship goes out of commission, all spaces where coal has been kept, as fine coal left in corners and on ledges frequently fires. Do not run electric wiring, unless in metal conduits, through spaces in which coal is placed. Use every precaution to prevent sparking at electric contacts.

What Alternating Current Has Done to Increase The Application of Electricity to Mining

Great Flexibility of Alternating-Current Distribution System—Better Voltage and Better Operation—Simplicity of Control, Ease of Repair, Ruggedness of Construction of Alternating-Current Equipment

By Edgar J. Gealy
Electrical Engineer; Associate Editor, *Coal Age*

IN THE earliest coal mines the only form of energy used was human energy, supplied by men, women and children. Later animal, hydraulic, pneumatic and steam energy were added, while today we find included in the list that seemingly all important form of energy called electricity.

Electricity as used in the mines falls into two rather distinct divisions, namely: direct-current and alternating-current. Direct-current, being the more simple form of electricity, was early adapted to coal mining, another important reason for its early use in mining being the fact that direct-current motors better fitted requirements in the mines while alternating-current motors had not been developed to this degree. As long as direct-current was the only form of electrical energy in the mines electrical application was on a moderate scale.

More extensive development of electrical equipment has now placed the alternating-current machine in a position where its application to mining has so many advantages over the direct-current machine that it stands in a fair way to supplant the direct-current machine.

With the sole exception of the haulage locomotive there seems to be no piece of electrical mining equipment which cannot be operated as well on alternating as on direct current.

Economy of Alternating Current

Under the present stress of economic conditions it is imperative that everything be done to increase the tonnage of coal produced per man employed. This means that a greater amount of machinery must be used, and since this machinery evidently is to be driven by electrical equipment we are confronted with the problem of maintaining an ample supply of electrical energy so that each man may be able to get out a good day's work without any reasonably avoidable delay. To accomplish this it is important that the electrical energy be supplied at a voltage that will permit all the equipment to function both efficiently and economically.

With direct current it usually is necessary to limit the range of distribution to one mile for 250 volts and to four miles for 500 volts because this is the economic limit for these potentials. Beyond these distances so much copper would be required as to make the proposition impracticable. We frequently find that these limits are greatly exceeded, however, and it is here that one must realize the importance of that increasingly important subject, engineering economics.

To illustrate the conditions which arise on a long distribution line let us take a case where the voltage between trolley and rail is to be determined in a 250-volt mine using 4-0 copper trolley wire and a single 4-0 solid copper feeder in parallel, the voltage to be determined at a point 3,000 ft. from the direct-current generator and the current to be assumed at 500 amperes. Under these conditions the voltage drop would be 70, thus leaving only 180 volts between trolley and track at the point mentioned.

Standard electric motors are designed to operate satisfactorily at 10 per cent under voltage or 10 per cent over voltage. Obviously even with the large trolley and feeder in the above example the resultant voltage remaining is far too low to give satisfactory operation.

From the fundamental laws governing the drop of voltage in conductors we may draw two important conclusions: (1) With the amount of power to be transmitted and the distance fixed, if the loss is to be cut in two, the wire will have to be doubled with a given voltage; (2) if the percentage of loss is to remain constant and the voltage is doubled, the wire may be cut in four—that is, actually reduced to twenty-five per cent in size.

Advantages of High-Voltage Distribution

Obviously high voltage is one of the greatest boons to electrical transmission. With a direct-current system the only feasible means of changing the voltage either up or down is by the use of a motor-generator set that is expensive, relatively inefficient and also requires more or less attention. With an alternating-current system the voltage may very readily be either raised or lowered by means of a transformer, a piece of electrical equipment which operates at high efficiencies and with little or no attention.

From this it is evident that the direct-current system is limited to those installations where all the energy is to be used within a relatively short distance of the power plant, whereas the alternating-current system lends itself to an almost unlimited distance for distribution. As the workings of the mines are extended and it becomes increasingly more difficult to keep up the voltage at the face the alternating-current distribution system increases in importance and economy.

Frequently a new mine is opened and developments at first are carried on in a small way with direct-current used for the distribution of electrical energy. If the mine succeeds this is almost invariably found to be a mistake because as the operations become more extensive in both distance and electrical needs, greater capacity is demanded in the equipment for converting alternating current to direct current or better voltage is needed at the face, which will require increase in voltage or extensive layouts in copper feeders.

Aside from the advantage gained by the use of smaller conductors used on alternating-current systems we have the added advantage of greater flexibility with the use of alternating current.

Transformers may be installed in almost any part of

the mine and, where necessary, they may be enclosed in fireproof concrete vaults, making the possibility of damage from fire very remote. The locating of the transformers near the place where the energy is to be used makes possible the transmission of almost any conceivable amount of available capacity. With the alternating-current system it is a very simple matter to extend the system at any time, stepping up the voltage when necessary to get to any remote point.

Under the present high stage of development of the alternating-current induction motor its application to various forms of drives has been markedly successful. The three-phase motor is most generally used and depending upon the frequency and number of poles in the stator winding practically any desired speed may be obtained without any additional control equipment outside of a starter. These advantages make it possible to apply the induction motor to a large number of applications and greatly simplifies the gearing system, in fact, the gearing may be entirely eliminated in many cases.

The squirrel-cage induction motor has been extensively applied to pumps and fans with conspicuous success, maintaining almost constant speed under wide variations in load. Here the ruggedness of the motor has proved itself, it having no commutator, but instead a simple rotor winding and a simple stator winding it is little affected by the mine humidity or splashing of water from the pump or fan. Another advantage is the relative ease with which a temporary repair can be made when a coil or coils in the stator break down; in this event it is rarely necessary to do more than "cut-out" the bad coil or coils by making a reconnection on the ends of the winding, which are easily available. Frequently important motors have been successfully operated for days and weeks with as much as 15 per cent of the winding "cut-out" until repair parts were received and the repair made.

We therefore find that the use of alternating current enables the engineer to maintain better voltage for all equipment, renders the energy distribution system more flexible, effects greater simplicity, lessens the need for repairs, affords larger assortment of equipment at lower cost and better deliveries.

Engineers, Scientists and Editors Plan Uniform Symbols and Abbreviations

A RECENT meeting held in New York City under the auspices of the American Engineering Standards Committee to further discuss the desirability of and procedure to be followed in establishing a unification of technical and scientific abbreviations and symbols was attended by a large and representative group of engineers, scientists, government officials, business-paper editors and industrial executives.

It was agreed that the standardization would result in inestimable mental economies, as the present situation with respect to the use of scientific abbreviations is comparable to a language that has degenerated into a multiplicity of dialects.

Abbreviations and symbols constitute an ever growing and important part of the language of the sciences. The use of one symbol or abbreviation for several different terms or meanings and the use of several different symbols or abbreviations for one meaning at present cause much confusion and often serious errors.

The conference was originally called by a limited group of engineering societies but after some discussion of the subject it was thought desirable to include as a part of the project the graphical symbols which are used in engineering drawings, diagrams, and the like, for representing instruments and apparatus and components of them. Here, it was thought advisable to obtain the co-operation of foreign standardization bodies in the work on account of the international character of much engineering and scientific work.

The work will go forward under a committee organization in accordance with the rules and procedure of the American Engineering Standards Committee.

Submits Tentative Standardization of Anthracite Names and Sizes

The Subcommittee on Standardization of Anthracite Sizes of the American Society for Testing Materials has prepared a tentative schedule of names, sizes and screen specifications for testing anthracite.

The following is a list of the names and sizes now used or used in the past:

ANTHRACITE SIZES, IN INCHES

	Round		Square						
	Through	Over	Through	Over	Slate, Per Cent	Bone, Per Cent	Total, Per Cent	Large, Per Cent	Small, Per Cent
Lump (Steamboat)	7	4½	6¼	4	..	..	..	5	10
Broken (Furnace)	4½	3¼	4	2¾	1	2	3	5–9	5–10
Egg	3¼	2¼	2¾	2	2	2	4	5	10
	3	2⅜	..	..	..	..	..	...	None
	..	2	..	..	..	..	..	...	.....
Stove	2¼	1⅝	2	1⅜	4	3	7	5	10
	2⅛	1⅜	..	..	..	.	..	...	None
	2	1⅜	..	..	..	..	..	...	.....
Chestnut (Nut)	1⅝	⅞	1⅜	¾	5	5	10	5	15
	1⅜	¾	..	..	..	..	..	...	.....
	1⅛	..	..	..	..	..	..	...	.....
	1	..	..	..	..	..	..	...	.....
Pea	⅞	9/16	¾	½	10	10	10	5	20
	¾	⅜	..	..	..	..	..	...	.....
	..	½	..	..	..	..	..	...	.....
Buckwheat	9/16	5/16	½	¼	15	15	15	...	15
	⅜	⅜	..	..	..	..	..	...	.....
	½	..	..	..	..	..	..	...	.....
Rice (Buck. No. 2)	5/16	3/16	¼	⅛	..	..	..	...	15
Barley (Buck. No. 3)	3/16	3/32	..	..	..	..	..	...	.....
		1/16	..	..	..	..	..	...	.....
Birdseye (Boiler)	5/16	1/16	..	..	..	..	..	...	.....
Culm (Slush)	1/16	3/32	..	..	..	..	..	...	.....

These are the sizes recommended by the subcommittee:

	Round-Hole Screens Through	Over		Round-Hole Screens Through	Over
Steamboat	7	4½	Pea	⅞	5/16
Broken	4½	3⅜	Buckwheat	9/16	5/16
Egg	3⅜	2⅜	Rice	5/16	3/16
Stove	2⅜	1⅝	Barley	3/16	3/32 or 1/16
Chestnut	1⅝	⅞			

Class 1 Railroads Consume 9,451,000 Tons Of Coal in February at $3.72 per Ton

Class 1 railroads of the United States consumed 9,451,000 net tons of coal during February, 1923, as charged to account 394, compared with 10,358,000 tons during the preceding month and 7,842,000 tons in February, 1922, according to a recent report of the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. During the first two months of 1923 these roads consumed 19,810,000 tons as compared with 15,968,000 tons during the corresponding period of 1922. The delivered cost per ton in February last was $3.72 compared with $3.55 for the corresponding month of last year.

Consumption of fuel oil during February totaled 135,537,000 gallons compared with 150,317,000 gallons in January and 110,679,000 gallons in February, 1922. The totals for the first two months of 1923 and of 1922 were 285,850,000 and 234,526,000 gallons respectively.

Handling and Testing Armatures

Careful Packing Especially Essential—Handling at Mines Should Be Done with Due Consideration of Dangers—Testing on Receipt of Armature Will Avert Considerable Annoyance and Expense—Methods of Making Tests

ALL reputable manufacturers and repair shops where armatures are either built or repaired have a regular system of testing them during the process of manufacture or repair and also upon completion. This is especially necessary with equipment used about the coal mines because of the severe conditions under which the armatures must work and the expense and inconvenience occasioned whenever one of them breaks down or must be taken out of a motor for any reason.

The reliability of such tests depends upon the persons conducting the test. For the most part these testers have become very proficient, due in part to the elaborate system of checking back upon any particular tester in case any equipment leaves the shops and is reported defective upon arrival at its destination.

There are so many important points to be considered in the handling of an armature around the coal mines that we shall single out only a few and give them our consideration.

Proper connections and insulation are the most important features in connection with all electrical equipment from the standpoint of maintenance.

The most delicate parts of a direct-current armature are the commutator and the coil ends, or turns. When lifting an armature special care should be taken of these parts and it is advisable to use a lifting band or sling whenever possible. A lifting band should be made of

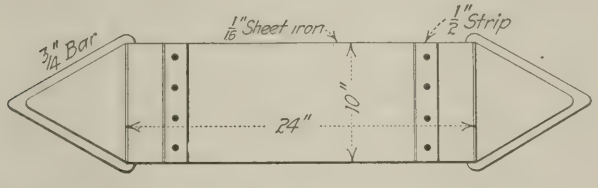


FIG. 1—LIFTING BAND FOR ARMATURES

The band is used around the body of the armature, thus forming a sort of hammock for carrying the armature instead of sliding or rolling it and causing damage to the winding.

sheet iron sufficiently flexible to be placed around the body of the armature as shown in Fig. 1. Such a lifting band is fitted with handles of sufficient strength to carry any weight to which the band may be subjected when lifting the heaviest armature.

If a sling is used it should be placed over each end of the armature shaft and a brace placed so as to prevent the rope from crowding against the commutator or coil turns, as shown in Fig. 2.

Great care should be exercised whenever an armature is boxed for shipment. Improper boxing of an armature being sent away for repairs has frequently increased the damage to the armature and necessarily the expense of the repair work which must be done.

The armature box used for shipping should be so constructed that the armature will be supported by its shaft, regardless of the position into which the box may be tipped during shipment. When the armature shaft is short and does not extend far enough outside the ends of the commutator bars, it can be extended by a short piece of pipe slipped over the end of the shaft. Care should be taken here to block the end of the pipe so that it cannot shift and thus allow the armature to drop.

To fasten the lid on the box it is always preferable to use screws, as their use gives the box greater strength, and they are more likely to be properly placed so as not to damage the armature. If nails or screws are used in the construction of the box, great care should be exercised so that they do not injure the winding on the commutator.

When moving armatures about the colliery, they should never be rolled, as such a procedure, although too common, aside from forcing particles of dirt, coal, metals or other foreign materials into the coils, also strains the laminated core, which shifts and chafes or cuts the insulation of the coils in the slots of the armature. The proper way is to support the armature shaft in a kind of cradle (as shown in Fig. 3), similar to a stretcher with two handles at each end. The armature should be further protected against moisture and mechanical injury from falling objects.

When a new or repaired armature is received, it should be unpacked at once and given a careful inspection and a thorough test. In some instances such a procedure discloses a fault which, if found in time, will not only prevent more serious damage but will also save the work and inconvenience of assembling an armature in a motor only to find it defective.

One of the first things to be done with a new or repaired armature is to look it over very carefully for any outward appearances of damage or wrong assembly. This inspection consists in examining the coils, which should not be broken, improperly insulated, or not well down in position. The commutator should be examined for high, low or rough spots, or short-circuited bars. The clearance of the coils when the housings are in place should be examined, and the shaft and bearings should be examined for a true fit. After this is done the armature should be tested for electrical faults. A test should be made for grounds in the coils or commutator, for short-circuits in the coils or commutator and for open circuits in the winding. The equipment necessary for the above-mentioned tests consist, in their simplest form, of a telephone receiver, a buzzer, a battery and a few pieces of wire. All colliery electricians should supply themselves with this simple testing set for any emergency. Let us assume we are going to test an

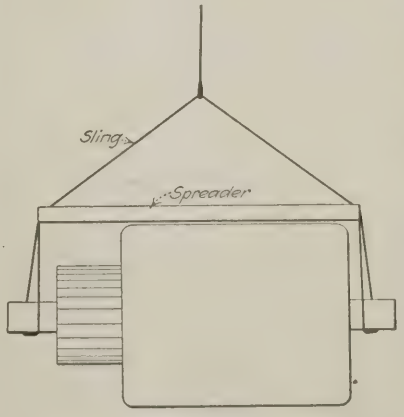


FIG. 2—ARRANGEMENT FOR SLING

The sling is kept from crowding into the commutator and coils by means of a brace. Frequently considerable damage is done by carcless use of chains and ropes used as slings.

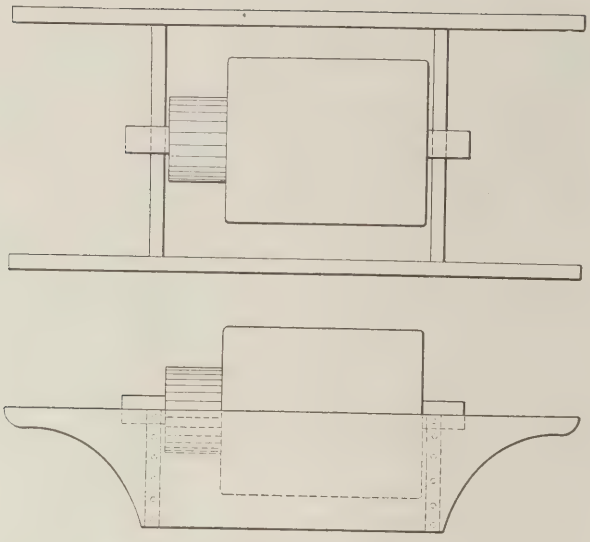


FIG. 3—ARMATURE CARRYING BOX

An unnecessary expense in repairs to armatures can be avoided by furnishing a supply of boxes similar to the above. These boxes can be used to transport armatures to all parts of the mines with reasonable safety.

armature for an open-circuited coil. This test is essentially the same as the test for a short-circuit coil. First of all we will connect a buzzer and battery in series as shown in Fig. 4; the free terminal of the buzzer and the free terminals of the battery are placed on the commutator say about 10 to 15 bars apart on the average commutator. As soon as this is done the buzzer will start to vibrate because the circuit is now closed through the winding on the armature; next the two terminals of a telephone receiver are put on two adjacent commutator bars about half way between the two terminals of the buzzer circuit. If the coil connected to the two bars to which the telephone receiver is connected is all right there will be only a slight vibrating sound in the receiver, because the receiver is shunted on the coil. If there is a loud sound in the receiver then there is an open circuit in the coil and the receiver terminals are not shunted by the coil, hence the loud sound in the receiver. If there is very little or no sound in the receiver then the coil or the two commutator bars are short-circuited. This test is carried on all around the commutator in this way until completed, always keeping the receiver terminals about half way between the buzzer circuit terminals as all four terminals are moved around the commutator during the test. If an open circuit is found it will be well first to examine the connections to the commutator bars, as the trouble may be there; otherwise the trouble will be found to be in the coil. If a short-circuit is found examine the commutator bars and see if the bars are short-circuited, especially at the necks of bars and at the mica between the bars. If necessary disconnect the coil from the commutator bars and test to find out whether the short-circuit is in the coil or in the bars.

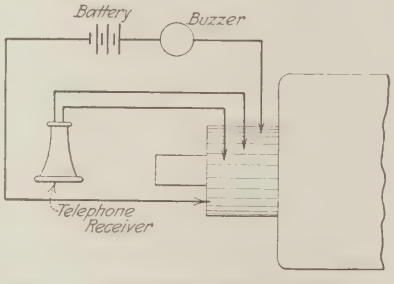


FIG. 4—TESTING FOR OPEN- OR SHORT-CIRCUITS

The bar-to-bar test will readily locate defects. Sometimes it will be necessary to disconnect the coils from the bars to localize the trouble.

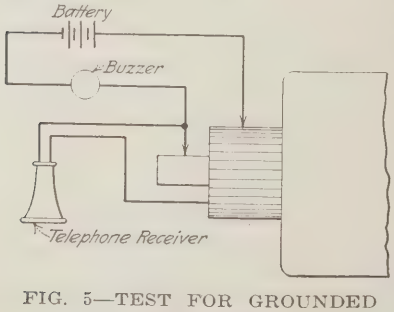


FIG. 5—TEST FOR GROUNDED COILS OR BARS

Grounds usually are easily detected, but sometimes difficult to localize. A little experience with this outfit will enable the operator to localize the ground by the variations of the sound in the receiver.

Fig. 5 shows the arrangement for testing the armature for grounds. Here the battery terminal is moved around the armature and when it comes to a grounded bar or coil the sound in the receiver stops or becomes very weak. In this way the grounded bar or coil can be located, and here again it is advisable to disconnect the coil from the bar so as to determine whether the ground is in the bar or the coil.

Would Organize Syndicate to Buy Cars and Apportion on Basis of Consumption

IN ANSWER to a question addressed to L. S. Evans, president of the Eastern Coal & Export Corporation, prompted by his article on ownership of coal cars (*Coal Age*, April 19, 1923), he has written the following comment:

"In reply to your letter of April 19, I am sure you are correct in saying that non-originating roads would not favor owning coal cars, and I do not blame them. So long as they can put this burden on the coal roads and collect revenue on coal tonnage carried in the other man's cars, they will be opposed to any plan having for its object the shifting of the financial burden to their own shoulders. The point is not the attitude of the roads, but the essence of the question is whether consumption or production is dominant.

"We have gradually come to view the railroads as facilities to give service to the public, rather than business enterprises promoted to pay dividends to investors. In consequence we have the Interstate Commerce Commission controlling the roads, with the public interest uppermost in their minds. On the other hand, purchasing of cars is left to the different roads, and is, therefore, made by and subject to the viewjoint of their owners. I mean that the railroads buy cars only when the pressure of necessity compels their purchase, and such pressure always comes after the needs of the public have exceeded the facilities of the roads.

"A way around a sudden reversal of the present practice would be the formation of a national car-owning company, contributed to by all the roads, which corporation or syndicate would buy coal cars as a pool and distribute them to the different roads on the basis of coal consumption thereon.

"The opposition of non-originating roads is in itself not an argument against the idea, and the point is to arouse discussion and have the opposing roads state valid reasons and facts to support their point of view. Something must be done in this country to remedy the defects in coal distribution, or the uninformed public, in conjunction with the ignorant labor unions, in the mass will bring about nationalization or some other form of socialistic control."

EVIDENTLY THOSE VICTIMS of that Herrin mob committed suicide.—*Greenville Piedmont.*



Screening, Dry Cleaning, Aspirating and Dust Collecting At Brilliant Mine in New Mexico*

Coal Under One-Inch Diameter Sized on Two Banks Each Consisting of Five Ascending Screens — Oversize Cleaned on Two Spirals — Coal Under One-Sixteenth Inch Aspirated—Minor Mechanical Difficulties in Operation

By F. A. Young
Chief Engineer, St. Louis, Rocky Mountain & Pacific Co., Raton, N. M.

ORIGINAL in most of its features is the dry-process cleaning plant built and operated by the St. Louis, Rocky Mountain & Pacific Co. adjacent to its mine at Brilliant, N. M. The equipment consists, primarily of screens for separating the coal into five different sizes all smaller than 1 in., an aspirator for preparing a sixth size and pneumatic machines each cleaning one of the six sizes. These machines are patented and were manufactured by Sutton, Steele & Steele, of Dallas, Texas., until a few months ago, when all the selling rights were acquired by the American Coal Cleaning Corporation.

These screens (see Fig. 1) are called anti-gravity screens because the coal travels uphill. The screens at Brilliant are 3 ft. wide and 7 ft. 4 in. long. They consist of one upper deck having a screen of wire mesh which slopes upward at an angle of 12 deg. in the direction in which the coal flows. Under this is a lower deck sloping in the same direction at an angle of 7 deg. and having a solid bottom. This deck advances the undersize to the next screen.

These decks are about 11 in. apart at the discharge end. Owing to the pitch in the lower deck and the fact that the undersize is carried upward it is possible to place any number of screens on a level floor, the coal from one screen falling a few inches onto the upper deck of the screen next in line. This is one of the most valuable features in this arrangement, for the coal does not have to be elevated or rehandled in any way.

The oversize may be taken off on either one or on both sides. The length of the screens corresponds to the proper spacing of the cleaning tables, which obviously are placed on the floor below. I know of no other screen which can be operated in this way. The coal is caused to travel by a reciprocating motion, a shaft with two eccentrics, one on each side of the screen, being placed under the screen at about its midlength.

The screen box is attached to the stationary underframe by means of cast-iron plates extending across its full width. These are placed at an angle, as shown, so that the forward motion of the eccentrics causes the screen box to rise as it moves forward and the backward motion drops the screen from under the coal, thereby causing it to advance. The coal, advancing over the screen cloth in this rolling or jumping motion, is sized most effectually. It should be stated here that accurate sizing is necessary for the success of the cleaning tables. The stroke of the eccentric is 1 in. and the speed 350 r.p.m.

The pneumatic cleaning table works on the principle that when a film of coal 1 to 2 in. thick, the individual pieces of which are nearly all of the same size, is placed on a flat perforated surface and a large volume of air passed through it, the lighter particles, which are the clean coal, soon find their way to the top of the film, whereas the heavier particles, or waste, remain on the bottom.

The machine is built with a perforated deck about 4 ft. square under which is an air chamber and air duct connecting with a fan which is part of the machine.

*Article entitled "Dry Cleaning Coal at Brilliant Mine," read before Rocky Mountain Coal Mining Institute Feb. 27, 1923.

Note—Headpiece shows dry-process coal-cleaning plant at Brilliant Mine, the trestle from the mines and the tipple. Note the conveyor shed by which the cleaned coal is returned by a belt conveyor to the tipple for mixing with the run-of-mine if desired. The cleaned coal also can be delivered from a storage bin to cars spotted at proper points alongside the building.

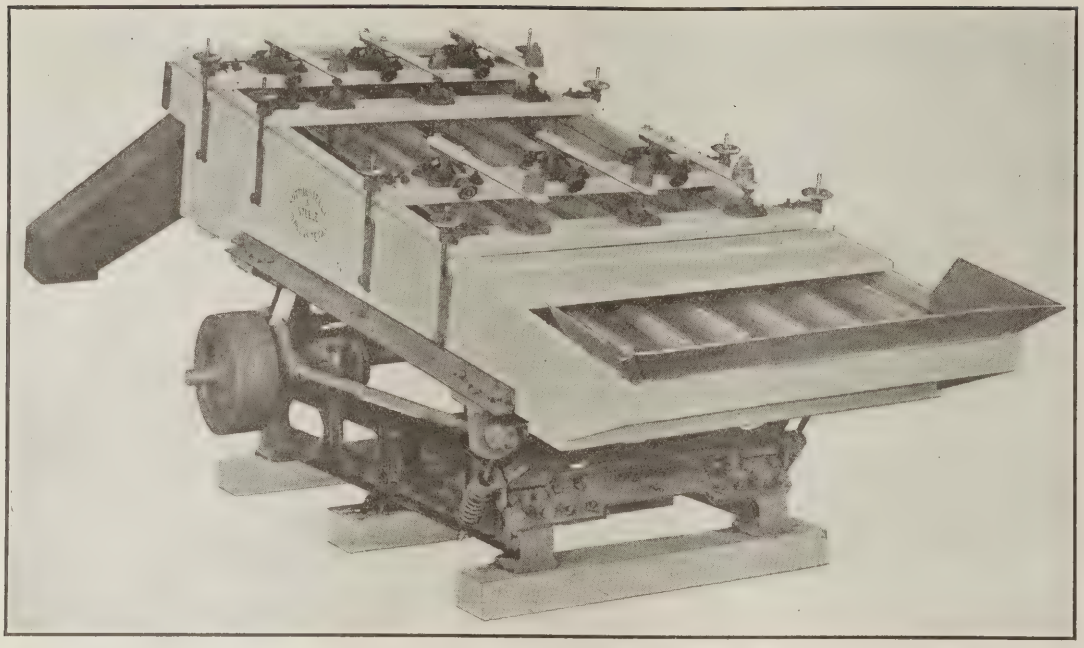


FIG. 1

Screening Table

The lower or feed end of the table is provided with a guard plate so that the air will not be sucked in by the dust hood except from over the screen. The eccentric will be noted by which the screen is shaken in strokes of one inch amplitude. The eccentric shaft makes about 350 r.p.m., the number being variable at will.

The deck of the table has a reciprocating motion the same as that of the screens already described. This tends to advance the product up a slight adjustable slope. The coal is fed at one corner of the table as shown, and the deck slopes away from the feed and at right angles to the reciprocating motion. On top of the perforated deck are riffles about 2 in. apart, running parallel to the line of reciprocation. These riffles are about ½ in. high at the fan and feed side of the table and taper to nothing at the far side.

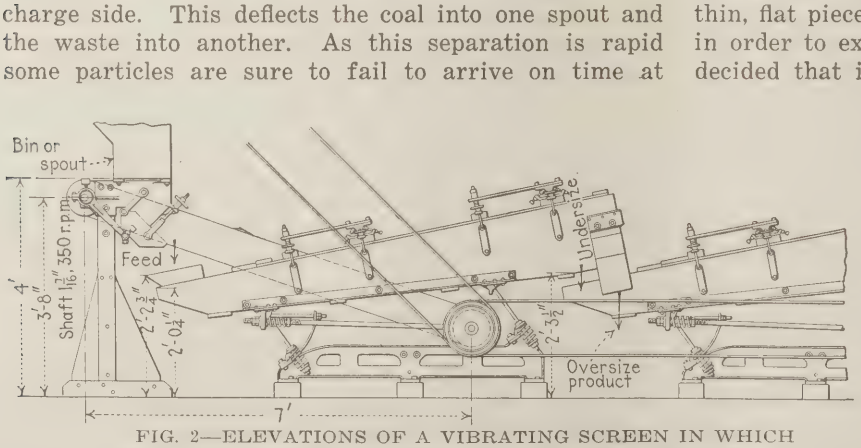
When coal is fed onto the table, the air passing through the perforations tends to raise it and roll it over these riffles down the slope toward the clean-coal discharge. The heavier particles do not get over the riffles as rapidly as the lighter ones, and the reciprocating motion is constantly pushing them toward the far side, where the waste is discharged. With these two actions constantly at work and tending in directions at right angles to each other and with the slopes in two directions nicely adjusted, a line is formed in a few minutes between the coal and the heavier particles, the line being near that side of the table which is opposite the fan.

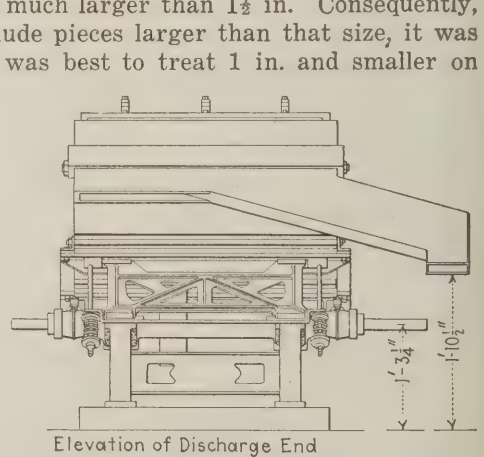
A splitter board is readily adjustable along the discharge side. This deflects the coal into one spout and the waste into another. As this separation is rapid some particles are sure to fail to arrive on time at their proper position. For this reason it is advisable to make a third product, middlings, and this product is taken back and sent through the entire process for a second trial.

As this method of cleaning depends for its success on the difference of specific gravity between the coal and the impurity, it will of course work better when the refuse is slate or rock than when it is bone. There is, however, another important factor. Not only must the pieces treated be all of the same size but also all of the same shape. A slate impurity is sometimes thin and flaky, and in that case it is difficult to separate.

At our Brilliant mine the impurity is nearly all slate, some of it in thin flakes. At our Koehler mine the impurity is mostly bone. This material breaks into pieces of the same shape as the coal. In a full day's test run on Koehler coal we were surprised to find that it was cleaned even more effectually than that from the Brilliant mine.

This latter mine produces about 800 tons in 8 hours. Our intention was to clean in this plant such coal as would pass through a 1½-in. bar screen. This appeared by test to be about 75 per cent of the total output. It was known that these screenings would contain many thin, flat pieces much larger than 1½ in. Consequently, in order to exclude pieces larger than that size, it was decided that it was best to treat 1 in. and smaller on





Elevation of Discharge End

FIG. 2—ELEVATIONS OF A VIBRATING SCREEN IN WHICH OVER- AND UNDERSIZE BOTH TRAVEL UPWARD

In the early days of the industry the point of feed of a screen was much above the point of discharge. With the introduction of shaking screens it became possible to lessen the difference between them. Finally someone bolder than the rest, desiring to save tipple height, made the screen bed level. Here is a series of screens in which each screen is level with its predecessor but nevertheless is fed from it. To do this the undersize travels on an upward grade of 7 deg. and the oversize on a grade of 12 deg. The movement of the screen is only one-inch and the action one of vibration rather than of shaking. Each screen reciprocation is independent and out of step with the rest, thus vibrating the screen without excessive vibration of the structure in which it operates. Five screens are set in one bank, the undersize traveling from one screen to the next.

the pneumatic tables. The experience in tests made confirmed us in that opinion. In consequence two spiral separators were installed for cleaning the larger sizes.

The plant was planned to take the screenings direct from the tipple to the cleaning plant and to return the cleaned coal to the tipple either for mixing with the hand-picked lump to make a clean mine-run or for shipment as a stoker coal, all the cleaned sizes being combined for that purpose. In order that a belt conveyor rather than an elevator might be used to bring the raw coal to the cleaning equipment, the plant was placed 230 ft. from the tipple. A 30-in. belt conveyor 250 ft. long between centers and having a rise of 63 ft. takes the raw coal from the tipple to the plant.

This discharges into a revolving screen 5 ft. in diameter and 13 ft. long. The upper 8 ft. of this screen has 1-in. square perforations. The undersize drops into a 30-ton bin which supplies the anti-gravity screens. The lower 5-ft. section of the revolving screen has 1½-in. square perforations, and the undersize drops to a 5-ton bin which supplies the left-hand spiral. The oversize of the 1½-in. screen goes to another 5-ton bin which supplies the right-hand spiral. These three bins discharge at a point about 4 ft. above the screen floor, which floor is 48 ft. above the ground.

The anti-gravity screens are placed in two batteries of five each, 8 ft. 3 in. apart from center to center and equidistant from the center line of the building. The No. 1 screens are each fed from the 30-ton bin by a reciprocating feeder which delivers coal over the full width of the screen. These feeders as well as those for the cleaning tables are patented by Sutton, Steele & Steele. They admit of accurate adjustment and are satisfactory in every way.

The screen meshes are as follows: ¾ in., ½ in., ⅜ in., $\frac{3}{16}$ in. and $\frac{1}{16}$ in., the first two being square mesh and the other three "ton-cap." The oversize from each screen is spouted to a steel pocket of about one-ton capacity which is hung from the bottom of the screen floor beams. These pockets are directly over and spaced exactly to suit the cleaning tables on the floor below.

The coal from the two small bins is fed to the spirals by small shakers of the Parrish type. Spirals for cleaning bituminous coal have a bad name because they do not clean satisfactorily all kinds of bituminous coal. Before adopting them we visited a large plant in Illinois where the results seemed to us to be poor, and a small plant in Oklahoma where the results were good. Much criticism is heard at Brilliant, largely, I think, because the 25 per cent of bright clean coal of this size in the waste pile shows up quite plainly, whereas at a wet washer, where the presence of the coal in the refuse could not be seen but could be ascertained only by analysis, a waste containing an equal percentage of coal would be considered acceptable.

In spiral cleaning, as you know, the specific gravity of the materials has nothing to do with the results. The difference in the coefficient of friction makes the separation. On steel chutes coal slides more rapidly than slate or bone and by centrifugal force is thrown over the side of the spiral chute into the outer collecting spiral. The slate, as it travels only slowly, stays in the inner spiral to the lower end, which thus becomes the waste chute.

Remember that the material, particularly the waste, must slide and not roll. Therefore, if the impurities in any coal are inclined to be round or cubical in shape they cannot be removed by spirals. At Brilliant the impurities are largely thin, flat pieces of slate. In every full-day test we have made of Brilliant coal the spirals cleaned as well as the ¾-in. pneumatic table. One full-day run of Koehler coal showed equally good results. We lately tried cleaning 3-in. to 1½-in. nut coal from the Sugarite mine. In this test the results were not at all good.

The waste from the spirals is conducted in chutes to a cross conveyor where it combines with the other waste and is taken to the waste pile. The clean-coal discharge is so arranged that it can either be mixed with other sizes in the main clean-coal bin or diverted to a sep-

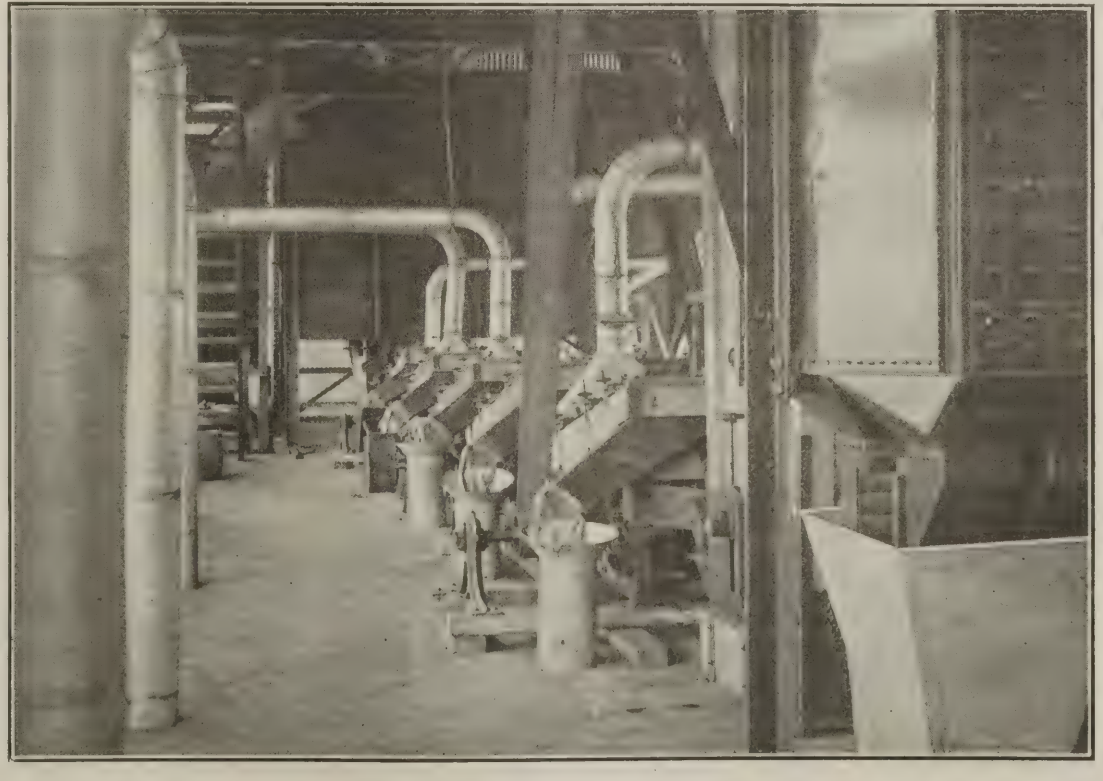


FIG. 3

Battery of Screens

The oversize is taken off at the upper end of the screen and goes by a chute spout to a vertical pipe leading to a small bin over a coal-cleaning table on the floor below, a cloth hood being used to prevent the escape of dust. It will be noted that dust-collecting hoods are placed over the point at which the undersize of the one screen is delivered to the top of the next for further screening.

arate bin on the other side of the building, from which it can be loaded into railroad cars as a pea coal.

To return to the anti-gravity screens, the last unit in each battery takes off the particles larger than $\frac{1}{16}$ in. At most mines it would not be worth while to screen or clean coal smaller than that, but at Brilliant this size contains more impurity than any other. It seemed to us easier to remove the dust from this last undersize by air than by screening.

Sutton, Steele & Steele make a machine for this which they call an aspirator. It consists of an inclosed chute 1 in. deep and 30 in. wide on a 50-deg. slope which joins another vertical chute which has the same dimensions at the junction point but is widened at the top and bottom, the top being converted into a 10-in. circular pipe which leads to a suction fan, the bottom becoming a discharge. The coal is taken from the undersize delivery of the last screen by a small bucket elevator about 12 ft. high and is delivered through an inclosed spout to the aspirator.

The fine coal thus joins the air current in a thin, wide stream. The velocity of the air at this junction slot is about 7,000 ft. per minute. Nearly all the dust below 60-mesh is removed. The coarser particles from 60-mesh to $\frac{1}{16}$ in. drop into a pocket over the No. 6 cleaning table.

The pneumatic tables occupy the floor below the screens. They are placed in two batteries, right and left, under the steel pockets as shown. The same type of feeder as is used as for the screens, but the feed is only 12 in. wide. This removes the coal from the steel pockets and delivers it to the tables. The table completely reciprocates 350 times per minute, each stroke being $\frac{5}{8}$ in. long, but a pair of cone pulleys provides adjustment so that the number of reciprocations can be increased or decreased about 50 strokes per minute. The fan for each machine has its own speed of operation. The speeds are as follows: No. 1 table, 1,040 r.p.m.; No. 2 table, 1,040; No. 3 table, 1,540; No. 4 table, 1,000; No. 5 table, 1,000, and No. 6 table, 900. As may be noted from the plan, the clean coal drops directly into a storage bin occupying the next lower section of the building.

The lower part of this bin is provided with gates and chutes for loading railroad cars alongside the building and on the underside are pipe outlets delivering to a belt conveyor which takes the clean coal back to the mine-run car at the tipple. This conveyor must stop when the tipple stops, and when this occurs the pipe outlets soon fill up at the belt and stop automatically. The middlings from both batteries of tables are delivered to a single belt conveyor which leads to a bucket elevator at the end of the building. This discharges into the 30-ton storage bin. The waste from each battery of tables falls onto a separate conveyor and each of these delivers to a cross conveyor which takes all the waste out of the building and delivers it to the waste pile.

This completes the description of the process except for the dust-collecting apparatus. It was known from the beginning that we would require such a unit; first, for the operation of the aspirators and, second, to free the building from dust. The one installed is manufactured by the Clark Dust Collecting Co., of Chicago, and is designed specially for our needs. It consists primarily of a 60-in. Claridge fan placed between two collecting cones, or cyclones, as they are often called.

The fan draws air from the sources of dust through headers and through branch pipes through the first cone and through the fan and then forces it through the second cone, discharging it to the atmosphere. The precipitation of dust is nearly perfect. The difficulty is to get the dust into the pipes. We tried to place dust hoods at all points where dust was liberated. These hoods will not get much dust unless the air enters at high velocity. The cross-sectional area of the hood opening must be no greater than that of its conductor pipe.

The pipe branches to the hoods generally were of 7-in. diameter and the hood 30 in. wide. Therefore the



FIG. 4

Coal-Cleaning Tables

Coal comes to these tables from the screens above, which are so spaced as to deliver the coal at the desired point. Three kinds of material are made on the table — coal, middlings and refuse. The middlings are taken back to the main feed bin, resized and given a second cleaning. This continues until they ultimately line up either with the coal or the refuse. In the end there is no middlings product, only clean coal and waste material

width of opening could be only about 1¼ in., but it is clear that a hood opening 30x1¼ in. will not reclaim dust from a wide area. We placed one hood at the discharge of the raw-coal conveyor, one at each anti-gravity screen feed, one at each screen discharge and one large pipe to each aspirator. On the cleaning floor one hood was placed at the feed of each cleaning table. The revolving screen had no dust hood, and we soon found that it produced much dust.

We partly inclosed it and placed a collector branch in one side of the housing. Though this improved the dust-collecting qualities, the hoods still do not collect nearly all the dust. At the cleaning tables the condition is worse. The hood at the feed collected much dust but a greater quantity was liberated after the coal had spread out on the table. To collect this is difficult, perhaps impossible. About 6,000 cu.ft. of air per minute comes up through the table deck. Even a 9-in. pipe and hood would take only about 1,500 cu.ft. Consequently the floor containing the cleaning tables is still a dusty place.

The application of power was planned as follows: On the screen-room floor a 50-hp. motor was placed which drove a line shaft running across the building on the level of the floor beneath the revolving screen. From this line shaft belts were run to the raw-coal conveyor, the revolving screen, the middlings elevator and the anti-gravity screen.

On the cleaning-table floor a 100-hp. motor was placed driving a line shaft on one side of the building. This in turn drove a similar shaft on the opposite side. These shafts drove the table fans directly through belts and, by means of countershafts, drove the shafts of the eccentrics on each table, the conveyors and the feeders. Separate motors drive the dust-collector fans.

The conveyor galleries and the main building are constructed entirely of steel and are covered with corrugated iron and lighted by windows having steel sash. A plant outside the building furnishes steam heat. The electric wiring is all in conduit with dustproof light sockets.

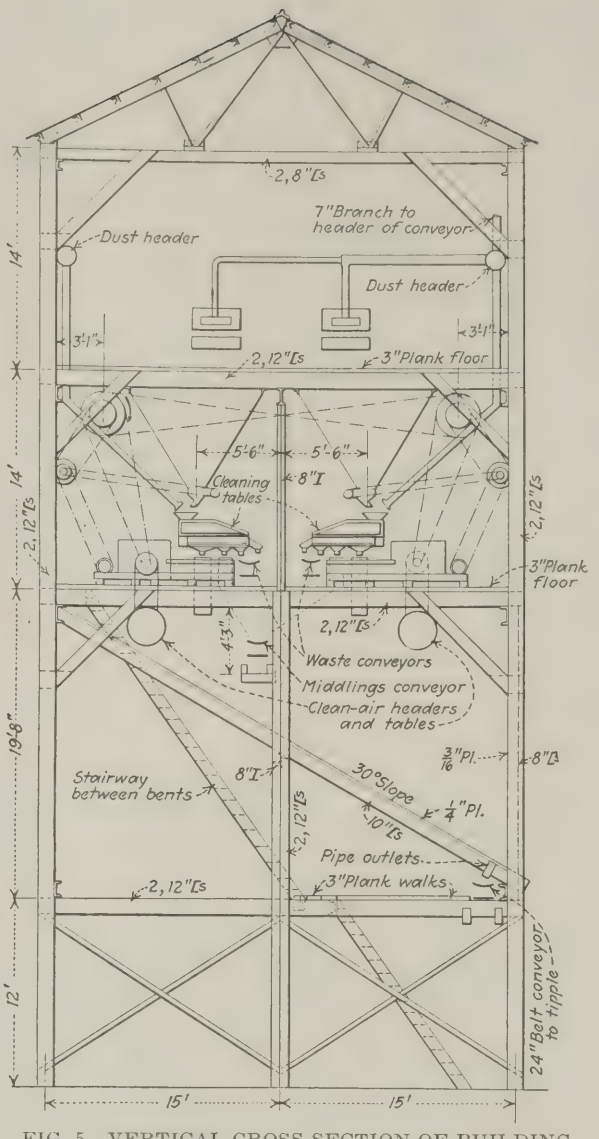


FIG. 5—VERTICAL CROSS-SECTION OF BUILDING

This elevation shows how the middlings and waste discharge of the tables are disposed of. The middlings and the waste each goes to its own conveyor. Note the almost vertical drives and the system by which clear air is taken to the tables and the dusty air is removed to the dust header.

Difficulties in Early Operation of Plant

From all this it might seem that the plant would work smoothly and without difficulty. Nevertheless there have been difficulties. First, these anti-gravity screens, although connected by chain drives to keep them out of step, cause much vibration. The floor beams of the screen floor were 12-in. I-beams 2 ft. 6 in. apart and of 30-ft. span. These were amply strong, but they had excessive vibration, so we ran a 12-in. I-beam under the center with 8-in. I-columns at each bent. This could be done, we found, without seriously obstructing the floor on which the cleaning tables operated.

Then, also, the dust was unpleasant and perhaps dangerous. Not only that, it stuck to the belts and pulleys and caused them to slip. Making the belts very tight caused great friction on the line shafts and nearly doubled the power required. You will note that the drives to the fans are not very good, being nearly vertical and having short centers. The main drive from the motor is not much better.

Not realizing at first that the friction of the tight belts would cause a great loss of power we put in another 100-hp. motor. Later we widened the belts and with less tension reduced the power to normal. The dust was still bad, so we installed another collector unit, dividing the headers between them. As the air was still dusty we covered all motors with airtight sheet-iron boxes or houses ventilated by intake and outlet pipes extending outside the building.

Then we were confronted with the greatest difficulty of all. The anti-gravity screens were supposed to operate at 300 strokes per minute and were so installed. At this speed the capacity was small. We had to increase the number of strokes to 350 to get 30 tons per hour with each battery. The eccentrics then began to break. We replaced them with wider and heavier eccentrics. Then the lugs to which the rods are attached began to break. We installed much heavier lugs, but then the pull-back springs began to break. The makers furnished heavier ones, but even now they often break.

The makers have devised and manufactured another screen of this type with a somewhat different driving mechanism which may be all right. If you buy any, first test them in an all-day run at full capacity. The cleaning tables work perfectly and never have needed repairs. All parts of the plant except the screens are now working satisfactorily.

As to the results of dry cleaning, the screens will

handle 30 tons per hour per battery and screen perfectly. Our experiences as to capacity of cleaning tables is as in Table I.

TABLE I—CAPACITIES OF TABLES AND SIZE OF COAL TREATED

Table	Size of Coal	Capacity, Tons per Hour
No. 1	1 in. to ¾ in.	12
No. 2	¾ in. to ½ in.	10
No. 3	½ in. to ⅜ in.	8
No. 4	⅜ in. to 3/16 in.	6
No. 5	3/16 in. to 1/16 in.	4½
No. 6	1/16 in. to 60-mesh	3

A fair average of cleaning is as in Table II.

If the dust were added to the clean product, as it would be in producing mine-run, the ash content would be 12.01 per cent. The ash in picked samples of clean coal runs from 8 to 9 per cent. Careful calculation from our analyses show that 72 per cent of the free impurity is removed. The quantity of waste is about 10 per cent of all raw coal coming to the plant.

At a dry-cleaning plant of this kind now being built at McComas, W. Va., each of the cleaning tables is to be operated by a direct-connected motor. This is in

TABLE II—PRODUCT RECEIVED AND DELIVERED BY TABLES

Table	Ash in Raw Coal, Per Cent	Ash in Cleaned Coal, Per Cent	Ash in Waste, Per Cent
No. 1	17	11	63
No. 2	17	10.5	65
No. 3	16	9.5	70
No. 4	18	10	66
No. 5	22	14	70
No. 6	25	19	70
Total	16.83	11.06	64.6

line with modern practice, but if you are going to build a plant do not forget about the dust. From our experience we conclude that a far better plan would be to place all motors outside the building and drive every unit from a line shaft.

The power required to run this plant is shown by meter readings to be 200 hp. Four men are required to operate it, a foreman and three laborers. The cost of constructing such a plant is perhaps 20 per cent more than for a wet-process plant. The cost of power is a little higher, but the labor cost is about the same.

There is, in my opinion, no good reason why this dry process should displace washing except in certain cases: First, if water is not available except at great cost; second, if the cleaned coal is to be shipped in railroad cars. In this case allowance would have to be made the customer for the water content, but someone would have to pay the freight on at least 6 per cent

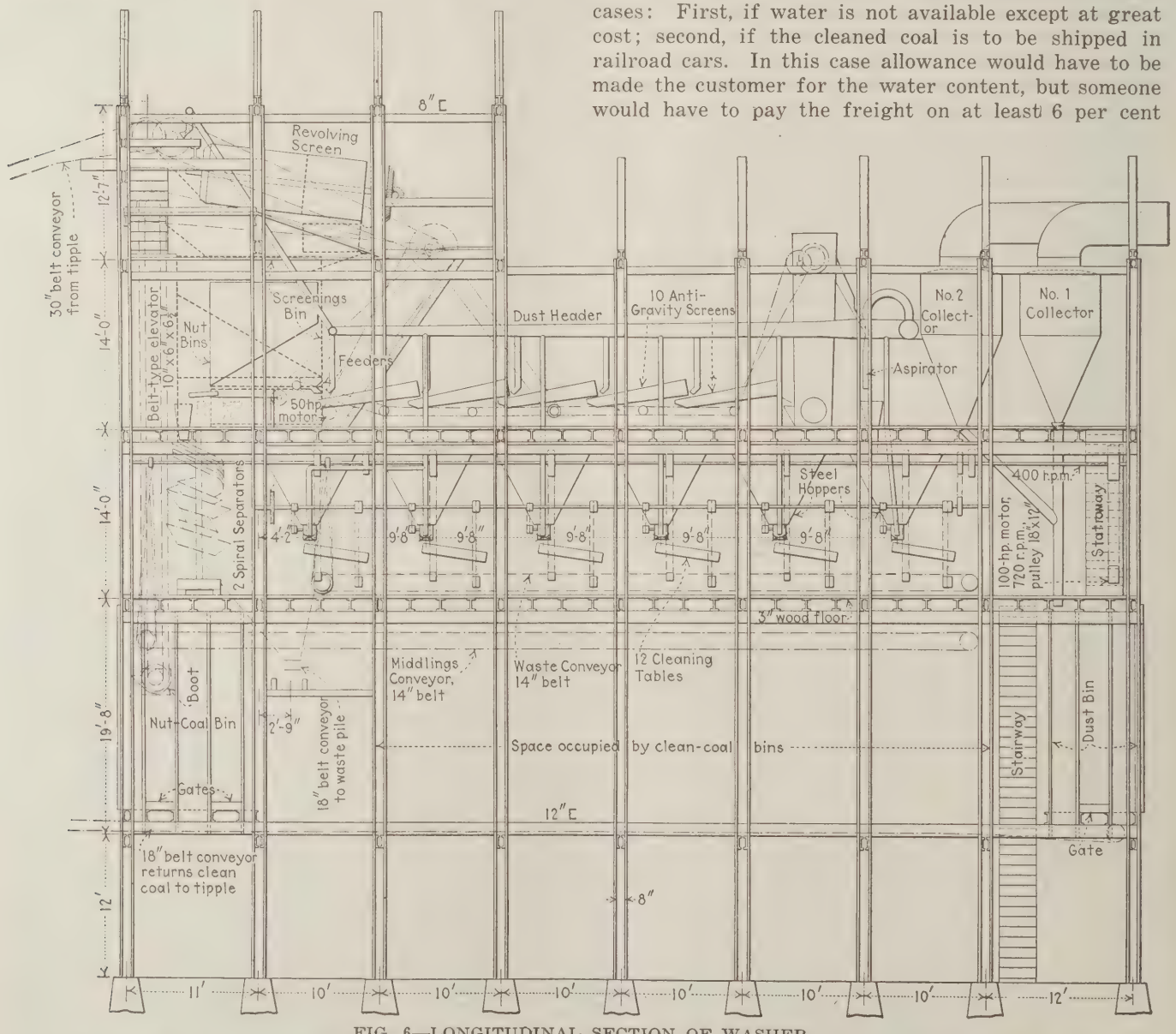


FIG. 6—LONGITUDINAL SECTION OF WASHER

This drawing shows the relation of the five screens in each bank to the six tables to which their product passes. It also shows the conveyors for middlings and waste. The space below the table floor is used for clean-coal bins. The system for removing dust also may be noted, as also the spiral separators and the drives.

of water. Third, if the coal is to be used at a powdered-coal plant. The size of coal prepared by the dry-process tables is finding an increasing market at plants which use powdered coal. At such plants fully half the machinery and more than half the expense is for drying the coal. At many mines such as Brilliant this dry-cleaned product if shipped in closed cars can go direct to the pulverizers without drying.

The steel structure and covering at the Brilliant plant was built by the Kansas City Structural Steel Co. after our plans and their own details. The conveying and transmission machinery and the revolving screen were furnished by the Link-Belt Co., and was, I think, perfect in every detail.

Paper Discussed at Rocky Mountain Session

At the completion of the paper, E. H. Weitzel asked what disposition was made of the middling product from the tables. Mr. Young stated it is sent back to repeat the process, over and over again, in a closed circuit, until it finally passes to the clean coal or the waste pile. In reply to a question by F. W. Whiteside, Mr. Young said the spiral could not handle wet coal. This agreed with Mr. Whiteside's experience, that as long as the coal was dry the spirals worked, but when the coal was wet they were no longer efficient. Mr. Young said the spirals are adjustable for various temperatures.

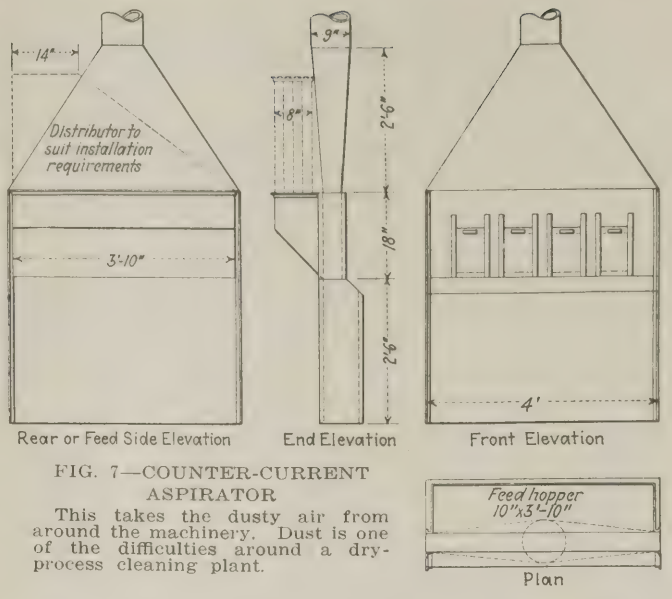


FIG. 7—COUNTER-CURRENT ASPIRATOR

This takes the dusty air from around the machinery. Dust is one of the difficulties around a dry-process cleaning plant.

Bureau of Mines Now Has Leasing Branch: Changes in Personnel

Continued growth of the U. S. Bureau of Mines, especially in the supervision of leasing operations on public lands, has resulted in the creation of a leasing branch within the bureau, the appointment of another assistant director, and several changes of personnel within the organization.

General operations under the leasing act of Feb. 25, 1920, development of lands in the naval reserves, and the supervision of operations on Indian lands have combined to make the federal government an outstanding factor in the production of minerals. Wells drilled on public lands, including the naval reserves, now produce approximately 3,000,000 barrels of oil monthly, or at a daily rate of 100,000 barrels. This production is outside of that from Indian lands. Coal leases and prospecting permits have been issued in fourteen Western states, in which the federal government is supervising the operation of 89 mines.

A. W. Ambrose, assistant director, has been placed in charge of the newly created leasing branch. He also will act as a consulting engineer to all branches of the bureau on matters relating to petroleum and natural gas.

D. A. Lyon, chief metallurgist and supervisor of stations, has been appointed assistant director in charge of the research branch, which includes the functions and scope of the former investigations branch after the elimination of leasing matters. For the present no appointment will be made to the position of supervisor of stations and Mr. Lyon will perform the duties of supervisor in addition to those of head of the research branch.

T. T. Read, having asked to be relieved from his position as chief of the information service and assigned to investigative work, has been appointed a supervising mining engineer. During the absence of F. J. Bailey, assistant to the director, on a visit to the mine safety cars and stations, Mr. Read will serve as acting head of the operations branch of the bureau and will later be assigned to appropriate field duties.

C. E. Julihn has been recalled from service as chief mining engineer of the War Minerals Relief Commission and made chief of the information service. Francis Winslow, now connected with the division of war minerals supply, has been assigned to serve with the War Minerals Relief Commission as chief engineer. J. W. Furness, who has been working with the war minerals supply division of the Bureau of Mines, has been given a permanent appointment in that division.

All of these changes and appointments became effective as of March 1, 1923.

How About Federal Ownership of Flivvers?

If Henry Ford believes in government ownership of railroads because the people should control their own transportation does he also believe in government ownership of automobile factories for the same reason? P. H. Greenlaw of the Fifth and Ninth Districts Coal Operators Association, in St. Louis, Mo., wants to know. He can't seem to get Henry Ford to answer, in spite of his best efforts to melt the wires between St. Louis and Detroit, Mich.

It all started when Mr. Ford was quoted sensationally about railroads and coal in the May issue of a magazine from the Hearst yellow presses. Among other things Mr. Ford was made to say: "No people can be free and go unrobbed who lack the power to move about and have their goods moved about without making terms with private interests." Reading this argument for government ownership of railroads, Mr. Greenlaw began bombarding Detroit with queries. He wired asking if Mr. Ford had been correctly quoted. Mr. Ford's first secretary replied he knew "nothing regarding statement reference to your telegram." Whereupon Mr. Greenlaw tried again, asking further if Mr. Ford favored government ownership of the automobile industry as well as railroads. Mr. Ford's second secretary replied that Mr. Greenlaw should write Mr. Ford a letter about it.

Mr. Greenlaw wired again and marked it "Personal." This time he said: "My inquiry needs no elaboration. It is simply: 'Are you in favor of government ownership of the automobile industry?' You surely would not advocate government ownership of property belonging to other people and be opposed to government ownership of an industry that enables one individual to pile up the wealth and power that the automobile industry has enabled you to secure." No reply. Mr. Greenlaw waited two days and then despatched another one saying: "Do you decline to commit yourself?" Still no reply.

So the country remains in ignorance of whether Mr. Ford would like to turn over his factory to the government along with all railroads so that the people "can go free and unrobbed," because they would then have "the power to move about and move their goods about without making terms with private interests."

Choosing and Operating an Underfeed Stoker

Light Firing at Short Intervals Early Found to Give Best Results—Equipment for Steam Plant at Mine Must Be Able to Meet Sudden and Wide Variations in Demand

OUT OF THE industrial revolution which took place in England during the eighteenth century came a number of basic inventions, many of which were in connection with the generation and utilization of steam. The improvements of the steam engine encouraged efforts to develop machines to be driven by it, which in turn called for improved means of generating steam. It is not surprising, then, to learn that the first stoker was introduced into England by Brunton back in 1822, over a century ago. We are perplexed, however, by the tardiness of industries in adopting the mechanical stoker. Only in the past few years has it been recognized as an aid to efficiency.

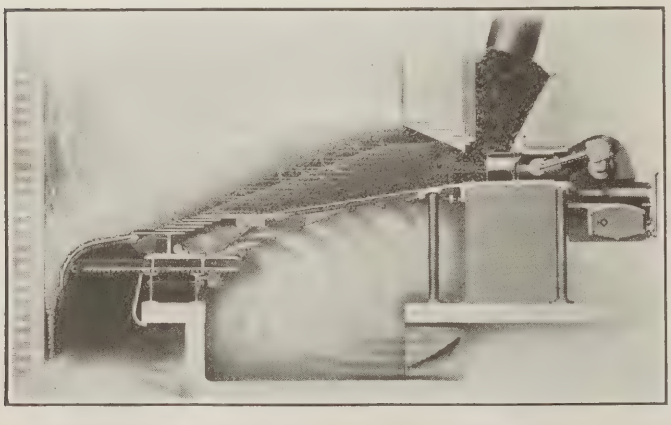
Steam is most extensively used in the railroad industry, where it is a direct agent of motive power, and it is here that one must turn for early methods in its generation. In the early days of little power and small trains light firing at short intervals was discovered to give best results, and it finally struck the locomotive fireman that his job was not to see how much but rather how little coal could be shoveled into the furnace and yet obtain satisfactory results. This led to the practice of loading several scoops of coal just in front of the furnace door, followed by the pushing ahead and the breaking up of the caked mass to allow a replenishment of fuel at the door. To this day the method of hand firing the locomotive has not materially changed, and this so-called coking method of hand firing furnaces was used in many industries prior to the introduction of the stoker.

It was learned also that to load coal into a furnace promiscuously was to defeat the end desired—a uniform temperature—and that the stack loss is increased because combustible gases arising from the fuel bed are only partly burned and because the temperature falls when the flames are smothered. As a consequence, the pressure of the steam drops correspondingly. For bituminous coal good practice calls for the depositing of fresh fuel on bright spots in the fuel bed, as these are indications of a local thinning out; and if best results are to be obtained a level bed of uniform thickness must be maintained. In reality this is a checkerboard system of hand firing and no existing stoker has analagous principles of operation which demand the human element for success. Hand firing by spreading had a large following where anthracite was used. In this system the coal was scattered in thin layers over the entire fuel bed, and it produced excellent results because clinkering was not a serious problem in the combustion of anthracite.

There still remains one other scheme of firing furnaces by hand which was used to a limited extent in the early days, and that is the alternate, or side-firing, system, wherein the fuel bed is divided from front to rear into two sections which are alternately fired and cleaned, so that while one half burns intensely the other half is comparatively green and passing through the process of coking. The side-feed inclined stoker operates on a modification of this principle in that it has two fuel beds independent of each other.

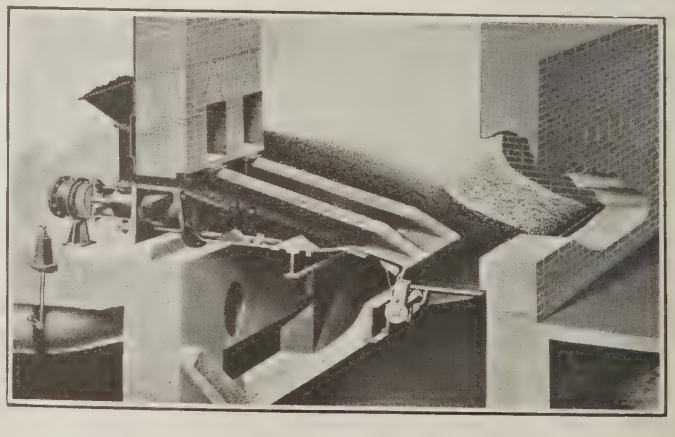
As in choosing a particular type and capacity of mine pump to meet a given condition in a mine or in selecting different types of motors under different circumstances, care must be exercised in the application of mechanical stokers to the needs of the boilers, depending upon the demands of the plant. Economy cannot be obtained by correct operation of the stoking mechanism itself, to obtain the best results other factors must be in harmony, such, for instance, as a unit properly proportioned to the boiler and the load demand. Under one set of conditions a chain-grate stoker might be advisable and the use of any other type would be a misapplication likely to end in failure. Under other conditions the chain-grate stoker should not be considered. Many of the troubles encountered in steam plants may be attributed to incorrect design, and to guard against these is the duty of the engineer. After a careful survey he should decide upon the particular type of stoker which best meets the conditions.

Thus at a plant with a fairly uniform load through-



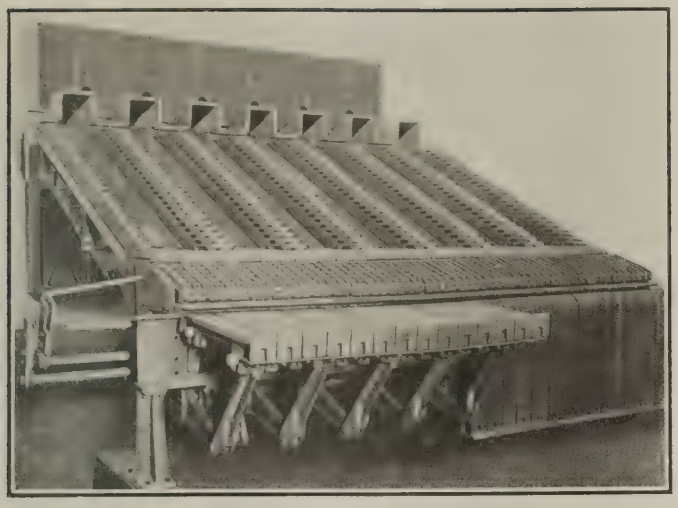
RILEY STOKER, IN WHICH THE RETORTS RECIPROCATE

This stoker is singular in that the entire grate area is adjustable and movable. Reciprocating motion of a steam plunger is transmitted from a wrist pin by connecting rods to the bearing bars. The retort, overfeed grate and ash tray alike reciprocate.



JONES A-C STOKER HAS NO OVERFEED GRATE

Movement and agitation of the fuel is dependent upon pusher blocks connected to the steam rams. The distinctive feature of this stoker is the automatic control of fuel and air effected by auxiliary devices.



TYPE H TAYLOR STOKER ADAPTED FOR COMBUSTION OF LOW GRADE FUEL

Reciprocation of the extension of overfeed grate is effected by the same mechanism which moves the rams. A steam cylinder imparts quick motion to the dump plate, loosening the clinkers which adhere to it.

out the day only a small excess rating is required as compared with a plant where the demand rises and falls in a twenty-four hour period, as in a mine plant. Here economy calls for a large enough but not too large a plant, and in the design allowance must be made for day-to-day variations in demand as the mine is further developed or the production is more or less than normal. The plant must be designed to minimize expenses in adding new units and at the same time provide the utmost simplicity of operation. The proportionate horsepower increase as a ratio of increase over total demand from period to period as the mine workings are extended is greater at a mine generating its own power than the proportionate horsepower increase in a large commercial power plant. In the latter case the load factor usually tends to become better, especially where the industries served are of different characters with respect to load.

In the selection of an electric motor the first quality to be investigated is its performance characteristics; likewise in looking about for a stoker to meet the needs at the mine plant, for the same reasons, one should study its application characteristics. The application of the same stoker to different types of boilers, even of the same horsepower, will produce different results. First the stoker must be chosen, then a boiler must be selected, and finally the furnace must be designed to derive the greatest efficiency from both. The three parts that go to make up the whole—the boiler, the stoker and the furnace—must be correctly proportioned to one another. For instance, it is much easier to proportion a boiler and furnace having the type and size of stoker in mind than it is to select the stoker after having decided upon a boiler and designed the furnace; in other words, as in the building of a house, the basement must precede the roof in construction. The application of a stoker to an old installation of a hand-fired boiler furnace often develops embarrassing difficulties that are not easily overcome, and great care should be exercised to obtain as nearly correct proportions as possible; otherwise poor plant operation will follow and the blame will be placed upon the stoker.

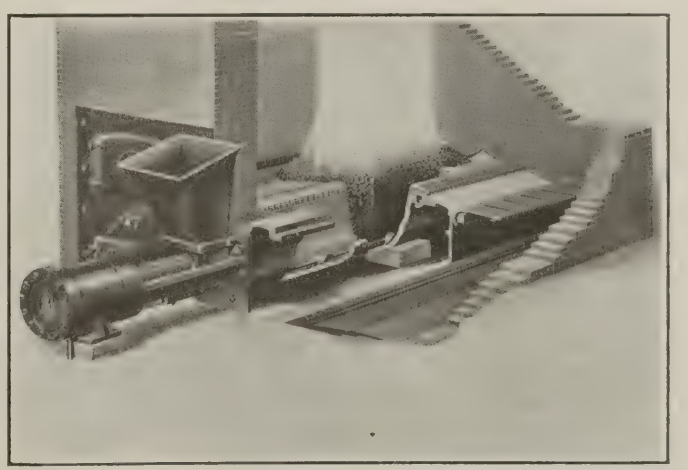
Another factor that must be considered when selecting a stoker is the fuel supply—the kind and grade of the coal to be burned must be taken into account. Those coals which have a tendency to cake burn better in a stoker which agitates the fuel bed in a manner to prevent caking; in extreme cases of caking forced draft may be needed to insure sufficient air for complete combustion. On the other hand, there are coals which do not have that tendency to mass. If these are introduced into a furnace having a stoker that agitates, best results are not obtained, as the fines are unduly sifted through the grates. The free-burning coals of the Middle West do well on the chaingrate stoker chiefly because it is not unduly agitated. The high ash content of these coals combats free agitation, and relative advancement from grate bar to grate bar is well nigh impossible with some of these, hence in this instance the traveling grate is best.

As we will deal with only one type of stoker in this article, the underfeed type, the application of several kinds of coal will be mentioned only as concerning this one type of stoker.

Of the three types of stokers, the underfeed stoker undoubtedly gives the best results when burning the low-volatile coals such as those of Pennsylvania and West Virginia. They are comparatively low in volatile matter and high in fixed carbon; they tend to cake in large masses in the early stages of combustion and consequently require agitation for efficient combustion. Extensive tests by the U. S. Bureau of Mines have proved that the greatest percentage of these coals have high fusing temperatures, for which reason agitation is not likely to cause clinkering trouble.

The valley-and-hill design of underfeed stoker with its retorts flanked by tuyere boxes affords a favorable condition for the burning of these coals. With a forced draft the fire may be thickened with less danger of its contents massing. The natural swelling and caking properties of these coals cause them to expand upward on heating. The simultaneous action of the air forced from the tuyeres and the lifting of the fuel in the retorts by the movement of the pushers does not afford an opportunity for extensive caking. Because the content of volatile matter is low the combustion is fairly complete in the fuel bed itself and consequently the heating surface is closer to the flames than is the case where high-volatile coals are burned, as the latter require more space above the fuel bed for ignition of the gases given off.

High-volatile coals with a moderate ash content also possess the caking property characteristic of the low-



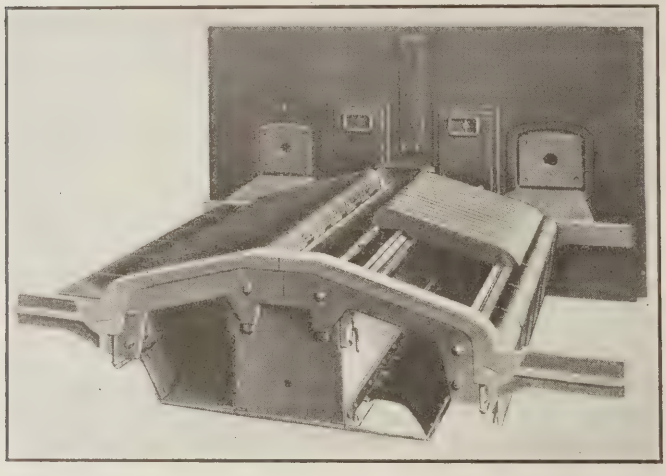
JONES SINGLE-RETORT UNDERFEED STOKER

Fuel is forced backward and sidewise by pusher blocks onto sloping combustion grates and then to hand-operated dump trays. The stoker is self-cleaning and simple in construction.

volatile coals but to a lesser extent. The thick fuel bed in the underfeed type of stoker furnishes an ideal condition for the distillation of the hydrocarbons. For this reason combustion is efficient and little smoke is made. However, the ash must be dumped at more frequent intervals because there is more of it.

One other kind of coal representative of major production in the United States, the high-ash coal coming from the West, having an impurity content varying from 6 to 30 per cent ash, presents problems in combustion depending upon its ash content. In the main it is a free-burning coal which tends to clinker, especially at high combustion rates, and to overcome this some means must be provided to prevent the adhesion of clinkers to the grates and brickwork. Best results are obtained by providing a continuous means for disposing of the ash, as, for instance, with a clinker grinder.

The working principle of the underfeed stoker is as follows: Fresh coal is fed upward and forward into the fuel bed by a pushing agent, usually a steam-operated ram. The fuel bed is made up of three layers which specifically may be called the green-coal zone, the coke zone and the incandescent zone. In the middle zone the volatile matter is "cooked" off and in the upper zone it is burned. Boiler ratings from normal to as much as 400 per cent may be obtained with the underfeed stoker.

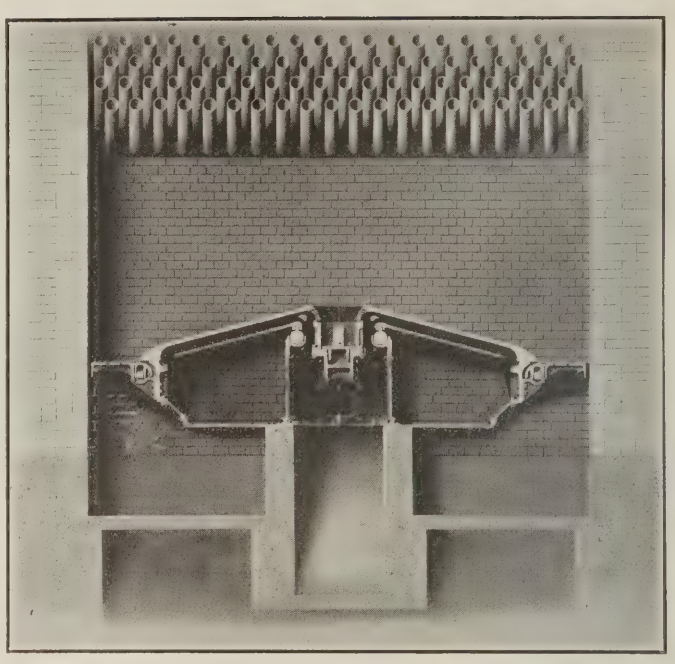


TYPE E STOKER SHOWING GRATES

This stoker has been perfected to control firing readily by means of a compensating-type damper regulator connected to a steam-driven engine, thus giving automatic operation.

Underfeed stokers are classified as single-retort and multiple-retort stokers. The former is best suited to boilers of small horsepower, not to exceed 350, and is applied to advantage to boilers which are set low and have no ashpit under them. Combustion may be completed with or without the aid of an ignition arch. The multiple-retort stoker provides a higher combustion rate per square foot of grate area and consequently will sustain peaks above boiler rating higher and for much longer periods than will the single-retort stoker. In addition to these merits the furnace temperature is more uniform and less floor space per horsepower is taken up by the multiple-retort than by the single-retort stoker. The latter, however, has an application in the smaller plants and may be applied to an old boiler more readily than the former.

Perhaps the simplest of stokers belonging to the single-retort class is the Jones standard side-dump stoker. On either side of the single retort are side



SECTIONAL VIEW OF TYPE E STOKER

Shows arrangement of ashpit and draft, also the relative position of grates with respect to the boiler tubes.

plates which support the fuel bed overflowing from the retort. Air from a blower travels to the fuel bed by way of a sealed ashpit, under ribbed dead plates, and thence through the tuyeres.

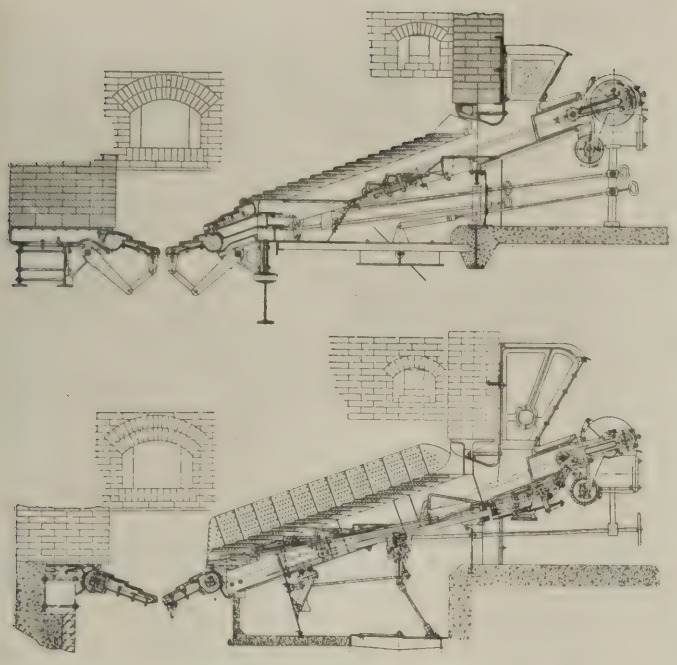
The outside equipment consists of a feed hopper to which is attached a steam cylinder operating the feed ram. Steam is admitted behind the piston and pushes the ram ahead and thus carries with it a portion of the coal to the retort, after which it is further relayed ahead by pusher rods.

The feature in the control of this stoker is the automatic steam control regulator on the steam line leading to the engine, which governs the speed of the engine and thus controls the speed of the fan and the feed of the coal to the retort. In this way an even pressure of steam is maintained and constant relation is sustained between the coal and air supplied for combustion.

With a small amount of brickwork and excavation for the ashpits this type of side-dump stoker may be installed under many types of boilers. The ashpits extend 6 to 18 in. below the floor line, depending on local conditions, and fuel is burned efficiently without combustion arches.

Retaining the simplicity of the Jones single-retort stoker, yet developed so as to preserve the merits of the multiple-retort design for large loads, the Jones A-C stoker differs from the other underfeed stokers which will be described.

Into a steam cylinder is fitted a piston to which in turn is attached a ram. When steam is admitted into the cylinder through an automatic control valve, the ram is withdrawn from the retort and coal drops in front of it. The operating mechanism is timed so that the valve reverses the flow of steam and the ram pushes the coal from the bottom of the hopper into the retort. The fuel already in the retort is pushed upward and ahead by pusher blocks fastened to auxiliary rams. Agitation of the fuel bed is accomplished entirely by these means. The overfeed section behind the retorts is not movable. The dump plates are made in sections which are hinged to a shaft running parallel to the



WESTINGHOUSE STANDARD AND NEW MODEL TYPES
Fuel is delivered to the grates by means of a cast-steel ram, shown under and just to the right of the hopper. Note that the overfeed grates are operated through a rod driven by the same mechanism that operates the feed ram.

rear of the overfeed section and are dropped toward the bridge wall by a control lever at the side of the stoker.

Other details are as described in the single-retort stoker of the same make. The control valve, which permits eight rates of operation, has already been described. In the multiple-retort type, however, a deep ashpit is employed together with necessary air compartments for forced draft.

Another stoker which strictly belongs to the single-retort class is the Detroit underfeed stoker, whereby coal from the feed hopper outside the furnace is fed ahead through the entire length of the retort. This ram is driven from a crank connected to a drive shaft and consequently its stroke is regulated directly by adjusting the length of the connecting rod. Likewise the rate of feed may be regulated by suitable adjustment.

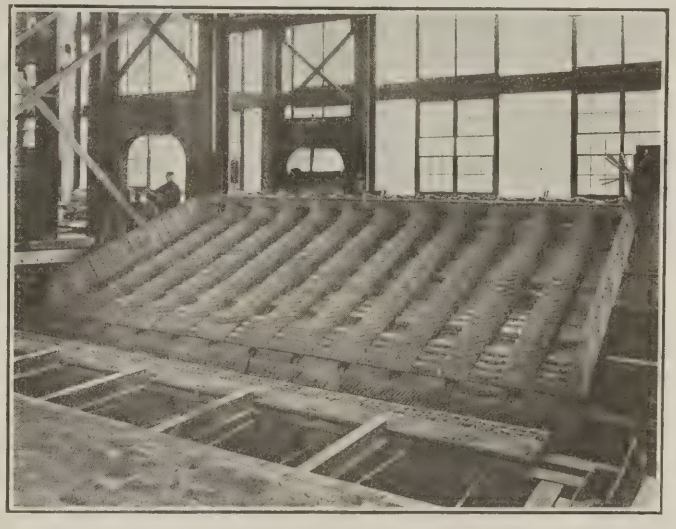
Like the Jones stoker, the sides of the retort are mounted by tuyere blocks alongside of which are ribbed grate plates. Burned-out ash is deposited upon solid dump plates which are dropped by a lever mechanism controlled from the front of the stoker. Forced draft is used in combustion. The blower directs air into sealed compartments and thence through unit sections of tuyere blocks to the fuel bed.

In the Roach single-retort underfeed stoker coal is fed to the stoker in the usual manner from a feed hopper by a steam-operated ram. In addition to the pushing action of the ram in the retort, the fuel bed is further agitated by reciprocation of inclined sectional side grates. The motion of these grates is adjustable to conform with the rate of combustion desired.

The side grates serve a dual purpose in that they agitate the fuel bed and, by reason of their hollow construction, act as conductors of air from an air chamber to the faces of the retort. Air for combustion is admitted to the combustion chamber under a high and a low pressure. The high-pressure air chamber is located under the low-pressure chamber and supplies the forced draft to the tuyere grates and also supplies air to the low-pressure chamber above it through a bleed-off valve which is controlled from the front of the furnace. This low-pressure air aids combustion by passing upward into the fuel bed on the grates through their interstices.

The Combustion Engineering Corporation builds single, double and triple-retort underfeed stokers, all of which in reality are of one type. They differ from each other only in so far as proportions and strength of construction are concerned. The double and triple-retort types, like the single, are known as the Type E stoker and are double and triple duplications of the single-retort stoker set side by side in one chamber.

Either coal-conveying machinery or hand labor delivers the coal into the stoker hopper, from which it is fed the full length of the retort by means of a reciprocating plate on the bottom of the retort. Then the coal is further distributed by auxiliary pushers attached to the bottom plate and alternate-moving fire bars which



CONSTRUCTION VIEW OF NEW MODEL TYPE
The ends of the rams are plainly seen and also the necessity for a wide hopper and ashpit.

form the side grates and carry the ash to dumping trays on either side of the side grates. These fire bars alternately are movable and fixed. The dumping trays are operated from without by a ratchet mechanism.

Air from the blower is conducted through a duct to the wind box located directly beneath the retort. From there it passes upward through tuyere openings in the retort end of the fire bars while the remainder passes through the hollow bars and is conducted to auxiliary air boxes under the grates. From the air boxes the air is vented to the fuel bed through slot openings between the fire bars.

Like the Jones stoker, the Type E stoker is automatically controlled by a compensating-type damper regulator which is sensitive to minute variations in steam pressure and connects with a throttle-valve on a steam driver or a rheostat on a motor.

In details of design and operation the Westinghouse underfeed stoker of the multiple-retort type is distinctive. The coal hopper is unusually large, being practically equal in length to the width of the furnace. Coal is delivered into the retort by a ram connected to a cast-steel crankshaft which is driven by a worm gearing.

To guard against damage, should foreign substances be admitted accidentally with the coal and block the movement of the rams, a small shearing pin is so placed in the speed shaft mechanism as to shear before the

initial stresses are transmitted to the working parts. The Riley and the Taylor stokers also are provided with such a shearing pin.

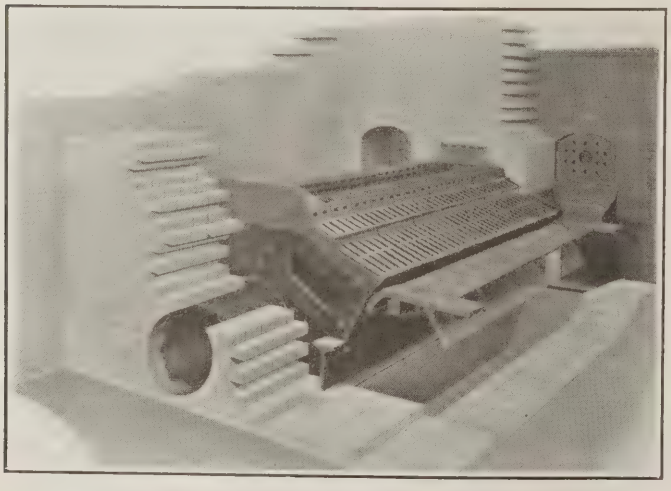
An auxiliary ram is operated by connecting rods through a lost-motion mechanism which causes it to reciprocate along the bottom of the retort and thus aid in the distribution of the coal. To aid the fuel in its movement to the dumping grates, beyond the retort-tuyere section are reciprocating overfeed grates which actuate through rod and lost-motion connections with the main ram.

Two dumping grates of interchangeable corrugated bars are pivoted upon brackets transverse to the center line of the retort and drop away from each other, thus providing a center dump operated from the side of the stoker. Air is controlled from the front or side of the stoker. Its passage from the wind box to the tuyeres and openings in the overfeed section is controlled by a system of dampers. The tuyeres fit into recesses in the tuyere boxes and interlock each other. The tuyeres are graduated so as to grow smaller progressively from the nose to the sides of the tuyere block.

Natural draft can be used at light loads and with a pressure of 6 or 7 in. in the wind box 400 per cent of rating may be obtained. This stoker is suitable for plants where the load is subject to wide and sudden variations.

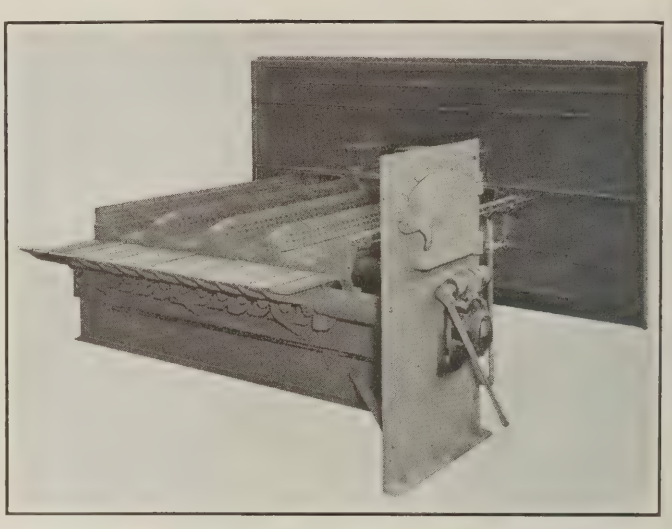
In the Taylor stoker, manufactured by the American Engineering Corporation, Philadelphia, Pa., the coal is fed into the retort by a large cylindrical ram which is operated by a crankshaft driven by a worm and gear. It is then redistributed by sets of short-stroke rams connected by links with the main ram. The grate area of a single retort set is composed of a retort inclined at 22 deg., an oscillating overfeed section and a single-leaf dumping grate which is operated by levers located in front of the stoker. The retorts slope steeply and are stepped by V-shaped tuyere blocks.

As an alternative for the hand-operated dumping grate a power dump plate may be used. This is arranged to oscillate rapidly so as to dislodge and dump the refuse and clinkers which might tend to adhere to its surfaces. Yet another provision for disposal of refuse is obtained in the clinker grinder which is sometimes used. It is revolved at a speed slow enough to keep ash above it at all times and thus seal it. Air for combustion is



DETROIT SINGLE RETORT UNDERFEED

This stoker was designed to serve boilers from 100- to 300-hp. For larger ratings two or more retorts are installed in one furnace.



DETROIT MULTIPLE RETORT UNDERFEED

Any number of retorts may be placed side by side, having a horizontal or level fuel bed. A row of tuyeres is placed between each pair of retorts, discharging air into the fuel bed.

forced from the wind box through the tuyeres to the fuel bed and also courses to the oscillating overfeed section. Both are controlled by dampers.

Bituminous and semi-bituminous coal, semi-anthracite and even lignite have been burned satisfactorily with this stoker. A wind-box pressure of 3 to 4 in. with 0.03 in. suction will permit continuous operation at 200 to 300 per cent of rating. From 60 to 80 lb. of coal per square foot per hour can be burned under peak-load conditions.

Different from all the stokers hereinbefore described is the Riley stoker in that the retort wall reciprocates and by direct-connection agitates the overfeed grate bars which extend across the full width of the stoker. The underfeed section is inclined at 20 deg. and receives its reciprocation through side rods driven by wrist pins on the main plunger. The amount of travel is adjusted by setting blocks which regulate the lost motion between wrist pins and side rods.

Air leaves the main air chamber, which is fed by a duct from the blower and travels through the tuyeres to the fuel bed. A damper arrangement regulates the passage of air from the wind box proper to the movable overfeed grate, where its pressure is less near the dump grate than it is near the retort. The dump grate is composed of a number of dump plates that operate continuously. Refuse leaving these plates is further handled by a crusher.

This stoker will burn all grades of bituminous coal and also lignites. A rating of 200 to 300 per cent may be obtained with it.

LEGISLATION TO COMPENSATE FOR DAMAGE BY SUBSIDENCES.—The question of property damage through subsidence due to mining operations has long been a subject of controversy in Wales. Property owners, in offering for sale or leasing land, invariably reserve to themselves the right to work any minerals on the land, and to let down the surface without any compensation to owners of buildings or other erections. One of the Welsh coal-miners' leaders has suggested legislation to compel coal and other mineral operators to compensate property owners and public authorities for damage done to buildings, gas and water mains, sewers and highways through subsidences.



Better Machine Bits Would Lower Cost of Cutting Coal

Power Cost of Cutting by No Means Main Reason for Using Good Bits —Avoiding Burnouts, Reducing Strain, Economizing in Labor, Increasing Service from Machines Are Others—Standardization Needed

By Alphonse F. Brosky
Assistant Editor, *Coal Age*, Pittsburgh, Pa.

WHEN in search of information relative to the "how" and "why" of doing anything much can be learned by talking with the man on the job. So with this belief in mind I chatted with a blacksmith at a mine on the subject of cutter bits for the chain-type mining machines. He was brimful of constructive criticisms of his trade, which, in the main, is the sharpening of bits, and for all his foreign accent and muddling of the English language he was capable of telling an interesting story:

"What's a matter with em bits, you ask me? I tell you what. You hear me what I say. I know someting bout dis job; used to be machine man myself, las' place I work. Some man he sharpen bits good, some man he sharpen bits bad. Good man he get sick, then bad man he sharpen bits and make machinemans sick. Machinemans swear lika hell. No can cut em places that shift. Night boss he mad too since he catch em hell from 'super' in morning. Maybe company call 'super' too; maybe so.

"See this bit, I sharpen em good this way. Wait; I show you 'nother one. Last blacksmith sharpen wrong and edge break off bye-byes. See; too long and not thick 'nough here. Every man got own way; most of time wrong. I know how because I cut em coal one time; see!"

So I spent nearly a half hour listening to the enlightening explanations of this man, at that time engaged in sharpening bits, but formerly on the other side of the fence cutting coal with a chain machine. He knew both sides of the story, and in his own simple way laid emphasis upon features in the shaping of bits. Many of these form the structure of this article.

Go where you will to the larger mines in the bituminous fields, on the days those mines are being worked you are almost certain to notice that bits for chain machines are being sharpened. Depending upon the hardness of the coal or the impurity and the width of the places, after a machine has made a number of cuts—sometimes two and sometimes as many as five—the bits become worn, and, as a result, cannot cut efficiently.

A dull bit in cutting is injurious to the machine itself and reduces the area which the men who operate it can cut in a shift. The blunt steel, instead of tearing into the coal as it should, tends to rub over its surface.

NOTE—The headpiece shows a blacksmith sharpening bits on a mechanical sharpening machine. The heated bit is dropped behind an anvil block which holds it firmly while a roll die passes over it and shapes it. The air for the forge is supplied by a small blower.

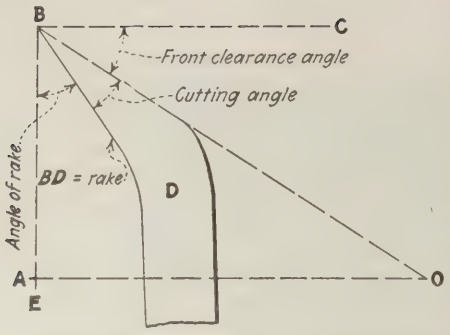


FIG. 1—DESIGNATIONS IN CUTTER BIT DESIGN

In present-day design all the various factors in cutter-bit design are variable. Some standardization would be desirable.

The operative is tempted to load the friction, in consequence of which an overload is placed upon the motor, which will blow its fuses unless the runners have replaced them with copper wire, in which case the armature is likely to burn out. Even if this does not happen an unnecessary strain is exerted on the mechanism of the machine, particularly on the feed chain.

Let it be said here that the runner is tempted to plug the fuse gap with wire of heavy resistance only when his machine is not functioning as it should or when the cutting is difficult. Furthermore, the runner prefers to use an excess of power and injure the coal cutter rather than replace bits, for in his eyes this work is an annoyance and a waste of time. Toward the close of the shift, accordingly he tires of changing bits and is disposed to try to cut an excessive yardage with one setting. Consequently the management should feel under obligation to remove the cause of this evil practice. Supply the runner with well-sharpened bits, and further trouble is likely to disappear.

At most mines bits are sharpened on an anvil or with a power hammer by a blacksmith, who is frequently required to work overtime. He must be skilled in his work; otherwise his bits will not be kept of the desired uniformity. At that, a close scrutiny of the finished hand-sharpened bit will show that no two are exactly alike. When the tip of the bit has been rounded somewhat it can be restored by a few blows of a hammer; but it frequently happens that a portion of the tip is torn off, in which case the steel must be drawn out. This takes time and labor, consequently the blacksmith often is disposed to shirk this part of his work.

But that is not the only objection to sharpening bits by hand. The exactitude with which the bit is shaped is limited by the ability of the blacksmith. The tip may come to a point as in a right pyramid, allowing little or no clearance below the cutting edge. Frequent sharpening of a bit which initially was of the correct shape as to clearance and rake may alter it so as to lower its ability to cut. Choice should be dependent upon efficiency of cutting as well as facility of sharpening.

Ask a machinist who operates a metal-turning lathe as to the theory of shapes applied to his cutting tools, and his remarks will set you to thinking about your own problem. All cutting tools may be considered primarily as wedges driven into the material to separate it. A thin-edged tool cuts more easily because it generates less friction, distorts the chips less and removes them more freely. The edge must be thick enough to make a heavy cut at a suitable speed and have a point of width sufficient to withstand the heat generated by friction. Large roughing tools are round-nosed because that shape provides a longer cutting edge than does a straight-line shape, as notably in a diamond-point or facing tool.

What applies to metal-turning where practices have been developed to a science after years of study and experience should apply also to coal cutting. In the latter case the cutting bits do not overheat, unless a sheet of sulphur or a piece or blackjack is being cut, as the material cut is comparatively soft, and each bit is not constantly cutting coal. Nevertheless, the theory of rough versus fine cutting is equally applicable to either case. We learn from our brother the machinist, therefore, that we must be discreet in our choice of tools for cutting coal.

He could further point out to us, were he to examine our cutting bits and witness our process of undercutting, that may of our bits are poorly designed. They are not provided with the necessary rake, nor do they have the up-and-down clearance which is an extremely important detail of design if friction is to be kept at a minimum.

He has developed his many cutting tools by evolution to the extent that the shop in which he works is equipped with a large number of lathe tools, each of which is meant for some particular job. A specific selection of one tool in preference to another is made only after due consideration of the hardness of the metal, its structure and the rate of cutting, and now he contemplates going a step further by establishing a nation-wide standardization of his tools, which will greatly reduce their number.

He would not expect us to carry our selection of bits to the nicety practiced in his machine shop but he might well wonder why it is that we use the same bit under divers circumstances with little or no regard for the work which it has to be applied. The coal of the many seams mined varies widely in hardness and in structure. Is it not reasonable to suppose, therefore, that judgment should be exercised and a cutting bit of one shape chosen in preference to another for cutting the coal in a given seam? At least should not the tool which is used be of a general design to minimize friction in cutting?

The master mechanic of a large bituminous company hints that managements would do well to see to it that bits are correctly and uniformly sharpened. After wide experience and extensive observation in the problems dealing with correct application of equipment he makes this recommendation—not so much because its fulfilment would effect a worthwhile saving in power as because places would be cut more easily and quickly, so that a single machine would cut more places in one shift and so that the wear and tear on the machine would be diminished, thus reducing maintenance cost by minimizing the frequence of repairs. To convince himself that the power cost in the cutting of coal by machine is a negligible consideration the master mechanic men-

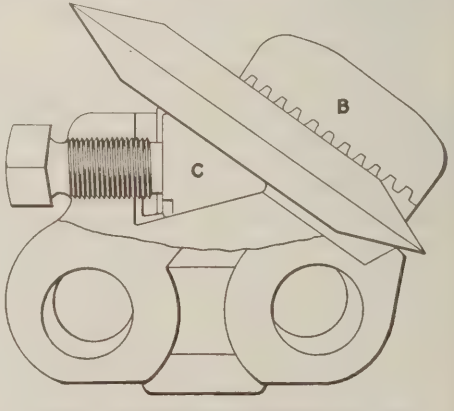


FIG. 2—SELF-SHARPENING BIT

Bit can be turned side for side and end for end, thus affording four sharp cutting edges before it needs sharpening. It cannot work loose.

tioned made a number of electrical tests of power consumption under different conditions. Most important of his discoveries was that the power consumption per square foot of undercut was not so high as to impose an important burden on the costs of operation. Depending upon the coal cut and the type of machine used, the power consumption varied from 22 to 56 watt-hours per square foot. A summary analysis of a particular machine, a Goodman universal shortwall mining machine, shows that it cut an average of ten places per shift. The length of the cutter bar and the width of the room cut were 7 and 17 ft. respectively; the power consumption per square foot of undercut was 23 watt-hours, and 4 kw.-hr. was the average power consumed per place cut, including moving from room to room.

Figuring the cost of cutting (at night) at 1.5c. per kilowatt.-hour, the cost of power to cut ten places was 60c. The power cost for one machine, even where the cutting is difficult, seldom exceeds $1 per shift. At that rate the power cost for undercutting 2,000 tons of coal varies from $6 to $10 and constitutes about one five-hundredth of the prime cost of producing the coal. For this reason we may regard power cost as an unimportant factor as compared with the direct cost of mining.

This point is emphasized in order to set aright those who judge the worth of an improvement in coal-cutting machinery solely by its saving in power. Though a reduction in power consumption is an indication of improvement, we are more concerned with ease and speed of cutting than with power consumption. Cause each machine to cut one additional place, and nine machines will do the work of ten. Reduce power consumption one-half and the saving of itself is small. Cut more places per shift and provide that delays and repairs occur less frequently, then something will have been accomplished. On this fact depends the plea that uniform and correctly shaped bits be used in the cutting of coal.

Though the two general types of bits in wide use are the chisel point and the pick point, their shapes are many, each arising from the individual ideas of the maker. How foolish it would be to use promiscuously any one of the shapes under any one given condition! Of the two types the pick point is that most used. Its shape varies from a needle-like point with squared corners to a round nose having a flat rake and a rounded drag. This last shape can be correctly formed only in the dies of a bit-sharpening machine.

Less power is required to operate pick points, which means that cutting is easier; but in a hard substance, such as sulphur sheets, chisel points are more applicable, because they protect the links and setscrews of the cutter chain from being abraded by the substance they cut. This last objection, however, is ruled out where cutter chains of seven or nine positions are used. In addition to these, several freakish shapes have been tried; some are curved in a prong point; in others the effective cutting edge is turned askew relative to the center line of the bit.

Would it not be well to standardize bits and reduce the number from one hundred or more to a half dozen well-defined shapes? Each shape could be numbered to indicate its adaptability to a coal of a given hardness. Thus No. 1 bit would be suited to very hard coal. No. 6 bit to very soft coal and the intervening numbers to graduated degrees of hardness. This, of course, would lead to the standardization of cutter chains also

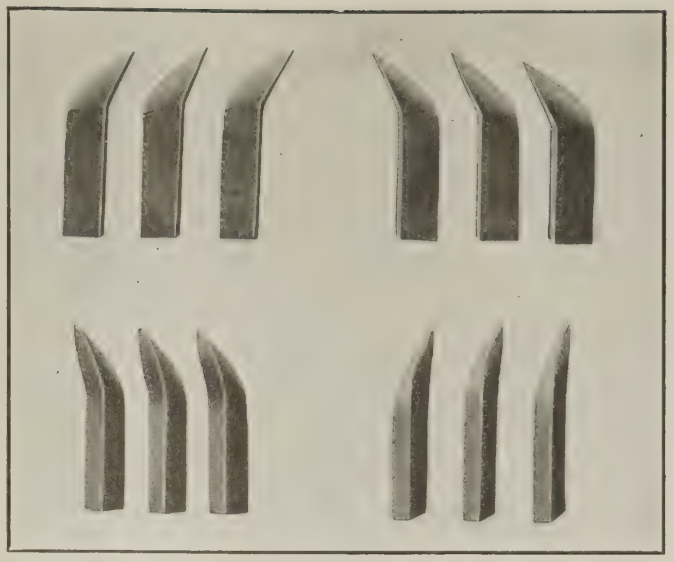


FIG. 3—PICK POINTS FOR CUTTING MACHINE
The pick point is suitable for coal that is easy to cut. It can do the work without becoming unduly heated with injury to the point.

—there is no reason why a standard cutter chain should not be applied to all cutting machines regardless of make.

These shapes could be derived through empirical tests, and the seams of coal being mined in this country could be grouped under six numbers according to their degrees of hardness. No longer would the mechanical man at the mines be in the dark as regards the shape of bit best suited to this needs nor would he experience trouble in making or having the bit made, knowing the shape best suited to his purpose.

There are relations between the angles and dimensions of a bit which affect its efficiency in cutting. Most of these are known by the makers of cutting machines and the rest could be worked out. Thus the smaller the cutting angle (see Fig. 1), the longer is the rake. Sometimes the cutting angle is referred to as angle AOB. In reality it is not, for the angle AOB is equal to the angle OBC, which is the front-clearance angle. To machinists the cutting angle is the angle OBD.

The harder the coal the smaller should be the front-clearance angle, and the softer the coal the smaller should be the cutting angle. The side-clearance angle has practically no relation to the other angles, the dimensions of the bits or the hardness of the coal to be cut. It could be made a constant for bits of all shapes.

How to obtain and maintain at the mine a uniformity in the shape of the bits is not an obstacle. Many intricate forgings are made by machines in other industries, and consequently there is no reason why machine dies could not be designed to make a bit of any shape found desirable.

The carbon content of the steels to be used in making these different shapes of bits could be specified. At the same time methods of tempering each steel could be evolved. Much of the trouble with bits is due to faulty tempering of the steel.

Of the many bits now in use only two might be recognized as standard. The term "standard" as applied to bits in this instance is meant to connote correct shape, which may be maintained uniformly in sharpening rather than universality of use. In this category are the Link-Belt double pointed bits, which owe their efficiency in cutting to the devices of the cutter chain

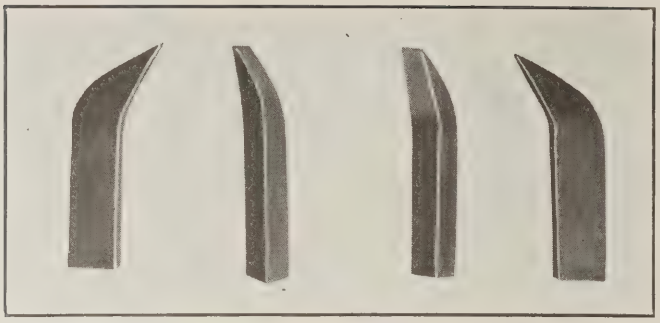


FIG. 4—CHISEL POINTS FOR HARD CUTTING

The chisel point is used where sulphur sheets are encountered. It lasts longer than the pick point, given similar material to cut. It can, however, be dispensed with where cutter chains of seven or nine positions are used.

which holds them, and the Sullivan machine-sharpened bits, which cut successfully because all are sharpened exactly alike in a machine die.

Both ends of the Link-Belt bit are symmetrically pointed. For this reason when the cutting edge of one point is worn, maintaining the same point uppermost and turning it side for side, a fresh cutting edge is put into position for cutting. After that edge is dulled the bit is turned end for end, giving it two additional cutting edges. The designs of the bit and the lug link which grips the bit are shown in Fig. 2.

The bit is gripped in the cast-steel lug link by two bearing surfaces. One of the grips, B, is corrugated and fixed as part of the lug link while the other is a movable wedge, C, which is positioned by a setscrew. The wedge and corrugated grips act in a manner to tighten rather than loosen in cutting. Consequently all bits are held in line as set, and none is lost in the cutting of the coal. Because the cutting angle (term used in the sense of angular position) is obtained by the position of the bit in the lug link, the efficiency of cutting does not depend so much upon the skill of the blacksmith in shaping it as it does with other bits. In the Link-Belt cutter chain the lug grips maintain this cutting angle, which, therefore, is mechanically controlled.

For details regarding the Sullivan bit sharpener the reader is referred to pp. 826, 827 and 828 of *Coal Age*, May 18, 1922. Briefly this machine is a belt-driven, oscillating roll die which draws out the point of each bit sharpened to exactly the same shape. An examination of the headpiece to this article will reveal its working principles. The finished bits are shown in Figs. 3 and 4.

About eighteen months ago a mechanical bit sharpener was installed at a mine which produces 2,000 tons of coal daily. Prior to this time the blacksmith shaped the bits on an anvil and sometimes had to work overtime in order to put a fresh edge on all the bits needed for the next day's run. One set of bits such as he could make by hand would cut no more than three places, whereas a set of the machine-sharpened bits now used will cut from seven to nine places. Repair costs have been lowered as a result.

Surges of current through the motor of a mining machine caused by variations in the load burn out many armature coils. In fact the armature coil in a mining machine is replaced more frequently than any other part. When hand-sharpened bits were used four of five coils burned out each week, but now the number is reduced to one.

Coal-cutting machines have been and constantly are being improved so that today they are both efficient and reliable, but a similar advance cannot be noted in the implement that actually performs the cutting, namely the cutter bit. We see much evidence of inefficiency caused by its shortcomings in general; on the other hand we have some evidence of its efficiency when due regard for correct design is observed. This problem concerns every soft-coal operator and consequently should receive more study.

Anthracite Small Sizes as Competitor of Bituminous Coal for Locomotive Use

Anthracite is consumed by railroads to some extent, the Lackawanna advertising its use in locomotives as a feature not to be overlooked by the traveler who decries dirt and sulphurous smoke. In recent years it is the smaller sizes rather than the much more valuable household coal that gets into locomotive fireboxes. In the April issue of *Baldwin Locomotives*, published by that famous Philadelphia maker of locomotives, is an article on the Philadelphia & Reading R.R. in which are some very interesting figures on the use of small sizes of hard coal in competition with bituminous coal in road service on that road's locomotives.

The figures given below are those showing the relative percentage of each used in several types of service, fast and slow:

NEW YORK DIVISION

Through passenger service	*Winter*	50 per cent buckwheat, anthracite 50 per cent bituminous
	Summer	60 per cent buckwheat 40 per cent bituminous
Local passenger service	*Winter*	60 per cent buckwheat 40 per cent bituminous
	Summer	70 per cent buckwheat 30 per cent bituminous

READING DIVISION

Through passenger service		Same as New York division
Local passenger service	*Winter*	65 per cent buckwheat 35 per cent bituminous
	Summer	75 per cent buckwheat 25 per cent bituminous

HARRISBURG DIVISION

Through passenger service		Same as New York division
Local passenger service	*Winter*	75 per cent buckwheat 25 per cent bituminous
	Summer	80 per cent buckwheat 20 per cent bituminous

A more striking instance of the efficiency of steam sizes of anthracite would be hard to cite. The record of the Reading for operating its trains at high speed, and getting them in on time need hardly be mentioned. The article in *Baldwin Locomotives* adds:

"The selection of these mixtures has been made an object of special study, with a view to combining high efficiency in operation with a minimum charge for fuel."

If the Reading, by mixing buckwheat with bituminous, gets high efficiency at the lowest cost, it would seem logical to suppose that other fuel users, especially those in anthracite territory, could duplicate that experience.

MINERS SAY THERE WILL BE NO SOFT-COAL STRIKE in 1923, so now we can put all our worry on the hard coal.—*Denver Express.*

Mortar Ejected from Cement Gun Protects Roof from Injurious Effects of Mine Atmosphere

Believing That Gunite Had Now Been in Place Long Enough to Reveal Its Qualities, "Coal Age" Requested a Representative to Inquire as to Its Ability to Prevent Roof Falls in Roadways

GUNITE is a mixture of cement and sand with water, projected as a plaster under pressure by a special device for that purpose, known as the cement gun. In the early days of its introduction, a little more than ten years ago, little confidence was shown around the mines in the permanency and value of such thin sheets of cement mortar, though it was recognized that the mixture thus sprayed was much denser than any hand-troweled coating. Its importance today in not only one but in all the heavy industries is justly recognized.

The civil engineer recommends its use in the facing of dams, reservoirs, spillways and ditches because of the ease with which it may be applied, its imperviousness to water and its great strength when reinforced with steel; the chemist recommends its use to protect materials such as metals from the attack of corrosive liquids and gases, and the metallurgist and combustion engineer each has borrowed the principle of applying gunite, in the one case for lining crucibles, retorts, blast, open-hearth and reverberatory furnaces with high-temperature cements and in the other for the repairing of boiler settings.

In the mining industry gunite is saving large sums of money chiefly by holding the roof of entries but also by facilitating construction work in or about the mines. Mining in sedimentary rock formations such as coal and the superincumbent measures has ever been dangerous and uncertain, and consequently any means that will decrease its inherent dangers and reduce the costs of maintaining excavations is of the greatest importance to the coal industry.

Its first accomplishments in coal mines were inspected publicly in 1916 when a group of prominent mining men visited the experimental mine of the U. S. Bureau of Mines at Bruceton, Pa. In this mine gunite had been placed on the surface of about 300 lineal feet of entry at the extreme inner end of an explosion chamber where the causes and effects of coal-dust explosions were being studied. Prior to the visit of this group of men it is estimated that nearly three hundred blasts were exploded in this chamber in the presence of finely comminuted coal. Some of these were of such violence as to crack the concrete lining which had been placed on the first few hundred feet of the entry.

Between the stretches of gunite and concrete was an interval of perhaps 400 ft. where no lining had been placed. Examination of this section revealed that the drawslate above the bibs of coal had been cut to such a degree that the span had been widened and the roof thus weakened. The rock over the roadway had fallen in places to considerable heights. The gunited portions evidenced no signs of slacking except where the coating was less than ½ in. thick. Timber sets, if placed in this entry to hold the roof, would have been dislodged by the first explosion following their erection.

The possibilities of the method were readily apparent. Here was a means of preventing a deterioration of the roof such as is the cause of most falls. Moreover, it would make the roof and ribs proof against fire. It is well known that coal will be ignited by the heat of a short-circuit such as frequently is caused by the grounding of a trolley wire.

They could see that the elimination of timbers along the main entries would make the roadways safer for derailments frequently dislodge timber; that men could travel back and forth with reasonable assurance of protection from roof falls, and that much expense would be saved by reason of the decreased necessity of removing fallen rock from haulageways. It also would make the haulage safer, for derailments are always to be feared where rock falls on the tracks.

This same group of men visited the Mt. Pleasant mine of the H. C. Frick Coke Co., which was one of the first commercial mines in which the roof of an entry was gunited for the purpose of preventing falls of rock. For a distance of 150 ft. adjoining an 18-in. brick arch near the shaft bottom a ⅛-in. coating of gunite had been applied. Though the thickness was less than the ½ in. recommended, there was no indication that at any point had the gunite broken off or the roof slacked.

From that mine the party went to Irwin to inspect Edna No. 1 mine of the United Coal Corporation. On the day of the visit a fall on the slope of the main haulageway had closed down the mine. This was the most troublesome slope in the region. The bad roof which is so general near the outcrop of the Irwin Basin had been further weakened by the ill-advised methods by which the mine had been operated in its early development, over twenty years earlier. The coal had been extracted on both sides of the slope with little consideration of the needs of the future, the barrier pillars, if

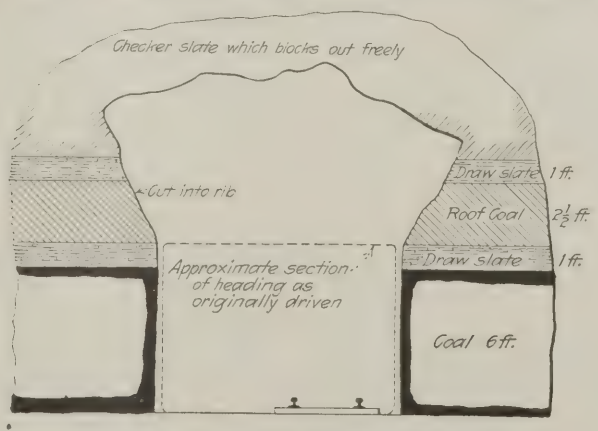


FIG. 1—CROSS-SECTION, SLOPE AT EDNA NO. 1

This slope, located on the edge of the Irwin Basin, kept disintegrating and falling until it reached a height of 12 ft. The coal ribs also spalled and widened till the roadway was 12 ft. wide. It was gunited six years ago and falls are now infrequent. Three trackwalkers used to be employed, and the condition of the slope made the flow of coal irregular. Only one man now is needed, as falls hardly ever occur.

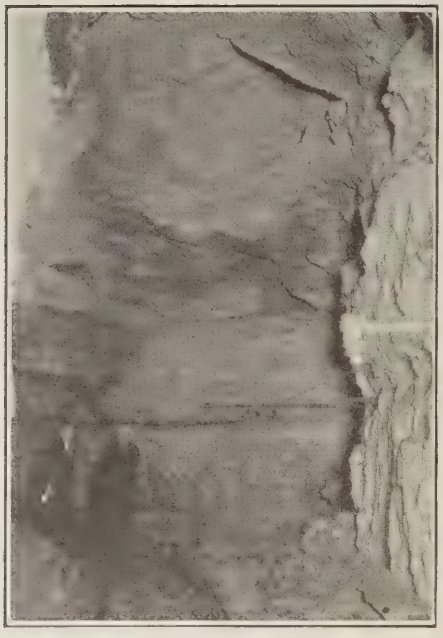


FIG. 2—HIGH PLACE, PITTSBURGH SEAM

The roof is 20 ft. above the rail as the result of continued caving. It has been gunited to render it safe and to make it economical to haul coal beneath it. A rotten sandstone lies above the coal.



FIG. 3—ENTRY ROOF CUT BY MINE AIR

The sweating of warm, moist, intake air makes the roof wet and subjects it to a weathering process. The changes in temperature also weaken the roof by expansion and contraction.

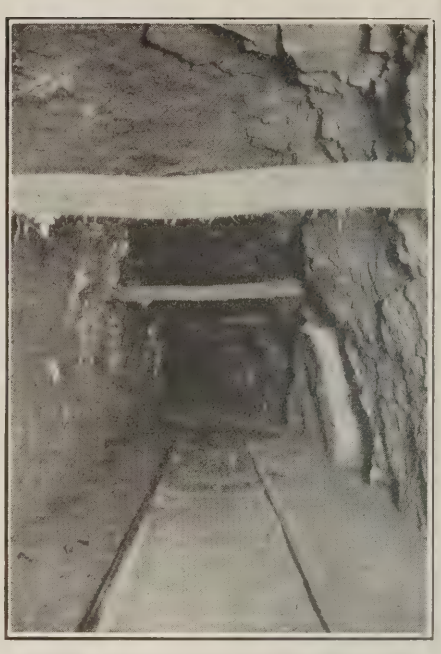


FIG. 4—ROOF SHOWN IN FIG. 3 GUNITED

Both Figs. 3 and 4 show conditions in the Gibson mine of the Hillman Coal & Coke Co. Because this section was wet, it was expected that it would have to be timbered, but the result was as shown.

such they could be termed, left for the support of the roadway being in places inordinately narrow and inadequate for the purpose intended.

The slope is one mile long and consists of a haulageway, a manway and two airways driven 10 ft. wide on 50-ft. centers. It is protected by barrier pillars which vary in width from 100 to 200 ft. Falls along this slope caused the mine to be shut down two to five days each month. The slope was timbered heavily and could be kept open only at great expense. Above the 6 ft. of Pittsburgh coal is a roof of drawslate 12 in. thick. Above that is approximately 30 in. of roof coal separated from a thick checker slate by another 12-in. stratum of draw slate. This uncertain material is overlaid by a solid sandstone.

Soon after this trip of inspection Edna No. 1 mine was acquired by the Hillman Coal & Coke Co., and the timbers lining the slope were removed, the roof and ribs being trimmed of all loose material. Gunite was then applied to a thickness of ¾ in. on roof and ribs. Though these entries originally had been driven 10 ft. wide on 50-ft. centers the roof and ribs had deteriorated to such an extent that in computing the cost of the gunite work, the height and width of the entries were each calculated to average 12 ft., the aggregate totalling 36 ft. Fig. 1 illustrates a typical cross-section of the haulageway.

At B Flat, 2,500 ft. from the slope mouth, a concrete wall several hundred feet long had been erected on either side of the track and walkway to support the roof where it had been brushed for the purpose of adjusting the grade over a local dip, this brushing having caused a considerable increase in the span of the roof.

The worst condition in the slope is found at 3 Flat, 100 ft. in, where the barrier pillar is only 55 ft. wide. In places rooms were driven through to the slope entries so that the ribs afford little protection to the roadway.

A short time ago the writer inspected this slope and found that the gunite had done much to hold this roof in check. The original gunite applied six years ago was still intact in places though it had been patched in spots of small, and sometimes exceedingly large, areas where the roof was heavy and fell. A comparison of the number of falls before and after the placing of gunite is indeed striking.

Prior to the completion of this work as many as three falls occurred daily. Three men were employed as slope walkers, whose duty it was to watch for signs of impending falls, which, when they occurred, inevitably crippled the haulage and decreased production. Today only one slope walker is employed, and he has a sinecure, for last summer in a period of three weeks only one fall occurred. The cost of placing the ¾-in. coating of gunite along this slope was $1.25 per lineal foot, which was 3½c. per square foot.

A consulting mining engineer reports that he witnessed the driving of a slope 400 ft. long through alternate strata of sandstone, shale and clay overlying the Lower Kittanning seam. When first driven the top and sides seemed so hard that it was considered unnecessary to timber the slope except for a short distance near its mouth.

As time went on, however, small pieces of the clay and shale kept falling until the slope became in places both high and wide. Gunite was applied to the top and sides, and though six years have elapsed since the completion of this work there has been no further trouble with the roof except in a small area where a large quantity of water at one time escaped into the roadway and made it difficult to obtain the requisite adhesion of the gunite to the rock.

An account of the guniting of entries in the mine of the Allegheny River Mining Co., Kittanning, Pa., appeared in *Coal Age* Aug. 14, 1919. A few words at this time regarding the permanence of this work will be scarcely out of place, as this company was one of the first to adopt the guniting of its haulageways as a standard practice. A report of its experiences prior to 1919 is reproduced on the next page:

"Along 5,842 lineal feet of headings covered with gunite not a single fall of any consequence has occurred either from the roof or the sides. This is certainly remarkable in view of the contrasting conditions which formerly existed when thousands of dollars were spent each year to clean up falls, to repair dislodged trolley wire, and to rectify other conditions consequent on the weakness of the roof. Timbering to support the entries cost at the rate of $7 per lineal foot, which is a prohibitive figure as compared with the expenditure of 75c. per lineal foot which is all that it has cost to support the roof with gunite."

In a recent statement this company reports that about two miles of entry has been gunited with entirely satisfactory results. The oldest gunite, which was applied five years ago, is holding well, though it must be patched periodically where thin sections have spalled. The average thickness of the coating is estimated to be ⅝ in.

Entries in both the Upper Freeport and the Lower Kittanning seams have been covered with equally satisfactory results. The roofs over these seams disintegrate rapidly, and small pieces drop from them so readily that the entries widen as the roof rises higher and higher. Timbering will not remedy such a condition. Gunite has kept the cross-section of the entries uniform over a period of years. The management specifically attributes its success in holding the sides and roof to an occasional patching of all areas where spalling occurred.

In No. 2 mine of the National Mining Co., near Pittsburgh, Pa., a shaft was sunk to handle the large quantity of slate that falls in the roadways. During the mine workers' strike in a distance of only 1,500 ft. about 1,500 tons of rock accumulated on the "Parallel Entry" leading from this shaft. In the first days following the settlement of that issue approximately 3,700 tons of rock was hoisted up the slate shaft. The weight of this slate was 30 per cent as large as that of the maximum production of coal which could have been hoisted in that period. This "Parallel Entry" was gunited, roof and ribs, immediately following the clean-up, and to all appearances this work has permanently checked further falls from the roof.

Before gunite was applied the top fell so freely that there was a constant fear that some one would be killed or injured from this cause. Two wiremen were employed to traverse the haulageways, totaling one mile in length. They were kept busy replacing the trolley brackets and rods which were continually coming down. In four years' time following the driving of this entry the roof scaled off to an average height of 15 ft. Above the 5½-ft. seam of Pittsburgh coal is an 8-in. band of draw-slate and then roof coal split by two bands of slate and a sheet of pyrite. A "rotten" sandstone 6 to 8 ft. thick is encountered above the roof coal. To make matters worse, coal and other soft strata are found above this fragile layer of sandstone.

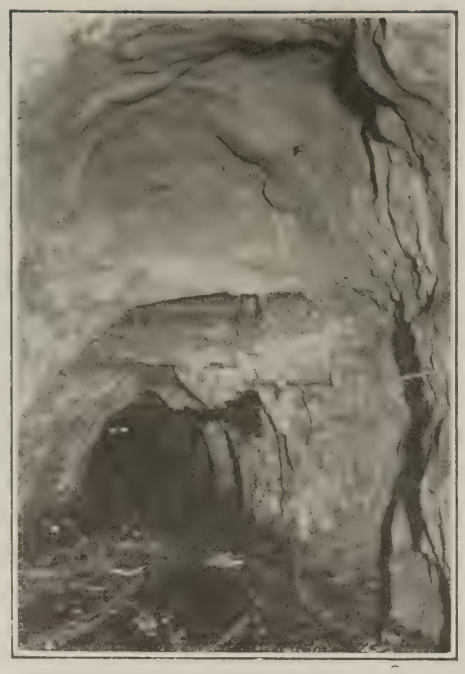


FIG. 6—GUNITE IN WET PLACE

Wolf Summit Mine. Roof falls to the greatest height where the water is most profuse*.

Needless to say, this sandstone could not be prevented from falling after it had been exposed to the air. It broke to considerable heights, as is made obvious by an inspection of Fig. 2, which shows a high place on the empty haulageway. Here a pot has been formed in the sandstone of a depth equal to the thickness of this rock.

The turnout in Fig. 5 widens out from a span of 11 ft. to one of 24 ft. and illustrates a natural condition in a representative mine. Heavy steel beams placed across this span of roof, when properly lagged and propped, would hold this roof temporarily, but the inadvisability of thus supporting it is readily apparent.

To begin with, steel beams would be quite expensive, and, though for a while they would give absolute security, air inevitably would leak through the lagging and loosen the roof material, which would settle upon the beams. In time the load would become so great that it would buckle the steel unless it was taken down occasionally and the load removed.

Conditions in the mine of the Wolf Summit Coal Co., near Clarksburg, W. Va., are different from those already described. The 8-ft. Pittsburgh seam is very friable and acts somewhat in the manner of a checker shale, so that timbering will not hold it in place along the entries, even where 2 ft. of the coal is left in the roof. The coal thus left is of equal quality with that extracted and one naturally is led to wonder why all the coal is not taken out at the same time and gunite almost immediately applied.

The answer is that a smooth slate, resembling a soapstone, and which weathers freely, lies directly above the seam, and if all the coal is taken out the roof begins to fall immediately, pieces weighing as much as 6 tons detaching themselves from the roof a few days after the

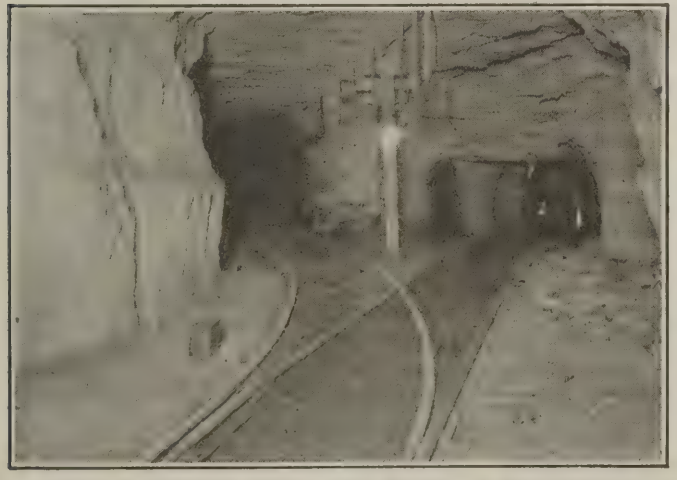


FIG. 5—GUNITE REPLACES STEEL AT TURNOUT

Scene in workings of National Mining Co. Though the span is 24 ft. at the point of the center pillar the roof is holding well as is evidenced by its flatness. Ribs as well as roof are gunited.

*Even in wet places with patience and skill gunite can be placed and will stay. In Fig. 6 may be seen the seep pipes inserted in the roof. After the pipes and the necessary rods were placed the gunite was worked inward toward them. The exposed coal on the right rib was trimmed to line up the trolley wire and is not the outcome of spalling.



FIG. 7—UNTRIMMED ENTRY IN WOLF SUMMIT MINE

The roof appears to be neatly corbeled from the ribs outward, but unless the overhanging material, which happens in this case to be coal, is trimmed from the roof and rib to the left, the gunite will crack after application. The left rib should be trimmed to look like the right rib.

coal is mined. If the gunite is applied to this slate as far away as 80 ft. from the face, the shock of a blast in the coal will dislodge the green gunite.

Yet despite the unusual difficulties, a few of which already have been explained, gunite is applied to the roof and the sides of the headings. Coal left in the roof in the driving of headings soon begins to break loose, the coal corbeling out over the roadway along each rib (see Fig. 7). This has to be trimmed before gunite can be applied. It is difficult to know whether any given portion of the entry has been properly trimmed, for it is impossible to judge just how much of the overhanging coal has been strained and its cohesion destroyed. Then also in some places large quantities of water are encountered (see Fig. 6). Under such circumstances the cement-gun crew has trouble in making the gunite stick.

In spite of the adverse conditions and in face of a bad sweating season last summer, during which time the mine was shut down by the strike, the roof was held by the gunite, so that after a year's idleness the mine resumed operation without a single fall having to be removed. The company believes that if the entries had been timbered it would have had to clean up all the headings. It bases its belief upon the experiences in a neighboring mine which is timbered and not gunited and from which large quantities of rock were removed before a resumption of mining.

The slacking or cutting of the sides and roof on fresh-air entries is most pronounced during the warm months of the year when the humidity in the air is condensed by the cool roof and ribs. Similarly, but in an even greater degree where mines are humidified with steam during the winter months, the roof if weak will slack and even fall in large masses. The Winding Gulf Colliery Co., of Winding Gulf, W. Va., met with such an experience and decided to apply gunite to the ribs and roof. Though this work was completed five years ago, the coating in the main is sound, requiring patching only occasionally at points where portions have fallen.

The material above the coal in most workings is not so weak as in the Wolf Summit mine and has strength enough to support itself when the roadway is driven, but the variation in temperatures of the ventilating air sets up stresses in the outer surfaces of the roof and ribs. Often the intake is so cold as to freeze the water which the roof contains. Moisture also is deposited on the cold surfaces during the sweating seasons and certain constituents in the rock oxidize.

Most of the moisture is deposited on the intake airways so that when the air reaches the return it is less humid and its temperature is more nearly that of the roof and ribs. Consequently falls on the return airways are less severe than on the intakes. It would seem advisable to exclude the air and moisture from the top and sides of entries. This may be accomplished by the use of gunite. Under most circumstances it will perform the duty assigned to it much more effectively than timbering and at a much smaller initial cost. Though easily applied it possesses the merits of being more permanent than timber and maintainable with less labor.

To say that gunite is a panacea for bad roof under all conditions would be an overstatement of its value. In making recommendations to one of his friends regarding the cement gun an operator intimated that there was no doubt that gunite will hold the roof in a mine where falls are caused by a deterioration in the roof due to the action of the atmosphere and not by inherent weakness in the roof, rock strains due to mining or gas pressure. This leads to an important consideration.

The Pittsburgh and the Freeport seams in the Pittsburgh region are known to be topped over limited areas with unusually bad roof, under which steel timbering will buckle and give because of the enormous loads which it must carry. Occasionally in driving into new territory gas pockets above the headings burst intervening rock and cause huge falls. Roof in stretches of 1,000 ft. or more are known to come down over night in an almost continuous line, the breakage extending several feet above the coal. This happened only recently in a mine working the Lower Kittanning seam. In such rare instances the logical solution is to let the roof come down, for usually it will fall to a certain height and then stop, after which gunite may be used to check further deterioration.

On haulageways, above all places, men come and go



FIG. 8—TOO THIN A COATING OF GUNITE

A glance at this illustration will convince anyone that the gunite coating of these ribs is too light. The roof and ribs retain the rough and jagged appearance of the original surface, which would not be the case if the gunite has been used less sparingly. With a better coat the cavities would have been filled and the entire surface rounded.

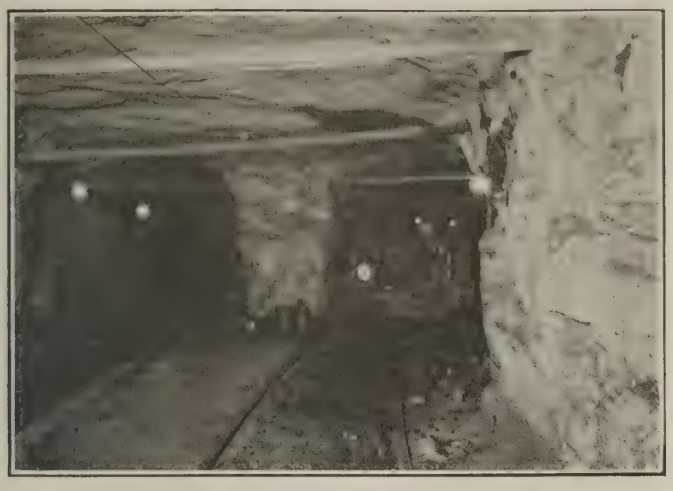


FIG. 9—SPALLED AREA NEEDS PROMPT PATCHING

Directly above the mine locomotive a large spalled area can be detected in the roof. The air has worked its way behind the gunited material through the exposed edges and caused the development of a large crack above the foremost trolley beam. The ribs also are beginning to spall, the coating being too thin. Where ¾ to ⅞ in. coat is used no trouble is experienced. Pressure of gas had caused many falls in the roadways before the gunite was introduced.

so often that protection against falls should be provided where the roof is known to be weak and treacherous, but if steel sets are used as supports and it is found that they sag under the roof they are intended to hold, they should not be employed except perhaps at shaft landings and turnouts. Would it not be better to support bad stretches of roof elsewhere by wood timber sets instead of steel, relying on them until it is clear that the load is becoming excessive? They then could be pulled down and the loose rock be allowed to fall, and other rock that is relatively loose could be barred down. Gunite then could be applied with some assurance that the difficulty thus met would not recur. In most cases the use of gunite in the first instance would make timbering entirely unnecessary.

Coal Mining Shown to Be Safe Occupation

UNDERGROUND coal-mining is safer than window cleaning, carpentry, running farm machinery, house painting and more than one hundred other occupations, according to figures made public May 9 by the Bituminous Operators' Special Committee, of which J. C. Brydon, of Somerset, Pa., is chairman. To determine the danger in coal-mining compared to that of other occupations generally considered less hazardous, Mr. Brydon pointed out, the State of Indiana was chosen as the most representative. The National Council of Workmen's Compensation Insurance fixes the rate at $3.55 which an employer of underground coal-mine labor in Indiana must pay per $100 for his payroll.

Compensation rates for underground miners in the different states, Mr. Brydon explained, vary from $2.50 per $100 payroll in Virginia to $5.60 in Illinois, while in more than two-thirds of the states the rate is between $3 and $4. Indiana, with a rate of $3.55 per $100 payroll, approximates the average for this type of insurance in all coal mining states.

"Merry-go-round and roller coaster employees," Mr. Brydon said, "are considered by Indiana insurance men as more liable to injury or death than underground coal miners, as shown by the rate of $5.85 per $100 payroll as against the mining rate of $3.55. Mining in nearly every other form, quarrying and excavating are considered more dangerous than coal-mining, the figures show.

Besides being a comparatively safe occupation, Mr. Brydon stated, underground coal-mining is carried on under more pleasant working conditions than occupations calling for higher insurance rates and less pay to the worker. In most Indiana mines the temperature winter and summer remains virtually the same; in one mine, for example, the temperature remaining within one point of 69 deg. the year round.

Although there are at least 100 occupations in Indiana, which is fairly representative of the United States, classed as more dangerous than coal mining, Mr. Brydon asserted that few if any of workers in these extra-hazardous callings receive a day-labor wage even approaching $7.50 a day, the minimum received by the underground day laborer in unionized fields.

The relative risk of each occupation may be estimated by comparing its insurance rate with $3.55, the Indiana underground coal-mining rate. The list, in part, follows:

Occupation	Base Rate per $100 Payroll
Cattle dealers	$3.57
Veterinary hospital employees	3.57
Drilling or dismantling oil wells	3.58
Bottling	3.61
Wood preserving	3.84
Drop or machine forging	3.84
Manufacturing chains, tools or hardware	3.84
Manufacturing shoddy	3.88
Erection of mausoleums or monuments	3.88
Painting signs on buildings	3.90
Erecting awnings and tents	3.90
Hanging flags and bunting for conventions and celebrations	3.90
Erecting advertising signs	3.90
Manufacturing carbonic-acid gas	3.98
Construction of electric light and power lines	4.01
Installation and repair of boilers	4.36
Manufacturing veneer	4.37
Scaling boilers	4.42
Erection and repair of elevators	4.65
Cotton ginning and compressing	4.77
Operation of electric light and power plants	4.89
Manufacturing cotton wadding and waste	4.91
Garbage reduction or incineration	5.31
Employees of horse sales stables	5.79
Ice harvesting and storing	5.84
Employees on merry-go rounds, roller coasters, etc.	5.85
Manufacturing cottonseed oil	6.21
Cleaning outside of buildings	6.27
Pile driving for foundations	6.52
Raising or moving buildings	7.41
Junk dealers, in shops or outside	7.99
Erecting blast furnaces	8.21
Metal stamping	8.24
Wrecking buildings or salvaging after fire	9.64
Window cleaning	12.09
Workers on rigging, not on vessels	14.91
Erecting scaffolds	16.10
Erecting iron and steel structures	16.10
Painting steel frames and bridges	16.10

Output of Coal on Public Lands in 1922 Double That of Previous Year

Production of coal upon public lands during 1922 more than doubled the output of 1921, according to figures recently issued by the Department of the Interior.

The number of mines that were operated upon public lands totaled 101 in eight Western states. Of these states the largest number of operations were in Wyoming and Colorado, each having twenty-eight mines. Wyoming, with an output of 390,000 tons, produced more than one-half of the total amount of coal from government lands. Colorado, with 165,000 tons, ranked second; North Dakota, with 67,000 tons, was third, and Utah, with 61,000 tons, was fourth.

Production of coal from government lands, by states, for the years 1921 and 1922, was as follows:

States	Mines Producing in 1922	Tons of Coal Produced 1921	1922
Colorado	28	13,096	161,546
Montana	20	3,533	5,454
New Mexico	4	2,816	14,009
North Dakota	8	27,710	66,924
South Dakota	2	.....	424
Utah	9	9,622	60,809
Washington	2	5,175	49,243
Wyoming	28	300,221	390,763
	101	362,173	752,172

Cambria Steel Co. Finds That Good Housing Increases Output*

By George Atwell Richardson
Cambria Steel Co., Philadelphia, Pa.



Well-Planned Residences with Modern Comforts in Village of Slickville Lower Turnover and Promote Contentment—Plans of Houses Already Constructed—Sewage Disposal—Many Houses Have Bathrooms, Running Water and Toilets

NO MAN is thoroughly contented unless he has a pleasant and happy home life, and the frame of mind of his wife, if he is married, is an important factor in attaining this condition. It is difficult to remain cheerful and good-natured if one's life partner is always nagging and complaining.

The average woman is not naturally ill-tempered. As a rule some extraneous cause is at the bottom of the difficulty, and no more fertile reason can be found than that of indifferent or bad housing accommodations. Give a woman a good home, and the foundation, at least, of her happiness has been laid.

Two of the main sources of difficulty in maintaining satisfactory outputs at any mining operation are: (1) The miner who drifts from place to place, the man who has no home ties to bind him and who is up and away at the least provocation; (2) the discontented miner who not only fails to measure up to his own best abilities but is a cause of dissatisfaction and contention among his fellow workers.

When the Cambria Steel Co. started to develop a new mining operation at a place about fifteen miles north of Greensburg, Pa., on the Turtle Creek Branch of the Pennsylvania R.R., it recognized these conditions and all plans were based on providing, first of all, really good housing conditions for its workers, a policy which has been fully justified by the results.



FOREMEN'S HOUSES ON APOLLO ROAD

It will be noted that care has been taken to leave enough trees to give the village an appearance of long establishment and the setting which every house needs. The houses are fully provided with plumbing fixtures.

The town of Slickville dates from the year 1916, at which time the town site was laid out, the 1,200 acres comprising the company's holdings having been acquired about 1900. The surveys were made in June and July, 1916, and the first mine opening was made in the autumn of the same year. At that time no railroad had been constructed to the property to be developed, so temporary buildings were erected for housing the employees.

All plans were based on the needs of a mine capable of producing about 3,000 gross tons of coal per day, this being the present capacity of the tipple, though from time to time the output has been increased to 3,100 gross tons. The Pittsburgh seam, the thickness of which on the Cambria property averages about 84 in., lies close to the surface in this locality, and at some near-by mines the coal is removed entirely by stripping. At Slickville, however, most of the work is underground; only a small area has been stripped, about 3,000 tons of coal having been thus obtained.

It was intended to bring the project to rapid completion and the work was expedited as much as possible. The only obstacle was that due to a lack of labor which was even then severely felt, though the United States at that time had not become a participant in the war.

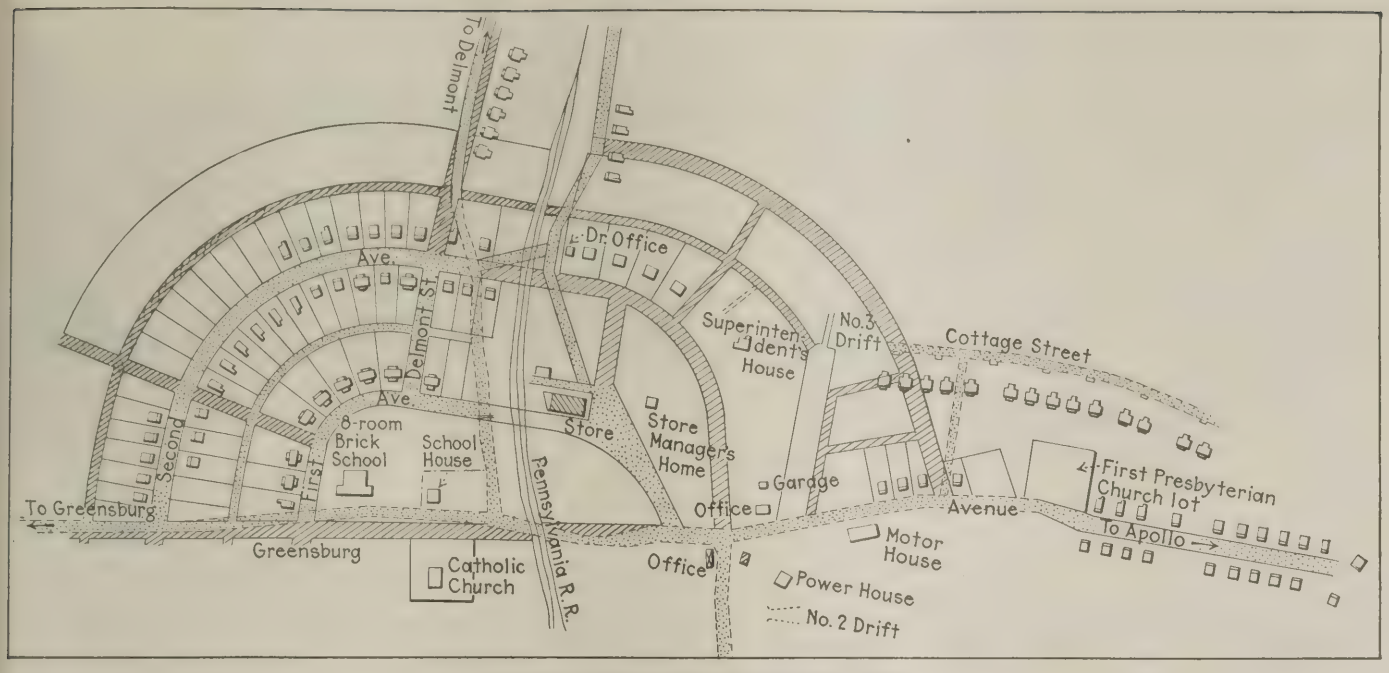
At the present time about 500 miners are employed at the mine, making the total population of Slickville about 1,200 to 1,500. The plan of the townsite, which forms a part of this article, shows the houses and buildings which the company has constructed.

All the houses are of frame construction and of the "ready-cut" type. The erection of the first permanent dwellings was started in 1917, at which time the nearest railroad connection was Saltsburg, five miles away. Material for ten double houses which made room for twenty families was hauled from this point.

These double houses which measure 24x40 ft. exclusive of porches, are provided with two stories. On the first floor of each side are a large living room and kitchen and on the second floor are three bedrooms of fair size which have plenty of closet space. Bathtubs are provided and provisions made for the supply of

*Since this article was received the Cambria Steel Co., as also the Midvale Steel & Ordnance Co., with which it was affiliated, has been merged with the Bethlehem Steel Co.

Note—Headpiece shows houses of foremen and mine bosses on the road to Apollo. These have the Sanisept system of sewage disposal. Houses measure 22x25 ft. exclusive of porches. Trees, lawns and fowers give to the houses an air that private ownership alone is believed to confer.



PLAN OF VILLAGE OF SLICKVILLE

The stippled areas show the roads as at present used. An effort has been made to avoid long, straight lines, which are monotonous and none too sightly. Nearly every lot has its service lane at the back so that coal can be stored in the rear of the lot. The road from Greensburg to Apollo runs through the village approximately due north.

hot water. These houses have outhouses provided with concrete vaults.

It is interesting to note that all the houses on the First Ave. circle were built under wartime conditions when there was a great shortage of labor. As a result it was necessary to bring the men out of the mine to complete them, and even the blacksmith took a hand in the work. Hence it can be said that much of the town is self-built.

In 1918 twenty single two-story houses, each measuring 22x22 ft. were erected. All of these are on Second Ave. A living room and kitchen on the first floor and three bedrooms on the second floor is the standard arrangement. A bathroom also is provided on the upper floor.

Another group of houses similar in every way to those built in 1918 except that the dimensions are 22x24 ft. were constructed in 1919 for the use of the foremen and mine bosses. It was still necessary to haul material for this third operation over the public roads, but by this time the railroad was within three miles and shortly thereafter entered town, so that the necessity of hauling material long distances no longer hampered construction. All the houses built in 1918 and 1919 were provided with the Sanisept system of sewage disposal.

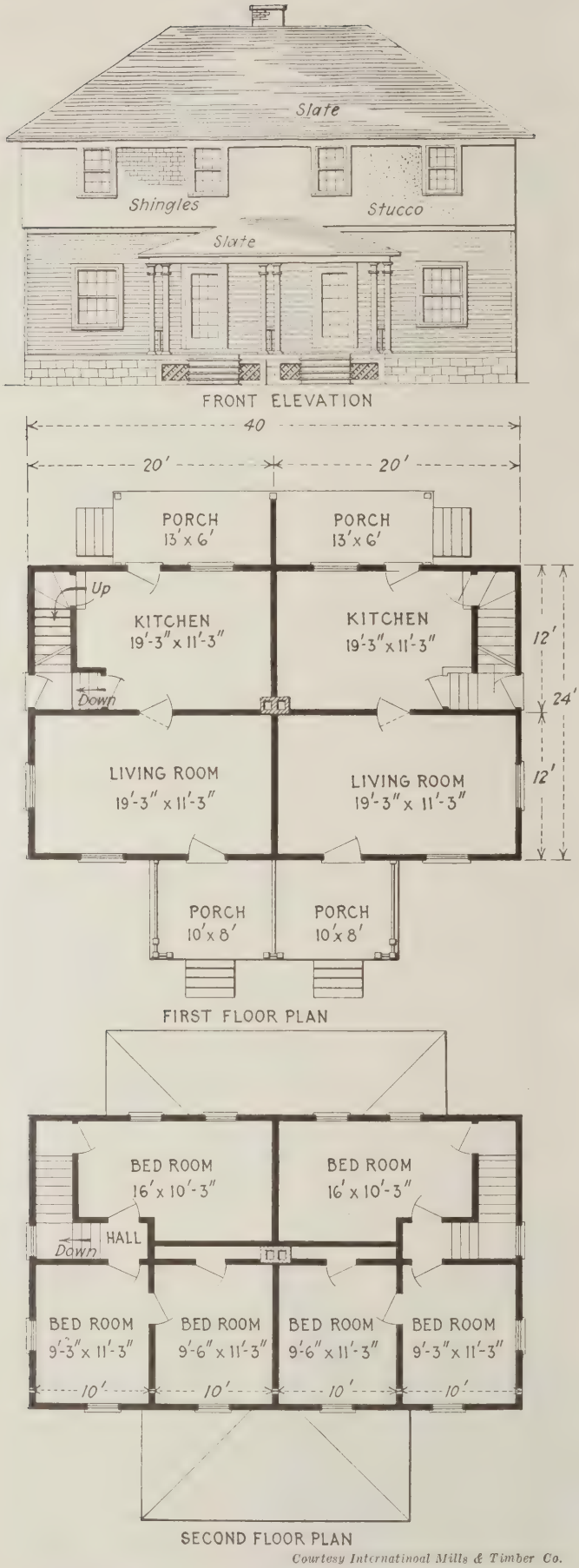
The year 1919 marks the beginning of the period in which the village began to take on the semblance of a completed town. In this year a large modern brick store building was erected. It is owned by the Cambria Steel Co., but is leased to and operated by the Miners' Supply Co., a stock organization. A complete line of groceries, general merchandise and meats is carried, and the store is provided with its own refrigeration plant. Here also is located the post office, which was raised from fourth class to third class rating in July, 1922.

The store is operated on a strictly competitive basis, the appeal to customers being based on the cleanliness of the surroundings, the completeness of the stocks and the low prices. It always has been well patronized,



Double Houses

A crescent of double residences on First Ave., taken from the hill in front of the school. The tenants in these houses pay only $7.50 per month for rent, $1.50 for electricity, $2 for coal and nothing for water. Each half house measures 24x20 ft. and has a living room, a kitchen, three bedrooms, bathtubs and water heaters.



Courtesy International Mills & Timber Co.

FIRST HOUSES IN TOWN ON FIRST AND SECOND AVE.

These houses, shown also in another illustration, measure 24x40 ft. and accommodate two families. The foundation is of stone and the roof of slate. The outhouses are furnished with concrete vaults. The men were brought out of the mines to build these houses, as labor was scarce. However, being ready-cut houses about all the qualification the men needed was to know how to drive a nail.



SINGLE HOUSES ALONG APOLLO ROAD

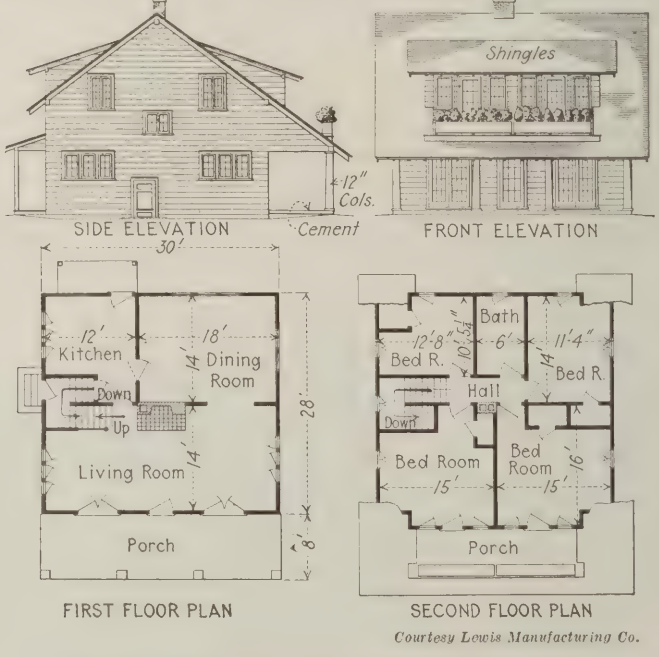
These houses rent for $10.50 a month, clearly exhibiting how little of the mine workers' earnings is devoted to rent. The urban worker often spends as much as 30 per cent on this item alone.

though no attempt has been made to prevent the construction of rival stores or like accommodations, of which there are some fifteen at the present time. The aim is to handle the best of everything, and the store is a credit to any community of the size of Slickville and many larger places. It is a "going" proposition in every sense of the word and pays a reasonable return on the investment.

In 1919 provision also was made for the housing of the various mine officials, a number of dwellings of better grade being erected in a westerly direction from the store. These measure 28x30 ft. and have seven rooms and bath. Individual garages also are provided with each house. The superintendent's house is of slightly different design but the same general type.

In 1920 a fourth group of twenty single houses, each containing four rooms, was erected. These have no bathroom but are provided with running water and with a toilet on the back porch.

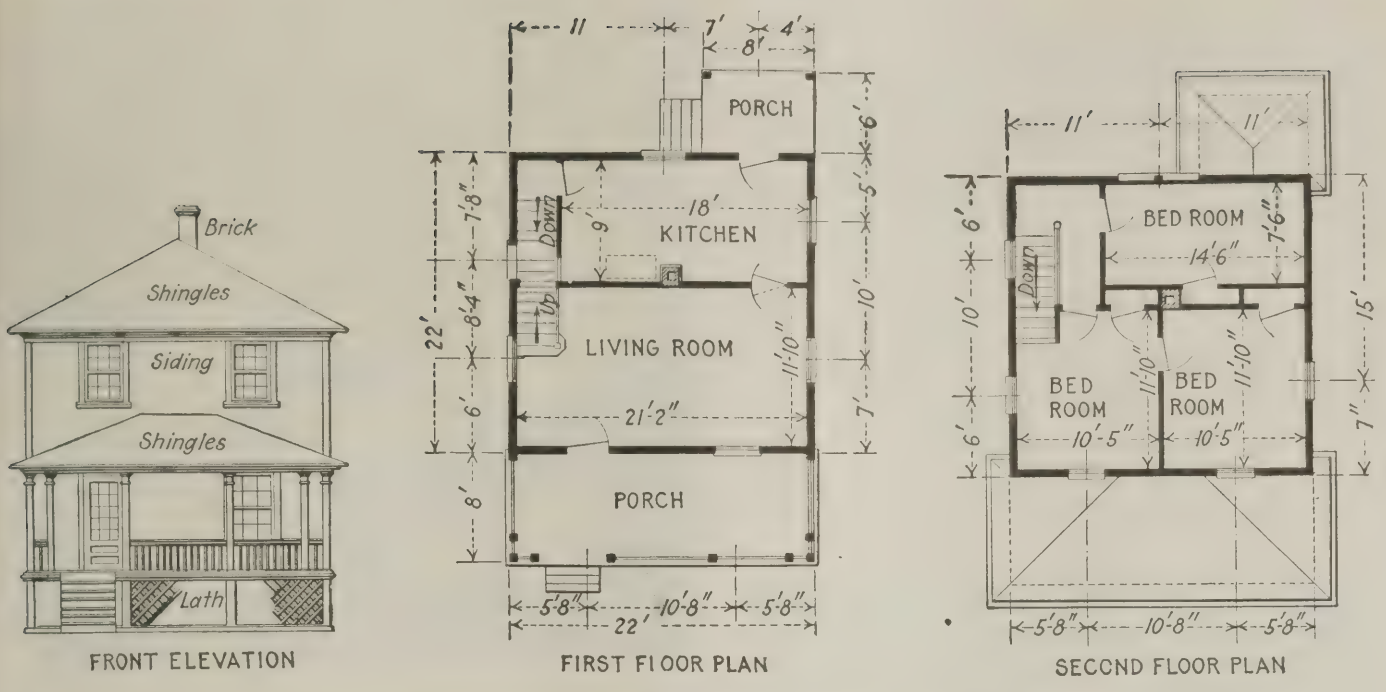
The fifth and last group of houses built to date was erected in 1922 more or less as an emergency. These houses are all five-room one-story single houses and are not provided with an inside water supply. One hydrant between each two houses provides the tenants with



Courtesy Lewis Manufacturing Co.

SEVEN-ROOMED HOUSE FOR MINE OFFICIALS

These lie to the north of the store, that is to the right of it in the plan. The upper floor has four bedrooms and a bathroom. The rooms have plenty of closet space. Each house has an individual garage.



SINGLE SHINGLED HOUSES ON SECOND AVE.

These houses have 7-ft. cellars with 12-in. walls. Similar houses, but measuring 22x24 ft., were built for firemen and fireboses. In all these houses the Sanisept system of sewage disposal has been provided.

water. The outhouses are fitted with concrete vaults. An inside water supply was not provided because it was feared that owing to the type of construction the pipe would be likely to freeze. Six of these houses are located on the road to Delmont at the west side of town, and the remaining fourteen, on Cottage Street in the northwestern part of the village.



SPECIALLY DESIGNED RESIDENCES FOR OFFICIALS

These were erected in 1919, when the railroad was being finished. They measure 28x30 ft. and contain six rooms and bath. They rent for $15 a month.

All the houses are lighted by electricity, the company furnishing the current. The steel company also supplies the coal used by the tenants. Every effort is made to keep these residences in the best of condition, the company keeping a plumber on the job whose duty it is to take care of all minor troubles. Likewise whenever necessary a carpenter is provided to make needed repairs.

The rental of the houses is quite reasonable. No attempt is made to make the investment profitable, the feeling being that the main reason for their existence is to provide housing of such a character as will form an invaluable asset to the mining operation. Indirectly the houses do pay for themselves, because contented help makes for better work. All rentals are figured on a base price for a given type of house plus a flat charge of $1.50 per month for light and $2 for coal. An idea of the low cost can be gained from the figures in the table herewith.

HOUSE RENTS IN VILLAGE OF SLICKVILLE, PA.

Type of House		Rent per Month
Double houses, built 1917 One side	Base	$7.50
Single houses, built 1918	Base	9.00
Single houses, built 1919	Base	10.50
Single 4-room houses, built 1920	Base	8.00
Single 5-room cottages, built 1922	Base	6.00
Officials' houses	Net	15.00
Superintendent's house	Net	25.00
Store manager's house	Net	25.00

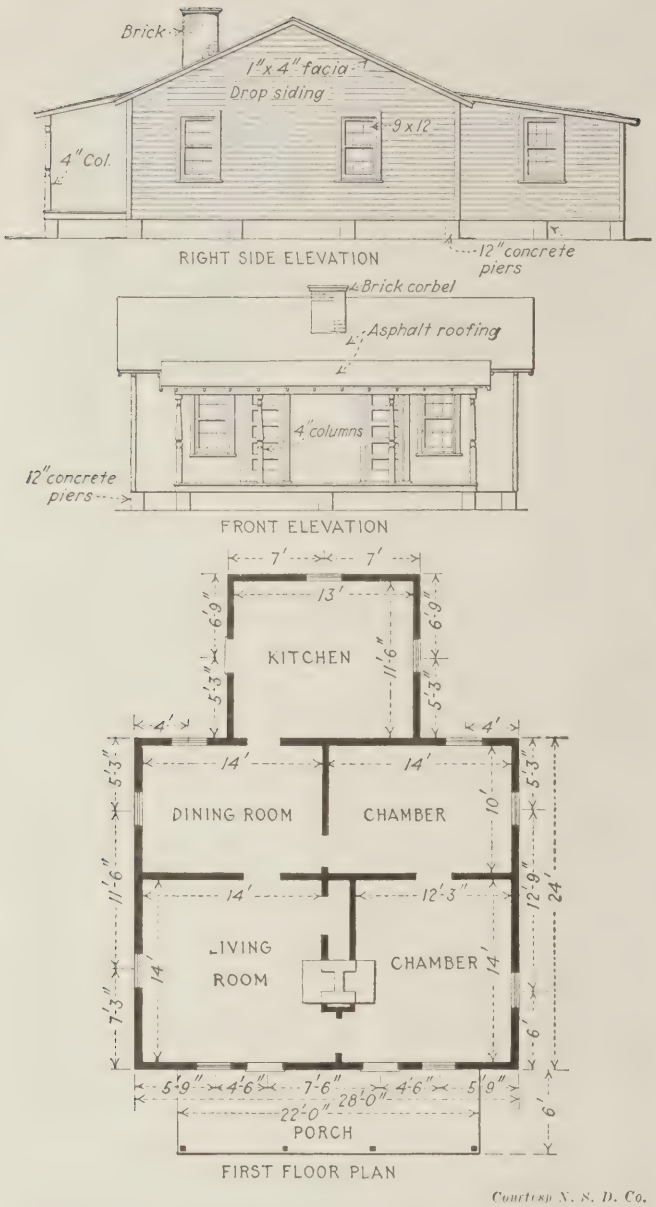
In 1922 a modern eight-room schoolhouse was completed and opened at the beginning of the fall term. This was built by the township, is steam heated and has its own Sanisept sewage disposal system. At the time the school was opened the old two-room structure previously used was abandoned and bought by the Cambria company, which refitted it as a bunkhouse for floating help and provided it with a shower bath.

At the present time there are two church organizations, both active. The Roman Catholics completed a church structure in 1920. The Presbyterians have a lot selected on which they plan to build in the near future.

Other company buildings include the doctor's office, a one-story brick building located close to the railroad station at one end of the row of officials' houses, and the company office. This latter is a two-story brick building which houses the various executive and engineering offices and also contains a jail in the basement.

Village Has Not Been Incorporated

Slickville as a community is directly under the management of the Cambria Steel Co. It is not an incorporated town or village and there are no local officials. Despite this, however, the attitude of the company is not paternalistic but rather co-operative in its nature. No attempt is made to interfere with private initiative of a legitimate character, as has already been evidenced



Courtesy N. S. D. Co.

FIVE-ROOMED BUNGALOWS ON POST FOUNDATION

These houses, which were erected in 1922 to meet an emergency, have a living room, dining room, kitchen and two bedrooms. An outside hydrant provides water for two houses. The outhouses have concrete vaults.

to some extent in the mention of the general store and its competitors.

A well-defined scheme of welfare work has never been planned or attempted. When the town was started the war interfered with activities of this character, and since that time the feeling has been that it was not needed. The company, by furnishing good houses and maintaining them, has stimulated a sense of pride in the residents and encouraged it by co-operation in other ways which do not impose on the independence of the individual. From the results obtained this policy has been more than justified.

A few of the things that the company actually does are as follows: (1) All the lots are provided with gardens. The company plows them and furnishes the necessary manure from its stables. On the whole, good care is bestowed on the garden plots and this effort is fully warranted. (2) The company backs a boy-scout troop which at the time this article is written has a registered membership of thirty-nine. John D. Martz, principal of the school, is scoutmaster and has a fine group of interested boys. Work of this kind is more than worth while in any community, but to be developed to its fullest extent it requires a head who can give lots of his time to it. In recognition of this fact the company has made a practice of allowing a small additional stipend to the principal over and above his regular salary which is paid by the community.

Almost everyone today recognizes the value of scouting, and the writer, as a former scoutmaster with some



RESIDENCE OF THE SUPERINTENDENT OF THE PLANT

This house rents for $25 a month. Where houses are erected for profit and are located near urban centers but still in more or less open country, the rent of such a house as this would be at least three times as high.

six years of experience, desires to emphasize the fact that in his opinion there is no single activity that has to do with boys that is more productive of lasting results. Even at times when those who are interested fear that their efforts have failed, an accidental discovery will show that this conclusion is fundamentally unsound, and in some instances the reaction is of a surprising nature.

The girls have not been overlooked, and a girl-scout troop under the leadership of Miss McKee, a teacher in the school, who is assisted by Miss Martz, a daughter of the principal, was started this year and now has a membership of sixteen.



OFFICE OF CAMBRIA STEEL CO., SLICKVILLE, PA.

This two-story brick building houses the various executive and engineering offices. The sheriff maintains a jail in the basement.

Recently both girls and boys were given a chance to show the value of their training when the school directors' meeting of Westmoreland County was held at this place. The ladies prepared the meals in their homes, and the youngsters aided in delivering, serving and handling with great success.

(3) *Safety Work.*—A large proportion of the safety work is handled directly through the schools in the belief that the fathers can be more easily reached in this



EIGHT-ROOM BRICK SCHOOLHOUSE

Large, well-lighted school replaces the old two-room structure that served the community prior to, and for a time after, the opening of the Slickville mine. It also has a private system of sewage disposal.

way. As a rule the children can advocate safety to their parents better than any outsider.

Many activities are carried on independently. Among these are a basket-ball team. Moving pictures are shown three times a week and there is also a dance hall.

The general result is that here is a small mining town where living conditions are particularly favorable to contentment. It is not too far away from a large town (Greensburg, the county seat), and the local surroundings are far better than can be found in many similar places. The locality is an attractive one, in the midst of a wooded, hilly section, and the streets of the town in summertime are particularly attractive because of the many trees which have been left standing.

The miners themselves like the place, and few seem disposed, after once they have moved in, to continue to follow the impulses of their roving natures. Even during the recent strike, when, after a long time, it finally became necessary to terminate the leases of some of the miners who refused to go to work, there was no hard feeling, and the same men have since been hired again. In connection with this description of the town of Slickville it will undoubtedly be of interest to know something about the character of the mines and their operation.

This is a typical drift-mining operation with three openings at the present time, the coal being dumped over one tipple. Owing to the position of the seam much of the coal to be mined is what is known as "crop coal" and much timbering is required. In some places it will be necessary to resort to stripping. The roof consists of a rooster coal which in places is 18 in. thick and at other places entirely absent, giving place to slate. Over this is about 18 in. of banded coal and slate and over that again a real slate and limestone. Under the coal is a 4-in. layer of fireclay resting on a hard limestone.

Electricity is used throughout the mine and property, power being furnished from the West Penn Power Co.'s line. A combination transformer and motor-generator station takes care of all requirements. All electrical equipment on the tipple is driven by 220-volt alternating current which is transformed from 2,200 volts. All the mine equipment is actuated by 250-volt direct current from the motor generator. In addition some current is transformed to 110-volt alternating current for use in the town, thus making possible the use of standard electrical devices in the homes. For night work in the mine a small motor-generator set takes care of all requirements.



SLICKVILLE HAS ITS TROOP OF BOY SCOUTS

John D. Martz, the principal of the school, is scoutmaster and has a group of thirty-nine greatly interested lads. Many a town is ruined by the misdirected activities of its boys and many another is given a quality of stability by the helpful influence of well-trained youth.



FIRST FLOOR OF STOREHOUSE

Time was when the mine foreman's shanty was the storehouse. There were only a few parts to keep, but even then they often were lost. The growth of mechanization has made storehouses necessary. This one is of brick. This, the first floor, is used for the storage of machine parts.

There are no special features of interest connected with the inside work of the mine. Steel mine ties are used in all rooms and 5x6-in. or 5½-in. wooden ties with 70-lb. rails are used on all main haulage tracks. Four 6-ton gathering locomotives and also horses and mules are used for gathering. On the main hauls three 13-ton and two 6-ton locomotives are used.

The cars used in this mine are of the same size as those used in thin coal. Cars of this size can be more conveniently handled in case they are derailed inside the mine, and even though no locomotive is immediately available for their rerailing. This quality more than offsets any losses due to decreased carrying capacity. The cars are of an all-steel pressed-body type with special patented features designed by Mr. Lubken, then general superintendent of the coal-mining operations of the Cambria Steel Co. These were illustrated in an article by the author on the Rolling Mill-Rosedale Mines at Johnstown in *Coal Age* of Sept. 7, 1922.

Tipple

This structure was built wholly from timber either sawed on the company's land or brought in from nearby mills. It was erected before the railroad was completed. The cars are discharged by rotary dumps and returned by kickbacks.



The tipple is of wood, all the timber for its construction being sawed on the company's or adjacent property. It was built before the railroad to the mine had been completed. All cars are discharged on rotary dumps, and kickbacks are used to return the cars.

From the dump the coal goes to crushers, the sizes under ¾ in. being bypassed directly to the loading-out chutes. The lump coal is crushed to sizes between ¾ in. and 3 in., all slack less than ¾ in. being screened out. None of the coal is washed. The slack is used in the coke ovens at Johnstown and the larger coal in the gas producers at the same place. In this connection it should be mentioned that the local Johnstown low-volatile coal is not a coking coal in itself, and it is necessary to mix it with gas coal to produce a coking mixture. This was one of the reasons for acquiring this property. Near the tipple is a small pumphouse containing an electric pump which lifts water from a 90-ft. well for use in the town and plant.

Method of Keeping Track of Men and Tonnage

Each miner has two checks. One is an identification check that he always keeps with him regardless of location. The other is the usual time check which is dropped in a box in the time office on the way into the mine. The timekeeper records it and then hangs it on a board where the man can get it again when he comes out. Numbers are assigned according to the mine, a special set being reserved for men working on general company work.

In an operation of this size the dispatching of coal cars is not a difficult problem. It is handled by the locomotive boss, who is responsible for the motormen being on hand and who also keeps tabs on trips. Each motorman reports on a blackboard the number of cars handled on each train. The locomotive boss knows what tonnage should come from each section and in this way allots the necessary empties. Every hour the number of tons dumped from each mine is telephoned from the tipple to the office.

Each week is held a company meeting which is attended by the various bosses, foremen and officials, and here all questions of policy, problems of operation, etc., are thrashed out. The storehouse is a two-story brick building and is a model of its kind. On the first floor all machine parts are stored, being kept in numbered bins. Each part has its own place, and the bins are grouped by machines. On the second floor bolts and miscellaneous materials are stored. Separate bins are used for bolts and all small articles.

In accordance with usual practice the cap house, which is of brick, is located at one end of the storehouse and the powder house is at the other end. These buildings carry about a day's supply, the balance being stored in separate storehouses in the valley back of a hill that bounds the town. An interesting feature of the powder house is the absence of light or heat inside. The only source of illumination is an electric light over the window through which the powder is passed out, making the storage as nearly safe as possible.

Oil pumps and sunken tanks are used in the oil house, which is provided with one 500-gal. tank for machine oil and one 1,000-gal. tank for crude oil. Both are set in concrete. This has been found to eliminate much waste. Before these reservoirs were installed, raised tanks were used, and someone was always letting the oil drip or run, no matter how much that practice was deprecated. The oil house is not heated.

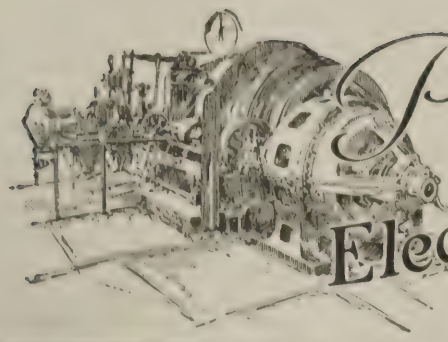
Slickville forms an interesting example of the trend of modern mine management. The property is one which is good for at least twenty years of operation based on present capacity, and plans have been made with this in view.

Jarring Blasts Save Lives from Blowouts

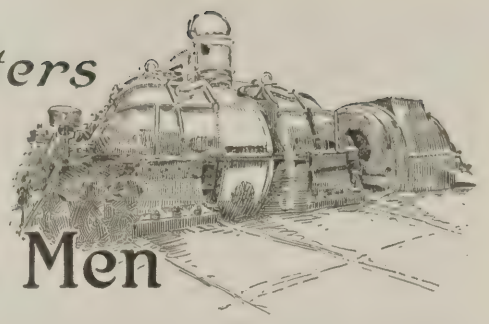
By F. C. Cornet

TWO methane outbursts of great violence, both killing men and doing great material damage, occurred in Belgium in March, 1923. One was at Paturages, the other at Quaregnon. They brought to a climax the controversy, between the operators on one side and the Department of Mines on the other, regarding the demand of the former that they be permitted, at the working faces, to use the jarring-blast method of initiating blowouts. Public opinion and the press took the side of the operators. So did the miners' union. The Department of Mines authorized a three-months' trial of the jarring blast in part of the Mons district.

The operators wasted no time and immediately introduced in their mines the long forbidden method. During the first week of the present month (April, 1923) a blowout of the first magnitude provoked by a jarring blast occurred in the Rieu du Cœur Mine, at Quaregnon. It killed nobody, as the men had left the mine, the shots being fired from the surface. The damage was estimated at less than $20. The operators of Belgium now feel sure that they will be permitted permanently to use the jarring-blast method of operation wherever it is advisable to do so. It long has been regarded in France as a life-saving provision.



Practical Pointers for Electrical and Mechanical Men



Voltage and Load Control of Alternators

IF AT any instant the electromotive force of one generator is lower than that of other machines with which it is connected in parallel, it will take current from the other generators instead of feeding current into the line.

That the electromotive forces may be the same at all times, the generators must conform in frequency, phase and wave form, otherwise pulsating currents will be set up. If similarly designed machines are adjusted for the same voltage and operate at the same uniform speed, these conditions usually are fulfilled.

The distribution of the load on alternators operated in parallel is determined by several factors, the primary one being the speed. If the governors on the driving machines give different speeds, that which runs at the greater speed will carry a greater proportion of the load until the speed is reduced, when the second machine will begin to carry the load. Before this condition is reached one generator may be running as a motor, as the tendency is for the speed to be higher than it would be if it were not running in parallel.

The effect on the engines of a periodic transfer of load occasioned by hunting between two machines running in parallel is somewhat similar in effect to throwing the load on or off a single engine at short equal intervals which may be measured by one or several pulsations in the combined turning efforts applied to the engine shaft.

In some extreme conditions the pulsations of load may amount to more than the normal capacity of either machine. With no external load one engine may then alternately drive the other, which evidently will be a more severe condition than if the load were only applied and removed from a single engine.

Different than with direct-current generators, when the rheostats of two alternators running in parallel at normal speed are not adjusted to give proper excitation, an idle or cross current will flow between the armatures, the value of which will depend only upon the difference in field charges of the machines. This cross current may vary over a wide range, from a minimum of zero when both field charges are normal, to more than full-load current when they differ greatly. The effect of this cross current is to increase the temperature of the armatures and, consequently, to cut down the output of the generators. It is important, therefore, that the rheostats be so set as to reduce the cross current to a minimum. This cross current is registered on the ammeters of both generators and usually increases both readings. The sum of the ammeter readings will be a minimum when the idle or cross current is zero.

In general, the proper field charge of a machine running in parallel with others is that which it would have if running alone and delivering its load at the same voltage.

In order to determine the proper position of the rheostats it is necessary to make trial adjustments after the alternators are connected in parallel until that position is found which reduces the sum of the ammeter readings to a minimum for a given load.

It is therefore obvious that by a combination of changes in the two rheostats—i. e., by cutting one in and the other out at the same time—the strength of the cross current may be varied considerably while the electromotive force of the system remains constant, and the load will be divided between the two machines practically the same as before, because, as pointed out above, the division of the load is a function of the speed at which the prime mover drives the generator.

Welding Cast Iron

ONE of the most difficult welds to make is a cast iron weld. The welding process forms a layer of extremely hard metal with low mechanical strength just under the deposited metal. This prevents a proper knitting together of the cast iron and welding material, which causes failure to take place in this area. To overcome this condition several methods have been developed, some of which are fairly successful. One method is to prepare the specimen for welding and then drill and tap the area with holes into which stud bolts are screwed. The stud bolts are left projecting out of the cast iron and the weld is made to the cast iron and studs. By this method the studs serve to tie the deposited metal to the specimen.

Another method is to make the weld with a non-ferrous electrode, such as bronze of certain alloy and copper nickel alloy. These metals deposit without the hard film referred to, and if properly done the weld will show high mechanical strength. Positive polarity in the electrode should be used for non-ferrous electrode work.

Reducing Voltage in Synchronous Converter For Locomotive Battery Charging

CONSIDERABLE economy may sometimes be effected in charging storage battery locomotives by the use of a three-wire synchronous converter. When the trolley voltage is 250 and the battery charging voltage is about 125, obviously it is necessary that the trolley voltage of 250 be reduced by some means. Frequently the voltage reduction is made by inserting resistance in series with the battery or by the use of a motor-generator set.

Both these methods are relatively expensive, due to

power loss and outlay for equipment. The three-wire synchronous converter may be used to great advantage. The neutral point usually is obtained from the middle point of the low-tension winding of the transformers or from auto-transformer balancing coils if the converter is used without step-down transformers. Series field windings on main poles and commutating poles, if any, are divided into two equal circuits, one connected in each main lead. This is necessary to obtain proper excitation with unbalanced direct-current loads. The result obtained will be 125 volts between each main lead and the neutral wire, this voltage being that required for charging most storage batteries used on mine locomotives.

Polarity, Composition of Electrodes and Adjustments for Luminous Arc Headlights

THE popularity of the luminous arc headlights for mine haulage locomotives is still well established, yet there is some confusion with respect to the polarity of the electrodes. With incorrect polarity it is possible at times to get seemingly satisfactory results for a time and it is for this reason that the incorrectness of polarity is not quickly and readily realized.

Incorrect polarity will not give the proper volume of light; the arc is unstable and of a greenish color. With correct polarity the arc gives a brilliant white light and burns steadily.

The upper electrode is a copper composition and the lower electrode is a magnetite composition. When properly connected to the circuit the upper electrode is positive and the lower electrode is negative.

Every arc is characteristic of its negative electrode—that is, the negative electrode determines the quality and color of the arc. When a new lower electrode is put in the headlight, it should be burned for about five minutes before being sent out on a locomotive. This time is necessary to burn off the iron cap on top of the electrode, during which time the arc is somewhat unstable.

After the electrode has burned for some time the top becomes a molten mass, and when it cools the end becomes hard and uneven. When the headlight is put in operation again, this readily melts. The end should never be knocked off.

The electrodes of luminous arc headlights burn a very long time. The upper (positive) electrode has a life of about 2,000 hours on 4-ampere headlights and about 3,000 hours on 2-ampere headlights. Therefore it is rarely necessary to adjust it more frequently than every two or three months. The lower electrode (negative) has a life of 75 to 100 hours on 4-ampere headlights and 150 to 200 hours on 2-ampere headlights; after ten hours' burning it should be adjusted.

Many users of the luminous arc headlight have found it to be so satisfactory in operation, when connected with the proper polarity, supplied with the correct electrodes and properly adjusted that whenever any difficulty is experienced they immediately check up on these points and almost invariably find the cause of the difficulty.

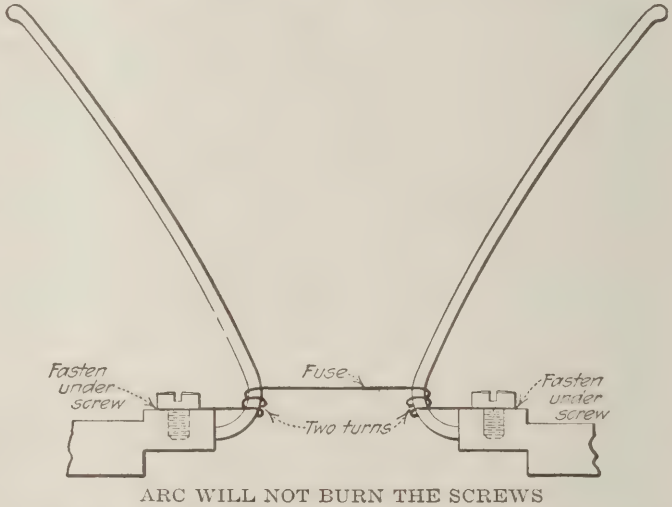
Wrong polarity occasionally is found to exist when the headlights come in on a new locomotive, and if not properly corrected on putting the locomotive in operation this condition may exist for an extended period, giving poor operation and being wasteful of electrodes. This may be due to the fact that the locomotive is placed at work in a section where no one is familiar with the headlight and also because the electrician rarely thinks it necessary to give a new locomotive a great amount of personal attention during the first year of its life.

Improper electrodes will greatly affect the stability of the arc and in checking into this detail some very interesting and strange things have been found in headlights used on locomotives which have been in service for long periods in remote sections of the mine. Copper trolley wire has been used for an electrode and even rail spikes have been used. These substitutes cannot give the proper light and frequently result in damage to the headlight and accidents on the haulage system entailing expense that would pay for obtaining and installing the proper electrodes.

The adjustments to the electrodes should be done regularly; this does not inflict any undue burden upon anyone because the inherent characteristics of the headlight automatically maintain proper adjustment for over ten hours of service.

How to Fuse a Horn Gap

IN A large number of relatively low-voltage alternating-current distribution lines the horn-gap fuse is most popular. Its advantage is that it does not require any cumbersome piece of equipment when it becomes necessary to re-fuse the line after some condition has arisen which has blown the fuse. However, a troublesome feature in connection with the horn-gap fuse is that the fuse wire is held under a screw or some form of wing nut which in the rupturing of the fuse very often becomes burned or welded fast by the arc following the fuse wire back to the screw while opening the circuit. This condition is very annoying and troublesome to the repair man who must sometimes renew the fuse in inclement weather and under inconvenient conditions on the top of a pole or on a dangerous switching tower.



ARC WILL NOT BURN THE SCREWS

Melting of the fuse carries the arc to the horns where it raises and stretches until broken and thus ruptures the circuit.

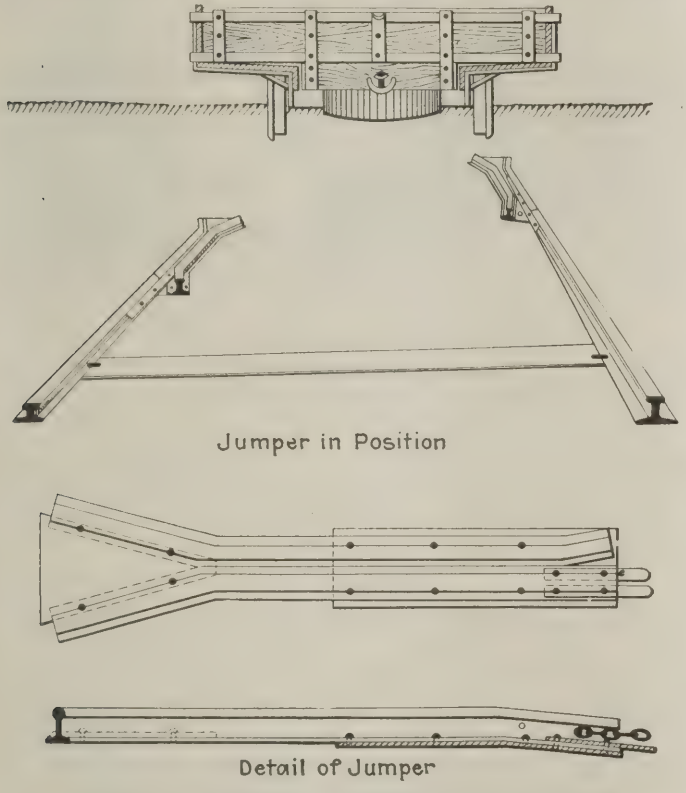
The method for fastening a fuse shown in the figure easily prevents the arc from burning the screw. It will be noticed that the fuse wire is wrapped around each horn before being attached under the screw. When the fuse is blown, the arc follows the fuse wire back to the horns and then goes up the horns, leaving the screw untouched.

New Equipment

Rerailing Device in Room Permits Car To Be Placed Near Working Face

MUCH energy is wasted at the working face whenever coal is loaded by hand. The actual work accomplished in foot pounds may be calculated by multiplying the net weight of the load by the height of its center of gravity above the bottom. Because in loading the coal must be tossed to a level higher than the side of the mine car and must be given energy of translation, much useless effort is expended. By bringing the mine car close to the face this can be remedied in part, for the distance the coal has to be thrown is thereby reduced.

A track device which may be used in a room or heading was patented recently by the Skinkle Mine Car Jumper Co., of Huntington, W. Va. By its use an empty mine car can be pushed off the end of the track and over the bottom to a position as close to the face as will favor the loading of coal. Whether animals or locomotives are employed in gathering, little difficulty is experienced in rerailing a loaded mine car over and through the rerailers and onto the room track beyond; especially is this device practicable where mining leaves a smooth, hard floor which expedites the movement of the mine car from the face to the track.



FROGLIKE JUMPER TO RERAIL CAR AT FACE

In England cars are quite frequently removed from the rails near the face. With the jumper shown the rerailing is easily accomplished. Steel plates would make this provision for easy loading feasible even where the bottom is soft and the car has to be run along the working face. This would avoid double shoveling, which in low coal is distressingly hard work and always destructive of coal of large size.

As shown in the figure, the two jumpers are fishplated each to the end of one of the rails. These may be attached one in advance of the other wherever the ends of the rails used at the face fail to be opposite. With two wheels on one rail and two on the smooth bottom the mine car will move in line with the track and completely rerail when the rerailing device on the other rail is reached. In fact, it might be well to lay the room track at all times so that one of the two jumpers will be slightly ahead of the other, for in that case the guard rails will guide the wheels until all four are on the track. Whenever a locomotive goes into a room thus equipped to pull out a car, it must of necessity be provided with a short towline for pulling the loaded mine car onto the room track

Enclosed Room Hoist Is Safe, Sturdy, Easily Portable and Convenient

TO MEET the ever increasing demand for a completely guarded room hoist, the Flood City Mfg. Co. has developed a totally enclosed steel frame hoist which besides meeting all the requirements of the mining and compensation codes, embraces several desirable features not heretofore found in hoists of this type.

Fig. 1 shows the completed hoist, on which no moving parts are exposed. The opening for the rope is provided with rollers at either side which guide the rope on the drum and protect it from being cut or damaged by the plates should the load not be directly in front of the hoist. The brake lever and clutch lever are placed at the side within convenient reach of the operator.

Fig. 2 illustrates the left side of the hoist, showing the construction of the gears and friction. One of the very desirable features of this hoist is the cone friction clutch which consists of a wood friction block bolted to the drum and which engages in a machined surface on the inside of the rim of the main gear. Operation of the clutch is obtained by means of a steel screw working in a bronze nut. A suitable hand lever is provided for operating the screw. By operating a lever the drum shaft and drum are forced endwise, thus engaging friction. Release is obtained by a coil spring placed between the gear and drum. Bearings of both shafts are 2-in. bronze bushings, and are interchangeable. Lubrication is by means of compression grease cups accessible through holes in the frame.

For direct-current power, the motor is a standard

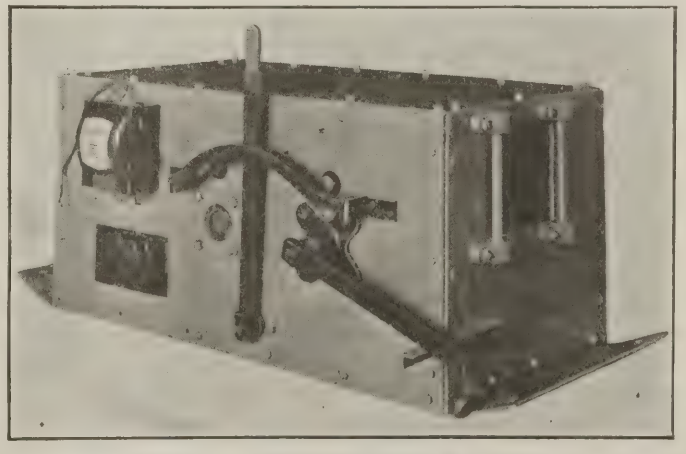


FIG. 1—BOXED-IN ROOM HOIST

The enclosing case makes the equipment safe and compact. The design of the bottom is such that the hoist may be skidded to a new location under its own power.

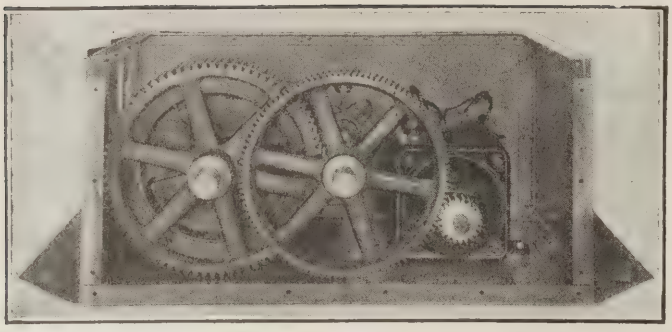


FIG. 2—REPAIRS AND INSPECTION EASILY MADE

Top and side covers, when removed, give ready access to all parts. Foreign materials cannot get between gears and pinions. Unauthorized adjustments are less frequent.

compound-wound crane-type motor of any standard make. Control is by means of an enclosed fused knife switch which connects the motor directly to line. As the motor is always started without a load this is permissible and eliminates all control and resistance troubles.

For alternating-current power a wound rotor or high-torque squirrel-cage motor with fused knife switch is used. The hoist is geared to a speed of 100 ft. per minute, and with a 5-hp. motor will develop a rope pull of 1,500 lb.

With either drive the motor is started by closing the knife switch, and after the motor has attained full speed the clutch is engaged, which can be done by manipulating the lever in such a manner that the load is started without any jerk. By allowing the clutch to slip, the load can be moved at any speed or any distance desired.

Cap Lamp Having a Solid Electrolyte

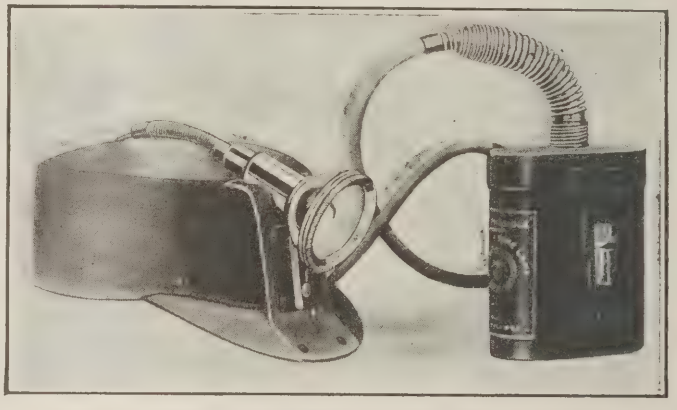
ONE of the earliest of cap lamps was the CEAG, manufactured by the Concordia Electric Co. It scored a greater success in Europe than in America because of the preference in this country for a cap lamp. The British Home Office in a competition in 1912 gave it first place out of 197 lamps submitted. Europe did not object to using a hand lamp, and indeed the preference was all in favor of a lamp that could be so carried and that could be hung to a nail.

Perhaps it is too late to argue that Europe may be right. As a rule the workman is not to be argued with. He has his notions and refuses to try out what does not please him. Yet it may be said that the United States Coal & Coke Co. is having considerable success with stationary lamps. These, however, are ordinary electric bulbs supplied with current by wires connected with the power lines of the mines. They do not have to be carried into the mines with every shift, and have a higher candle power. As for the objection to carrying the lamp, that surely is not serious wherever the miner is transported almost to his working face on a man trip. When he has to walk in and out and carry a pick or two, a drill or a keg of powder and a dinner pail, any additional load is looked upon as an unbearable encumbrance.

It might be well to give the reasons why the hand lamp is regarded as preferable. It gives a more equally diffused light. The miner does not work with part of his coal in a glare of light and part in darkness. The light flux of the hand lamp can be made roughly twice that of the light emitted by a cap lamp. Then again hand lamps have a hook which makes it possible for the miner to work unimpeded by a cord. Furthermore, the battery is not dragging from a strap. When the electrolyte is liquid it is likely to be spilled if the battery is carried on the person, and men have been burned in consequence of this fact. Another advantage is that the one vulnerable part of the outfit is omitted—the cord. This item in the equipment, though now much improved, was in early days a source of much trouble. For these many reasons perhaps the last word has yet to be spoken as to the possibilities of the hand lamp.

However, the manufacturer cannot dictate. He has to follow prejudices as to construction even though he feels they are inadvisable. So the CEAG is being made for use as a cap lamp, and, what is more, one of the difficulties, that of leakage of the electrolyte in the battery, is being eliminated by the use of a solid instead of a liquid. This safety lamp was approved by the U. S. Bureau of Mines under the new schedule No. 10-A, it being the first to receive certification under the new ruling.

As the electrolyte is a gel no burns can be received, as is the case with a liquid, whether acid or alkaline,



CAP SAFETY LAMP WITH BURNLESS BATTERY

To prevent the possibility of leakage and to keep the electrolyte always effectively covering the electrodes the lamp is provided with a solid electrolyte. The battery is locked by a strong magnet and so cannot be tampered with.

the burns from an alkali being worse than those of an acid. Furthermore it always covers the electrodes, so that no matter what the position of the battery may be in operation the light given is the same.

Self-Cleaning Revolving Grizzly Which Requires Little Power to Drive

THE old fashioned "grizzly" is a grating of iron or steel bars which, at the coal mines, usually is known as a "bar screen." It does not do good work, for many a little pile of slack rests on the top of a lump of coal and slides placidly down the screen without realizing how narrow is the chance that keeps it from an early fall.

For this reason the revolving grizzly has been introduced, the bars being circular and the mine product being run over the outside of the circle. It is like a screen, but it has bars instead of a mesh, and the run-of-mine is run over the outside instead of the inside.

This grizzly in revolving turns the lumps over and does it in a few inches of screen travel. Slack will travel almost any distance over a bar screen, for the lumps are not disposed to turn over. However, it is an unfortunate fact that the revolving grizzly will sometimes take a piece of irregular coal or other material and turn it over till a small diameter is presented to

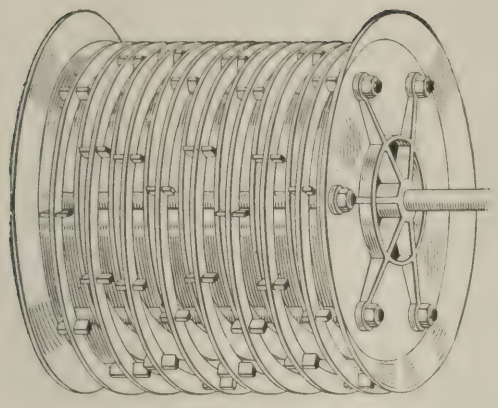


FIG. 1

PERSPECTIVE VIEW OF GRIZZLY

Note that the rings are all level at the top of the grizzly and far apart at the bottom, giving plenty of room for the escape of the material which has passed through the upper part of the rings into the grizzly. For this reason the device does not clog with screened material.

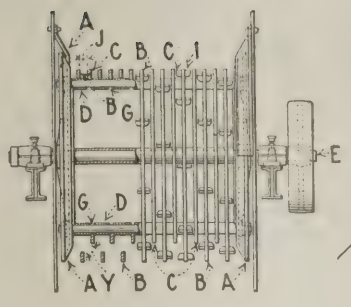


FIG. 2

CONSTRUCTION DETAILS

Here can be seen the spacers which keep the loose rings from spreading. They bear on the small rings. As these are firmly held by sleeves on the six rods they cannot get out of alignment.

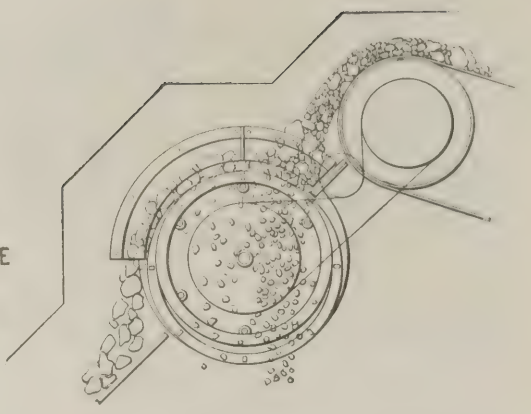


FIG. 3

SIDE ELEVATION SHOWING SCREENING

Here again can be seen the opportunity given for an escape of the screened material. The large rings are dangling all the time from what for the nonce is the uppermost rod. The opening, therefore, is largest at the lowest point in the grizzly. Such a device cannot fail to have large capacity.

the screen. That piece of coal falls into the grizzly but does not readily fall out until it has been lifted or rolled about. Several of these pieces are likely to load up the grizzly and oppose the passage between the bars even of pieces which are of the right diameter in all directions. This clogging of the grizzly increases the driving power needed and makes it necessary to shut down the machine till the obstruction has been cleared.

A new type of this device, shown in Fig. 1, which corrects the faults of the ordinary revolving grizzly, has been devised, its initial purpose being to screen copper ore. It was invented by Kenyon Burch, for the Copper Queen Concentrator, near Bisbee, Ariz.

Fig. 2 shows the details of construction. Two disks, or heads, *A*, are connected by a shaft, *E*, and six rods, *G*, are set in a circle somewhat near the periphery. The ends of the shaft extend through the heads for support on bearings and take the driving pulley, as shown. The screen rings rest on the rods. Some are of one and some of another diameter. The smaller rings, *C*, are held firmly in position by sleeve-like spacers, *D*, which surround the various rods, *G*, as can be seen best in Fig. 4. The larger rings, *B*, are kept in place by occasional spacers, *I*, but they swing free, and, consequently, though the rings are all at the same level at the top of the grizzly, that is anything but true at the bottom, the large rings standing well below the others at that point. In Fig. 2, *Y* and *C* represent the small rings which revolve with the grizzly and *B* represents large rings that do not so revolve. It can be seen, therefore, that any coal or other material trapped at the top of the grizzly is readily able to free itself at the bottom. For this reason the device is non-clogging.

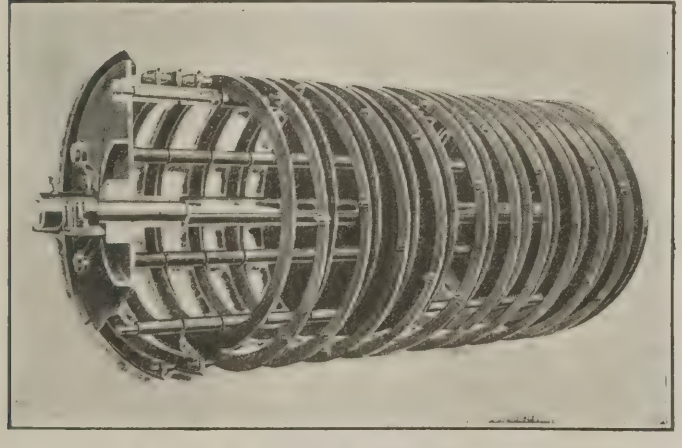


FIG. 4—BURCH GRIZZLY WITH RINGS PARTLY REMOVED

An excellent idea of the sleeves on the six rods can be obtained from this view. They hold the small rings firmly in place so that they cannot move sidewise from the position in which they have been placed.

Sales of Explosives Decline in February

Explosives manufactured in the United States and sold during February, 1923, according to reports to the U. S. Bureau of Mines, amounted to 588,556 kegs of black blasting powder, 4,460,178 lb. of permissible explosives, and 16,559,865 lb. of high explosives other than permissibles. These figures, based upon reports from companies that manufacture about 90 per cent of all explosives used in the United States, show increased sales of high explosives as compared with January, 1923, but reductions in sales of black powder and permissibles.

Sales of black powder during February were 28 per cent below the amount sold in January, 1923, 10 per cent more than February last year, 52 per cent more than February, 1921, and 28 per cent below February, 1920. During the first two months of the present year, 1,405,249 kegs of black powder have been sold, an increase of 34 per cent and 61 per cent, respectively, over the first two months of one and two years ago, but 18 per cent below the amount sold in January and February 1920. Of the total quantity of black powder sold in the first two months of 1923, 90.4 per cent was for coal mining.

Sales of permissible explosives in February showed a decrease of 17 per cent from the record for January, but an increase of 34 per cent over February last year, 74 per cent over February, 1921, and 14 per cent over February, 1920. The combined sales for January and February, 1923, have amounted to 9,836,548 lb., an increase of 60 per cent, 51 per cent and 18 per cent, respectively, over the two-month periods of 1922, 1921 and 1920. Of the permissibles sold in the first two months of 1923, 94.9 was used in coal mining.

February sales of high explosives other than permissibles were substantially the same as in January, an increase of less than 0.1 per cent being noted. As compared with February in previous years, however, the February, 1923, sales were 43 per cent more than February last year, 42 per cent more than February, 1921, but 9 per cent less than February, 1920. Of the high explosives sold in January and February, 1923, 18.6 per cent was for coal mining.



Problems of Operating Men

Edited by James T. Beard



Securing Capable Mine Officials Greatest Factor in Safety

Safety Circular of C. F. & I. Co., Approved by Bureau of Mines—Certifying Mine Superintendents —Efforts of Bureau of Mines to Educate Miners

ACCORDING to the letters of Robert A. Marshall, *Coal Age*, Nov. 16, p. 799, and W. H. Perdue, Jan. 11, p. 59, a circular was recently issued by the C. F. & I. Co., calling attention to certain things and making recommendations in the interest of safety. The circular was issued with the approval of the Bureau of Mines.

Among the recommendations contained in the circular was one urging "that all persons in responsible charge of the direct operation of coal mines, including superintendents, foreman, mine bosses and shotfirers, should be required to have certificates of competency issued by the state and showing that the applicant has passed an examination clearly establishing his knowledge of what constitutes up-to-date safe practices in the branch or branches of mine operations under his jurisdiction."

In discussing this question, Mr. Marshall remarked, "If the certifying of superintendents will make our mines safer I am for it heart and soul." Personally, it is hard for me to understand how the certifying of superintendents of mines would have any detrimental effect that would invite any opposition to such a measure. In Colorado,, the mine foreman is required to report to the superintendent for instructions and advice. For that reason, it is important that the latter official should have a thorough knowledge of underground conditions and requirements.

Without that knowledge, let me ask, how can a superintendent safely direct a foreman in matters pertaining to the work in the mine? It is true, I admit, that the Colorado law gives the mine foreman "full charge of all the inside workings and of all persons employed therein" (Sec. 44); and further states that "any superintendent or other person who interferes with the mine foreman, in the discharge of his duties as described by this Act, shall be deemed guilty of a misdemeanor."

Occult Influence of the Mine Superintendent

Nothwithstanding this provision of the law prohibiting the superintendent from interfering with the mine foreman in respect to the duties of the latter, there can be no doubt of the controlling influence the superintendent exerts by virtue of his superior position. Any foreman well knows that his superintendent has the power to discharge him whenever he may desire, besides being responsible to the management for the showing on the cost-sheet.

In many instances, the foreman realizes that it would be difficult, if not quite impossible, to explain to a superintendent having but a partial knowledge of matters underground, the need for certain work that to his mind is imperative. For this reason, a foreman is liable to allow certain things to go without giving them the attention they should receive. He determines to wait, until conditions appear a little more favorable, preferring to take the chance of increased danger rather than risk his good standing with the superintendent.

Speaking of examinations for certificates, my opinion is that not only should every mine superintendent be certified but he should hold a higher grade of certificate than that required of the foreman. His examination should prove that he has a superior technical education and a longer experience in mines than what is necessary for mine foremen. Having charge of the outside foremen also, the superintendent should prove his knowledge of surface requirements, including all types of machinery and equipment.

While I do not look with favor on the idea of repeated examinations and the limiting of certificates to a period of five years, as has been suggested, I do think that all certificates should be revokable for cause. It seems to me an unnecessary requirement to expect a well posted practical mine official to submit to repeated examinations, at stated periods or intervals.

Mining Men Should Be Students of Mining

In order to secure competent mine officials, which is the greatest factor in the safe operation of a mine, it is my belief that the work must begin with the education of mining men. My idea is that men seeking a position of responsibility in coal mining should become students of mining and should take a course extending over a period of years, a goodly proportion of which should be devoted to practical work underground that would make them familiar with every requirement.

In this regard, I do not refer to the accustomed cramming for examinations that is so common today among candidates for examinations for certificates of competency. Most every intelligent miner who can read and write can prepare himself for answering the questions asked in mine examinations, by studying faithfully for a period of six or eight months. The standard of examinations should be higher, that this sort of cramming could not insure the success of the candidate.

To be frank in the matter, I do not believe in second-class certificates, which make a man eligible for taking charge of a mine not generating gas. Who knows at what time such a mine will generate gas in dangerous quantities. Moreover, most mines are subject, to a greater or less extent, to mine fires that generate explosive or poisonous gases dangerous to life. Every mine official should have a thorough acquaintance with the properties and behavior of these gases.

The Bureau of Mines has shown a deep interest in the education of miners. To that end, they have published numerous pamphlets and bulletins, giving the

miner careful instructions in the use of safety lamps and other appliances employed in the practice of coal mining. Others of these bulletins describe the properties and behavior of mine gases, methods of timbering and many subjects of practical benefit to the miner.

Were it not for the lack of needed appropriations, I feel sure that the Bureau of Mines would adopt some scheme that would bring them in closer touch with students of mining, through the establishment of mining courses, as has already been suggested by Mr. Perdue, in his letter to which I have referred, previously. In that connection, the mine-rescue stations, established by many of the larger coal companies, in different districts, would form good bases from which such educational work could be directed.

As is well known, the prime object of rescue stations is the promotion of safety and what work would be more befitting their purpose than the education of mining men on a broad practical basis? THOMAS ALLEN.

Mount Harris, Colo.

Violation of Mining Laws Chief Cause of Explosions in Mines

Something lacking in the administration of affairs in mining—Not inadequate laws—Personal element responsible for occurrence of mining disasters.

ATTENTION has again been drawn to the frequency of mine disasters during recent months, by C. W. Atkins, writing in *Coal Age*, Feb. 15, p. 302. Mr. Atkins is quite right when he says there is something lacking in our administration of affairs in the operation of mines. However, to my mind, that *something* is not the want of adequate mining laws, as many imagine. Instead, I believe, the cause must be sought in the personal element that is always present and hard to eliminate.

A study of the situation will show that those countries and states that have the best possible mining laws are not exempt from these occurrences. Our mining laws have been drafted to cover most of the dangerous practices in our mines and, with few exceptions, these laws are adequate.

Mining Laws, Rules and Regulations Disregarded

In my opinion, the frequent recurrence of mine explosions is not the result of inadequate legislation. The trouble is that the laws we have are not strictly enforced; and we all realize that a law is of no value, unless it is enforced and every individual worker made to obey the law. A chain is no stronger than its weakest link and every man in the mine is a link in the chain of safety.

As I said before, the personal element is the chief factor in preventing the frequent recurrence of mine disasters. On previous occasions, investigation has shown that incompetence, ignorance, carelessness or disobedience to orders has been the direct cause of the disaster. In the majority of cases, the act has been an open violation of the mining laws or mine rules and regulations.

To one who has had years of experience and traveled much, it is a revelation to observe the manner in which both the laws of the state and the rules and regulations of the mines are disregarded, by mine workers and often winked at by the mine officials. In a few instances we find mines where discipline prevails and violations are suitably punished by the management.

On the other hand, how often do we find that the men holding responsible positions and on whom the lives of hundreds of workers depend, are incompetent. It is this class of worker or type of official that we have most to fear and should strive to eliminate in the operation of our mines.

How Mine Disasters May Be Avoided

Finally, let me add that it is only by the strict enforcement of our mining laws and safety rules and regulations and the careful selection and employment of experienced and competent officials, together with the training of all mine workers and impressing them with a sense of their personal responsibility for their own safety and that of their fellows, that we can hope to avoid disaster.

My answer to the question, "Should firebosses and safety inspectors be employed by the company or by the state or federal government?" is: They should be employed by the company. Employment by the state would not eliminate the personal element and would introduce a new danger, in the opportunity afforded for graft. Much as we regret to say it, there are always some men who can be bought and are willing to take chances for a slight consideration.

So long as we have men employed in the operation of our mines who can be bought, men who are willing and ready to risk their own lives and the lives and safety of their fellow workers and who openly and flagrantly violate the mining laws of the state, in order that they may make a record run and establish a reputation for themselves in the production of cheap coal; so long must we expect disasters to occur.

We all freely admit that, as individual workers, we make many mistakes that endanger ourselves and others working with us; but such mistakes are not made willingly. The all important question, in the attainment of mine safety, is how to avoid such errors and reduce accidents to a minimum. It cannot be done by assuming known risks.

The article entitled "Personal Touch in Management," in the same issue of *Coal Age*, appeals to me as conducive to a reduction of mine accidents. I believe that where officials and employees are brought into closer touch with each other and recognize their mutual relations in the safe operation of the mine, much can be accomplished in the establishment of strict discipline and greater safety will result. GEORGE HALLIDAY.

Carbonado, Wash.

The Company Store, Past and Present

Running the company store on its own merits—Biggest wage earners not always best store customers—Greasing the foreman not a reputable practice.

AT THE time of reading the interesting letter of George Edwards, *Coal Age*, Feb. 15, p. 303, I felt that much could be said in dispute of the idea that the improved status of the company store is to be attributed to the practice of soliciting the mine foreman's aid in securing customers among the miners.

Instead, I would ascribe the observed improvement in the conduct of company stores, among the larger coal companies and most of the smaller concerns, to the present tendency of running these stores on their own merits. My observation is that the average store manager, today, follows the practice of other storekeepers and tries to attract customers by offering fair goods,

at fair prices, and through the courteous treatment of his customers.

In the past, the goods offered in company stores have been of fair quality, but the prices have not been attractive in most instances. Moreover, the treatment accorded would-be customers, by the average store clerk, has been of the "take-it-or-leave-it" type and there has been little display of courtesy on the part of the salesman.

Improved Methods Bring Results

Today, things are quite different in the management of the company store. The manager himself works harder than was the custom in former days and he gets results that were never obtained under the old system. Discourtesy on the part of a salesman, or any lack of attention to the needs of a customer, is met with a sharp rebuke. The fact is realized that the store is in competition with other stores and can command trade only by the proper treatment of its customers.

In his letter, Mr. Edwards seems to convey the idea that the improvement observed in the company store of today may be attributed largely to enlisting the mine foreman's interest. It is suggested that an inspection of the payroll shows that many large wage earners are not the best customers of the store, while many who make less money consume practically their entire earnings in store orders before payday.

A little reflection should make known the fact that workmen who draw the biggest pay are those who are willing to accept the hardest tasks performed in the mine. No job is too hard for them and they are always ready to do any work they are asked. They are not seeking, like many others who make less money, the best places and the easiest work.

Under the old system of store management, the payroll was too often made the basis of judging what a man should spend at the company store. Many a mine foreman was led to believe that he would lose his job, unless he made it a part of his business to steer his men in the direction of the store, and the practice has generally proved a financial loss to the company.

The suggestion made in the letter to which I have referred, that good is accomplished by greasing the mine foreman, is bad. Such a practice is not reputable and no foreman could lend himself to it without losing his self-respect and the esteem of his men.

In closing, let me say that where such a practice is in vogue it will result in demoralizing the organization; it would be discriminating in favor of shirkers, to the detriment of good workers. In the end, the foreman would lose his job when the company discovered the financial loss that must inevitably follow the practice. I speak from a personal knowledge of such instances and know many other mining men whose experiences have led to the same conclusion.

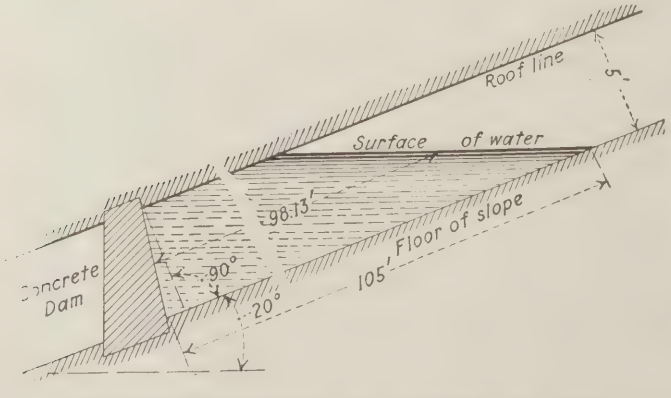
New York City. F. C. Cornet.

Inquiries Of General Interest

Concrete Dam Built on Mine Slope

Dam Built in Old Abandoned Slope—Pitching 20 Deg. — Slope Fills with Water — Total Pressure on Dam—Quantity of Water in Slope

KINDLY permit me to present a proposition regarding a concrete dam built in a slope that was long since abandoned. Originally, the slope had a sectional area of 84 sq.ft., being 12 ft. wide and 7 ft. high.



CONCRETE DAM ON SLOPE PITCHING 20 DEG.

For twenty years, a small stream of water has been running down the slope and required to be pumped out of the mine where it accumulated. In order to avoid this expense and to keep the water from running into the lower levels, a dam was built at a chosen point in the slope. In 45 hr. after the dam had been completed and sealed to make it watertight, the slope had filled with water to a distance of 105 ft. up the incline, which had a pitch of 20 deg.

Fearing that the pressure of water would break the dam, we started the pumps to avoid that danger. I should state, here, that, previous to the building of the dam, a squeeze had reduced the size of the slope opening so that it was now only 10 ft. wide and 5 ft. high, giving 60 sq.ft. for the water pressure to act on the dam. We are anxious to learn what quantity of water is in the slope when it has risen to the height mentioned, namely, 105 ft. measured on the floor. Also, what is the total pressure exerted, by the water, on the face of the dam?

Nanticoke, Pa. Albert Turley.

Assuming that the reduced dimensions give the average size of the slope that is now filled with water from the dam to a distance of 105 ft., measured on the floor of the slope and, further, assuming that the face of the dam is in a practically normal position in the seam, as shown in the accompanying figure, the surface of the water will meet the roof, at a distance from the dam, $105 - (5 \div \tan 20 \text{ deg.}) = 105 - (5 \div 0.364) = 105 - 13.74 = 91.26$ feet.

The average length of this prism of water filling the slope is, therefore, $\frac{1}{2}(105 + 91.26) = 98.13$ ft. But, the sectional area of the opening being 50 sq.ft., the volume of water standing in the slope is $50 \times 98.13 = 4{,}906.5$ cu.ft.; or $4{,}906.5 \times 7.48 = 36{,}700$ gal.

The vertical head of water exerted on the center of the face of dam is, $98.13 \times \sin 20 \text{ deg.} = 98.13 \times 0.342 = 33.56$ ft. This head corresponds to a pressure of $33.56 \times 62.5 = 2{,}098$ lb. per sq.ft. Finally, the face of the dam presenting an area of 50 sq.ft., the total pressure is $(50 \times 2{,}098) \div 2{,}000 = 52.45$ tons.

Examination Questions Answered

Miscellaneous Questions

(Answered by Request)

QUESTION—*What effect does a change in the atmospheric conditions at the surface have upon a mine generating explosive gases.*

ANSWER—A sudden fall of barometric pressure is always followed by an outflow of the gas-charged air filling the old abandoned works in the mine. The result is an increase in the gaseous condition of the mine air in the live workings.

QUESTION—*In case of an explosion in a mine whereby the doors and air stoppings are destroyed, what method would you adopt to restore circulation?*

ANSWER—The only possible way of restoring the circulation of air throughout the mine, under these conditions, is to rebuild the doors and stoppings destroyed or make temporary use of canvas as curtains to deflect the air and prevent its being short-circuited at such points. It is assumed that the ventilating fan is still running and capable of supplying the required air. The work of restoring circulation in a mine torn by an explosion is necessarily of a temporary nature when there are men to be rescued, especially if there is no properly equipped rescue corps who can safely penetrate the gas filled roads and workings.

QUESTION—*Are mine fires more likely to occur in one mine than in another and, if so, why?*

ANSWER—Yes, mines where the coal is friable and particularly inflammable, or where the coal contains much sulphur, are more subject to fire from spontaneous combustion occurring in the waste, if necessary precautions are not taken to prevent fine coal being stored in the gob. The presence of gas, also, renders some mines more liable to fires than where there is little or no gas in the seam.

QUESTION—*A shaft 300 ft. deep has an entry turned off at the bottom, 7 ft. high and 10 ft. wide. The shaft is full of water and overflowing. What is the pressure per square inch and the total pressure, in short tons, on the face of the entry?*

ANSWER—Assuming a vertical shaft, the pressure at its foot is $300 \times 0.434 = 130.2$ lb. per sq.in.

Then, if the entry is level the center of pressure at the face of the entry is $300 - \frac{1}{2} \times 7 = 296.5$ ft. vertically below the top of the shaft. This makes the average pressure on the entire face of the entry $296.5 \times 0.434 =$ say 128.7 lb. per sq.in.; and, the sectional area of the entry being $7 \times 10 = 70$ sq.ft., the total pressure on the face of the entry is $(70 \times 128.7 \times 144) \div 2{,}000 = 648.648$ short tons.

QUESTION—*A cross-compound engine has cylinders 16 in. and 24 in. in diameter, respectively; find the piston areas.*

ANSWER—The sectional area of the smaller high-pressure cylinder. 16 in. in diameter, is $0.7854 \times 16^2 = 201$ sq.in.

The sectional area of the larger low-pressure cylinder, 24 in. in diameter, is $0.7854 \times 24^2 = 452.4$ sq.in.

QUESTION—*If the high-pressure cylinder, in this engine, has an initial pressure of 120 lb. per sq.in. find the size of piston rod when the allowable working stress in the rod is 3,500 lb. per sq.in.*

ANSWER—The total pressure on the piston in the high-pressure cylinder of this engine is $120 \times 201 = 24{,}120$ lb. For an allowable stress of 3,500 lb. per sq.in., the sectional area of the piston rod is $24{,}120 \div 3{,}500 = 6.89$ sq.in. The required diameter of the rod is, therefore,

$$d = \sqrt{6.89/0.7854} = \text{say } 3 \text{ in.}$$

QUESTION—*In the low-pressure cylinder of this same engine, the initial pressure is 20 lb. per sq.in., find the number of ¾-in. studs required to hold the cylinder cover in place. The diameter of the ¾-in. studs, at the bottom of the thread, is 0.73 in. and the working stress on the material is 4,000 lb. per sq.in.*

ANSWER—The area of the low-pressure cylinder, as previously found, being 452.4 sq.in., the total pressure on the end of the cylinder is $20 \times 452.4 = 9{,}048$ lb. The sectional area of a single stud, for a diameter 0.73 in. at the bottom of the thread, is $0.7854 \times 0.73^2 = 0.4185$ sq.in. For an allowable stress of 4,000 lb. per sq.in., the safe working strength of a single stud is, $4{,}000 \times 0.4185 = 1{,}674$ lb. The number of studs required to hold the cylinder head is, therefore, $9{,}048 \div 1{,}674 = 5.4$, say 6 studs.

QUESTION—*How many hour's supply would a cylindrical tank 16 ft. in diameter, by 12 ft. in depth, hold for a 500-hp. plant, which uses 34½ lb. of water, per horsepower, per hour? Assume the average load is 75 per cent of the rated capacity of the plant equipment.*

ANSWER—In this case, the average load requires $0.75 \times 500 = 375$ hp.; and the water consumption will be $375 \times 34.5 = 12{,}937.5$ lb., per hour. The cubical contents of a tank 16 ft. in diameter and 12 ft. deep, is $12(0.7854 \times 16^2) = 2{,}412$ cu.ft. The weight of water in this tank when full is then $2{,}412 \times 62.5 = 150{,}750$ lb. Then, assuming a water consumption of 12,937.5 lb., per hour, this tank will be emptied in $150{,}750 \div 12{,}937.5 = 11.65$ hr., or say 11 hr. 39 min.

QUESTION—*If coal occupies 40 cu.ft. per ton, what size of storage bin will be required to carry a three-weeks' supply of coal for a plant where the water consumption is 12,937.5 lb., per hr.? Assume a pound of coal evaporates 5 lb. of water; and state what weight of coal will be required in storage.*

ANSWER—A water consumption of 12,937.5 lb., per hr. will require an assumed coal consumption, in this case, $12{,}937.5 \div 5 = 2{,}587.5$ lb., per hr. The coal consumed in an 8-hr. shift will then be $(8 \times 2{,}587.5) \div 2{,}000 = 10.35$ tons. Now, making due allowance for maintaining fires during idle hours, Sundays and night-shifts, the average consumption of coal may be assumed as, say 12 tons, per working day. A three-weeks' coal supply, on this basis, will be $3 \times 6 \times 12 = 216$ tons, which is the required capacity of the storage bins. Allowing 40 cu.ft. per ton, the cubic capacity of the bins will be $40 \times 216 = 8{,}640$ cu.ft. Assuming a length of 100 ft. for the bins, and a width of 10 ft., the average depth of coal in the bins will be 8.64 ft.

QUESTION—*How many cubic feet of air should be mixed with one cubic foot of firedamp to render it harmless?*

ANSWER—Assuming the firedamp mixture at its most explosive point and no dust present, 1 cu.ft. of the mixture contains 0.0946 cu.ft. of methane. Then, allowing two per cent of gas is harmless, under ordinary conditions, the total volume of gas and air is $0.0946 \div 0.02 = 4.73$ cu.ft., and the volume of air to be added is, therefore, $4.73 - 1 = 3.73$ cu.ft.

Export Coal Trade Still Shows Promise Despite Decline in Inquiries

Foreign inquiries and offers for our coal have decreased somewhat in the past month, according to Federal Fuel Distributor F. R. Wadleigh. The decrease is attributed partly to the expectations of an early settlement of the Ruhr situation, partly to the increase in prices of our coal at tidewater, together with the rise in ocean freight rates. Unwillingness on the part of our exporters to give the credit asked for by foreign buyers undoubtedly has prevented a number of sales.

Additional charters are being closed and the prevalent feeling seems to be that with a decline in ocean freight rates in the last week of April and a decrease in prices of coal from the high level of March, our coal exporters will be able to obtain considerable foreign business for the next few months. In fact, some of the contracts already closed cover deliveries over from four to six months and even longer.

Overseas exports of bituminous coal (including the West Indies) for January were 79,874 gross tons, decreasing to 75,204 tons in February and reaching 270,711 tons in March. Coke exports in the same months were 11,399 tons, 12,026 tons and 35,309 tons. The bulk of the coke has gone to France, while Italy, Germany and the Netherlands have taken the greater part of the coal.

From Feb. 20 to March 12, 52 steamships had been closed for the transatlantic coal and coke trade. From the latter date to April 30 the local number of charters announced as closed was 101 for coal and 80 for coke. There are always some charters not made public, so that the number given is slightly less than the total number chartered.

Inquiries for coke are not so numerous or urgent and there is a considerable accumulation waiting to be loaded into ships at tidewater; embargoes on coke for export are in effect at both Baltimore and Philadelphia and the permit system is being used by the railroads in moving it.

Commenting on the Ruhr situation Mr. Wadleigh in his statement of May 10 says:

"While it is impossible to obtain any actual figures of the Ruhr production for the past four months, indications point to a shortage of about twenty million tons during that period, as compared with the last four months of 1922. This shortage has, of course, affected all of the western European countries, but especially those where coals for making coke are imported—viz., France, Belgium, Italy, Netherlands—increasing the demand for British coking and gas coals, and causing a rise in f.o.b. prices of the latter from 25s. to 37s. 6d. for the best Durham gas and coking coals.

"The shortage in shipments of German coke to France, which totaled 4,303,324 metric tons in 1922, has also increased the general demand for coke. In January, 1923, there were 407,663 tons of coke imported by France; in February this had fallen to 164,577 tons, of which only 84,605 came from Germany. Coke production in the Ruhr field is reported as about 40 per cent of normal; coal production about 30 per cent."

A number of American coal exporters gave their views to Mr. Wadleigh, who quotes from them as follows:

"A number of inquiries are being received from South America," one exporter said, "and I am of the opinion that the South American trade will be good during the present year, as I believe England will take a large portion of the European business on account of the short haul and will be content to let the South America business go, expecting to regain it at a later date when needed. On account of the present European situation, I do not think there is any doubt but what the export business in coal will be good during the entire year, although I do not believe it will be sufficient to cause any actual shortage in this country, particularly if there is any marked improvement in the railroad transportation in this country, which there will probably be. The demand from Europe, however, has advanced the Cardiff and other British prices to such an extent that we are beginning to get inquiries and business from South America."

"My opinion is that the present situation, if cared for properly by the American exporter and handled with even ordinary intelligence," another shipper stated, "will enable us all to develop and maintain a sane and safe business in the future. The miserable interloper who injected himself in 1920, however, must be kept out or he will do again what he did then—practically destroy the confidence of the foreign buyer in the American coal exporter."

Stability Attained by Operators Upset by Snowbirds and Adverse Strike Settlement

The Bituminous Operators' Special Committee issued a statement on stabilization of the industry May 15, as follows:

"Before the war many large companies, and in some cases entire bituminous coal-mining fields, had accomplished a substantial degree of stability in the industry. There never was a real shortage of bituminous coal from the beginning of the century.

"With the war, and the unprecedented demand for fuel, prices went so high that the 'snowbird' mines were able to open and produce coal. The effect of this is always bad, as these mines demand from the railroads, cars which ordinarily would be used to handle the output of those mines which operate all the time, whether the market is high or low.

"The effect of this dilution of railroad cars is to limit output through the transportation factor. It is easily seen that a locomotive can operate far more efficiently leaving a train of cars at a mine, than running up and down the line leaving a car or two here, another car there, for many miles, then collecting them again. The fact that the railroads are forced to deliver cars to the 'snowbird' mines cuts down supply to regular mines, limiting their output.

"A further interference with the stability of the coal industry is the fact that the strike of last year, lasting five months and causing suffering and death, was settled adversely to the interests of the public. This settlement forced the inflated war wage scale for common labor in the mines to continue. This high wage naturally attracts many unneeded men from other industries, as no skill or training is required for the work for which union miners have insisted upon being paid $7.50 a day. This overmanning of the industry has now reached the point where there are 200,000 extra men being supported by the public in the coal-mining industry, as is recognized by the U. S. Coal Commission.

"While the strike was on, President Harding recognized that the nation was in the grip of this labor monopoly. He gave voice to this thought before Congress in an address, declaring that the country was 'at the mercy' of the United Mine Workers.

"With the present tremendously expanded supply of mine labor, naturally the miners work only part time in order to make a living. They are enabled to do this because of the high wages they receive. At the same time, it would be unsound economically to fix mine wages on the supposition that the miners are going to work on part time. Putting wages at the proper level would, through the operation of economic laws, rid the industry of this surplus of 200,000 men, and help materially to stabilize the industry. The present tendency of the miners is to work only part time, regardless of the working time of the mines in which they are employed.

"The United Mine Workers of America naturally is not averse to keeping unneeded men in its ranks. Through the 'check-off' system it collects dues from its members which now aggregate $15,000,000 a year. Cutting down the number of miners to those needed to produce the nation's coal supply would lop off the unneeded members of the United Mine Workers, and consequently cut down its enormous income from membership dues.

"In the last analysis, the leaders of the United Mine Workers control 60 per cent of the output of coal. Agreements with this organization have proved of little value, as they have been broken at will on many occasions, the list of which is a long and disgraceful one."

Price of Coal to Industry Governed by Shortages Caused by Labor Unrest, Says Bradley

The Natural Resources Group of the U. S. Chamber of Commerce gave over Wednesday afternoon to the coal industry at its 11th annual meeting in New York last week. The Green Room of the Waldorf was crowded, more by those wanting to learn about the coal situation than by coal men. J. D. A. Morrow was scheduled to speak but was unable to attend. J. G. Bradley opened the speaking program after the luncheon. His address, "Labor and Its Effect on the Cost of Industrial Coal," in abstract follows. An abstract of the talk of George Cushing, the second and last speaker, was carried in *Coal Age* last week.

"Throughout this discussion it should be understood that it is my opinion that the price of coal to the consuming industries has been governed rather through the creation of shortages with attendant speculation, the shortages being brought about by interference with the distribution of coal over which the operators had no control rather than through inherent defects in the industry itself," said Mr. Bradley. "Absentee labor control on the part of ambitious union leaders of both the miners and railroad operatives has been the chief contributing influence in the creation of these shortages, as an examination of the records of the U. S. Geological Survey and the American Railway Association will show.

"In considering labor and its effect on the cost of industrial coal, the whole general question of coal-field labor comes into review, both what it is paid directly and what it receives indirectly, as well as its peculiar efficiencies and inefficiencies, its privileges and immunities, all of which have various bearings upon the cost of the coal before it can be shipped to market. It should be understood that most coal-mine labor is housed in communities constructed and maintained by the operating company. It is the custom in the coal fields to lease the company houses at the monthly rental of about $2 a room and it may be generally stated that the operatives pay about $15 per month for rent, light, heat, fuel, doctor service for the entire family and insurance for themselves, which reduces their cost of living far below that of any other class of wage earners of which we have record.

"While the eight-hour day is the standard throughout the coal fields, as a rule only the day men work for the full eight hours and those constitute but 40 per cent of the employees at the ordinary bituminous-coal operation; the miners themselves, being paid by the ton, are free to quit work as soon as they have mined the number of tons which will bring their earnings up to an amount which is satisfactory to them. It is, therefore, an occupation with special privileges.

"As an occupation coal mining has its compensations and it is rarely that a man engaged in it leaves it for other pursuits. The operators have been charged with maintaining in the industry more men than are necessary to carry it on, but this is something which they could not do by force and if there is an oversupply of mine labor it is because of the attractions offered to the workers by the industry itself, and in the union districts to the encouragement held out by the labor leaders for the realization of a full-time wage for part-time work.

"According to the preliminary report of the U. S. Coal Commission there were employed in the bituminous-coal industry 663,000 men, or more than 60 per cent of all the employees engaged in all kinds of mining in the United States, and of these 663,000 men, about 500,000 are claimed as members by the United Mine Workers of America. The total number of wage earners of the country as shown by the last available census figures is about 9,000,000. It therefore appears that about 7 per cent of the wage earners of the country are engaged in the production of bituminous coal. The production per man in 1921 was, as shown by the U. S. Coal Commission's figures, about 650 tons each.

"Only for short periods since 1918 has the price of coal to industry been closely related to the cost of production. It has been controlled by its availability in the market, which has depended upon and been influenced by various interruptions to the process of distribution brought about by strikes both within the coal industry itself and on the railroads. In other words, it has been the interferences with the orderly conduct of the business which has made the market price, rather than the cost of production itself.

"There has been a growing tendency in both union and non-union mines toward absenteeism on the part of the well-paid workers. Since the pay increase granted in 1920 the thriftless men have occupied positions in which their failure to report for duty has thrown others out of work; they have both added to the cost of coal by reducing the mine's production and done injury to numbers of the fellow workers and their families. This may be illustrated by the case of a cutting-machine runner whose failure to report for duty causes idleness of a dozen leaders the following day. About the mines there are many such key positions, and if one has not had practical experience it is hard to believe that such cases should occur as frequently as they do. In union operations it is a well-known fact that public opinion among the workers prevents the ambitious individual from doing more than the accepted average on the old and fallacious theory that to do more would take work away from someone else, losing sight of the fact that anything which tends to increase production and lower the cost thereof tends toward the reduction of the cost of living generally and means a greater purchasing power for the wage earner himself.

Labor Most Important Item of Cost

"Emphasis is put on the need of production in volume to decrease costs. The increase in productive capacity which we have had has been too widely distributed. Economically, conditions would be happier if the production were better concentrated and the mining units were fewer and larger. If the interferences which perpetuate speculative conditions in the coal markets could be removed, unrestricted competition would soon bring this about.

"The most important single factor of cost is the labor item with its 68 per cent of the whole. In conjunction with wise and skillful management and the progressive development of mechanical mining, labor can play a principal part in cutting fuel cost in the future. It was this combination in the non-union coal fields of the country which started the wheels of industry turning in the early part of 1922. Cheap power is dependent upon cheap fuel and cheap power is the talisman of industrial supremacy.

"The 8,400,000 wage earners of the country who are not engaged in mining coal cannot afford to protect the coal miner in the enjoyment of a special wage; they cannot wisely grant him a subsidy which will keep him in an industry at which he proposes to work but six hours a day five days a week. If they are inveigled into such a course by arguments of sentimentality or threats which arouse their fears they will find themselves supporting a policy and perpetuating an economic condition which will take from their children the wonderful opportunities for work, development and individual liberty which they inherited from their fathers. They are but paving the way to a future of socialistic indolence and misery in which the only persons with full stomachs will be those who succeed in ingratiating themselves with the little ring of astute political minds who can stay in control prior to the period of final chaos.

"The time will come again when the market price of coal will be based upon the cost of production, and then the industrial manager will have brought home his interest in the proper solution of the mine-labor problem, and he probably will be surprised to find how much the giant of irresponsible unionism has grown, and shocked to learn that he, the industrial manager, has supplied the wherewithal to make him grow."

Unionization Necessary for Stabilization, Say Union Officials

Union recognition and joint agreements provide the only way through which the coal industry can be stabilized, and stability is essential to the success of the industry, the United Mine Workers of America declares in a communication submitting "certain constructive suggestions concerning the coal industry" to the U. S. Coal Commission.

The communication consists of statements by Philip Murray, International vice-president of the union, and William Green, secretary-treasurer of the organization.

Mr. Murray says the U. S. Coal Commission by an aggressive, fearless attitude can compose all differences which exist in the unorganized coal-mining sections of the country and can further provide a peaceful and prosperous basis for collective bargaining which will govern the future procedure of the industry in those fields.

The only practical way in which this can be done, Mr. Murray contends, is to bring about for the non-union mining territory of this country working agreements which will safeguard properly the fundamental rights of mine workers and mine operators, protect the public and provide a just and reasonable basis for working relations and conditions. The safeguards which are essential to regularity of production and of peace and tranquility are:

"The guarantee of freedom of speech, freedom of assembly, freedom of movement.

"The right of all workers to organize and bargain collectively through representatives of their own choosing.

"The protection of mine workers against discrimination because of membership in the United Mine Workers of America or any other labor organization.

"The assurance that democratic institutions, such as the United Mine Workers of America, will not be subordinated to industrial control by the practice of the non-union coal operators in paying and controlling deputy sheriffs and constables or by employing private guards instead of using the services of distinterested, conscientious peace officers."

Admitting that the union does seek to organize the entire coal industry, Mr. Murray says its sole purpose is to seek uniformity of wages and working conditions and regularity and continuity of employment, and thereby to bargain collectively with the operators on terms approaching equality. Contending that all coal operators, including those in the non-union fields are organized, through membership in the National Coal Association, Mr. Murray, adds: "In all fairness, it should be possible for all the miners of the country, including those in the non-union fields, to be united in their national organization so that they may meet the maximum economic strength of the operators with the maximum economic strength of the mine workers."

At the same time Mr. Murray says: "We do not seek to control the coal industry, but we do demand a voice in its control. Advocates of the open-shop movement have taken as their slogan 'Those who pay should have the say.' Today the whole world knows that might does not make right but that right makes might, and we believe we are fundamentally and eternally right."

Mr. Murray declares the miners' organization stands for industrial peace, the stabilizing of conditions of employment and for the continuity and acceleration of production, while the non-union operators have nothing to offer except arbitrary action and industrial autocracy. The fruits of their policy, the statement says, are industrial and civil warfare.

Mr. Green's statement deals with collective bargaining and union recognition, and declares there can be no recognition of the principle of collective bargaining without a corresponding recognition of the right of the workers to organize into trade unions. To deny the workers the right to organize is nothing more, Mr. Green declares, than improper interference with the exercise of an inherent right and normal activities of a free people.

Notwithstanding the criticism emanating from some groups of people because of the coal strike of 1922, Mr. Green says there were only two failures to negotiate wage scales resulting in national suspensions during a period of twenty-three years in the anthracite and about thirty years in the bituminous-coal fields.

This record becomes the more remarkable, he says, when it is considered that these wage scales were negotiated through voluntary action on the part of coal operators and miners. "Joint wage agreements in effect for fixed periods of time between coal operators and miners serve to stabilize the industry and to guarantee an adequate coal supply. No interruption of mining operations because of a strike can take place during the life of the joint agreement. Such agreement, however, can only be successful through collective bargaining based upon union recognition.

"In coal fields where the miners are unorganized there can be no guarantee against strikes. The men employed in these sections are not parties to an agreement, are under no obligations to continue at work. Consequently they are free to cease work at any time. Especially is this true when the men employed in non-union territory become dissatisfied with the wages and conditions of employment arbitrarily fixed by their employer, and their desire to organize and for union recognition becomes strong."

As in every industry, Mr. Green says there are in the mining industry good and bad employers, none of which should have the authority arbitrarily to fix the wages and working conditions which their employees must accept. "Those who work and serve in industry are as essential to success as those who operate and manage the industry. Each has rights which the other should respect. Neither should become a dictator, because that would be autocracy in industry, something which is repugnant to the American sense of fair play."

Replying to the charge that may be made by those opposed to union recognition and collective bargaining, that if the mine workers were completely organized they would strike and paralyze the industries of the nation at will, Mr. Green said: "There could be no strike except at the termination of a contract period and then only in the event of a failure to agree upon a new wage agreement. The moral responsibility of the operators and miners would be so great and solemn that they could not, except in extreme emergency, refuse to agree upon the terms and conditions of a fair and reasonable wage scale."

Appellate Court Modifies McClintic Order Restraining Payment of Check-Off

The U. S. Circuit Court of Appeals at Richmond handed down a decision May 7 modifying the injunction of Judge George W. McClintic of the U. S. District Court for the southern district of West Virginia to the extent of eliminating that feature prohibiting the payment of check-off funds to the United Mines Workers. Judge McClintic's order had not only restrained the payment of the check-off but also enjoined the union from threatening or interfering or attempting to interfere in any manner whatsoever with employees of the Carbon Fuel Co. and 22 other mining companies in the Kanawha region.

In entering a modifying order, the appellate court to a great extent followed its action in the Borderland Coal Co. case. The one exception was as to the check-off, which the higher court permits to remain in force. Although the union is permitted to collect the funds derived from the check-off, the organization is not permitted to give or remit such money to striking miners who may be occupying houses on the property of the Carbon Fuel Co. and other plaintiff companies with a view to rendering assistance to such occupants so as to have them retain such occupancy in violation of the law. The appellate court continues to enjoin the United Mine Workers from aiding or abetting any person or persons to occupy or hold without rights any property of the plaintiffs by sending money or other assistance to be used by such persons in furtherance of such unlawful occupancy or holding.

Pending adjudication of the case on its merits in the district court, the injunction order of the appellate court is to remain in full force and effect.

THE OLD-FASHIONED religious revival depended on faith. And so does a business revival.—*Fresno Republican.*

Commission Probes Deeply Into Valuations, Royalties And Effect of Unionism on Productivity

By Paul Wooton
Washington Correspondent of *Coal Age*

That the President's Coal Commission is making more searching investigations than has been generally realized into the important matters of degradation of coal, productivity of labor under union and non-union conditions, establishment of fair valuations of mining properties, and of the royalty charges on coal lands was revealed on May 11 when Chairman Hammond, Governor Marshall, Dr. Devine, Dr. Smith and Mr. Howell, of the commission, discussed their work at the conference with representatives of the press.

It was the quality of anthracite rather than its price which gave rise to most of the complaints of last winter, Dr. Devine stated. He said the commission is anxious to receive suggestions as to the best procedure which will insure the receipt by the public of the quality of coal for which they are paying. He pointed out that some guarantee as to coal quality is in the interest of producers and dealers, as well as the ultimate consumer. The matter was discussed with the anthracite operators when they appeared before the commission. The operators expressed the opinion that there would be no difficulties arising from the quality of coal in normal times. Apparently, however, the commission expects to go deeply into the subject and is anxious to have opinion as to the advisability of leaving quality-control to the industry itself or whether government inspection is justified.

The anthracite operators seemed to have impressed the commission with their suggestion that prices to the ultimate consumer could be reduced materially were people to be less fastidious in their demand for "styles" of coal. They told the commission that there is no sound economic reason for the preparation of so many grades of anthracite. If the public would consent to a reduction of grades and will burn two grades together it would be possible for them to have more heat at a much less price, the commission was told. Governor Marshall advanced the opinion that the average householder would benefit were he to take a correspondence course in "Being One's Own Fireman." Dr. Smith admitted that some consumers are "more fussy than sensible."

Dr. Devine was positive in an assertion that the commission would have highly accurate information as to the productivity of labor under union and non-union conditions. This phase of the commission's inquiry is being conducted very carefully in the hope that the uncertainty will be removed from this much mooted point. Figures in that particular are being taken under a variety of working conditions.

In order to calculate the actual earnings of coal producers, accurate ideas as to property values must be available. Methods which are to be followed in the evaluation of coal mines are to be suggested by a committee of engineers which has consented to serve the commission in an advisory capacity. The personnel of the committee is as follows: R. V. Norris, Wilkes-Barre; H. M. Chance, Philadelphia; S. A. Taylor, Pittsburgh; J. H. Allport, Barnesboro, Pa., and James R. Finlay, of New York. This committee will serve the commission without compensation. These men were invited by the commission to do this work because of their long experience in the work of valuing mining properties. Several members of the committee have taken prominent parts in tax valuation work of various states.

Royalty charges were discussed with the anthracite operators and with Senator Pepper. In that connection, Governor Marshall announced that one of the best lawyers in Pennsylvania had been retained by the commission to advise as to the possibilities of fixing or limiting royalty charges. The commission is trying to ascertain to what extent the high royalties on the Girard holdings set the pace for royalty rates on other lands. Senator Pepper's statements in regard to royalties were general in character.

The anthracite operators committed themselves thoroughly to the policy of selling coal to any group of ultimate consumers willing to buy as much as a full carload. While this was not possible last winter, owing to the workings of the allocation plan, set up to insure equality in the distribution of the limited supply, the operators assured the commission that anthracite would be sold in carload units and shipped to any point where side-track facilities are available. This led several of the members of the commission to suggest that the way is open for any householder who is dissatisfied with his dealers' price to club together with three or four of his neighbors and purchase a carload of coal direct. One instance was cited where that plan had resulted in a saving of $6 a ton to the ultimate consumer.

In response to an inquiry from the Retail Coal Merchants' Association, the commission stated that it is committed to the advisability of the universal adoption of the short ton as the unit to be used in the coal trade.

Chairman Hammond stated that the discussion with the anthracite operators had been extended and had covered many of the important phases of the situation, but that the question of the wage agreement had not been broached as yet. He reiterated that the commission is particularly anxious to expedite these negotiations, so as to remove as quickly as possible the uncertainty which will surround anthracite until the new agreement is signed. He stated that the commission expects to confer with John L. Lewis within a few days and that further conferences with the anthracite operators will be held. No conclusions have been reached by the commission and none will be attempted until the representatives of the miners have been heard on each point in the presentation made by the anthracite operators.

The published article purporting to be an outline of the commission's anthracite report was described as fanciful fluff. It was stated positively that no draft of this report has been made and that the commission has no idea of attempting to formulate its report until it has heard finally from all concerned.

Merger of Northwestern Docks Begins

The Pittsburgh Coal Co. has "purchased a substantial interest" in the Milwaukee-Western Fuel Co., one of the largest dock interests on the upper Great Lakes. This announcement, together with the word that Alex B. Uhrig, president and director of the Milwaukee-Western, had resigned, was issued May 10 after a meeting of the directors of that company. This is the first definite news about the various dock mergers that have been rumored for weeks. It is now confidently expected by coal men that within a short time another great Northwest distributor will announce the absorption of several smaller dock companies.

Joseph W. Simpson, for years connected with the Milwaukee-Western, has been named to succeed Mr. Uhrig as president and will have direct charge of the business under the new régime. Mr. Uhrig declined to discuss his future plans.

The company operates ten dockyards in Milwaukee harbor, all of which are equipped with the most improved coal-handling machinery. From 2,000,000 to 3,000,000 tons of coal were received by lake annually by the company. The company also is interested in a fleet of steel steamers which are engaged in the coal and grain carrying trade.

Peter Reiss, of Sheboygan, Wis., head of the C. Reiss Coal Co., another of the principal Northwestern dock concerns, denies that his company is combined in the Pittsburgh-Milwaukee-Western consolidation. He had a hand in effecting the combine, but he was acting only as a director of the Pittsburgh Coal Co., he said.

In Kansas Everybody Is Willing for the Other Fellow to Remedy Coal Troubles

Manifestation of willingness for the other fellow to do something to put life in the Kansas coal market was the outstanding feature of the conference of operators, dealers, miners and railway officials in Topeka, May 10. Representatives of the miners expressed eagerness to support any move other than a reduction of wages. Retailers were willing to sponsor anything but a shaving of their own profits. The railroads favored anything but a reduction of freight rates. Operators declared they were producing coal at a loss right now. And E. T. Hackney, representing the Governor, who called the conference, had no reply to the suggestion of C. P. A. Clough, president of the Jackson-Walker Coal & Mining Co., that the state burn coal instead of oil in state institutions. The only point on which all were in accord was that the public should be encouraged to store its winter coal during the summer.

The conference was called by Governor Davis following his receipt of the report of Mr. Hackney, appointed by the Governor to investigate conditions in the southeastern Kansas field. Mr. Hackney found many mines closed, and others operating only one or two days a week. He found between 8,000 and 10,000 miners out of work.

His suggestions were passed on to the men at the Topeka conference, and, as has been indicated, each group was heartily in favor of the others putting them into effect. But Mr. Hackney had no suggestion for correcting the one thing above all others that is injuring the Kansas coal field—oil competition. Operators insist that lower freight rates and wage reductions alone can make it possible for them to lower prices to meet it.

Wage contracts have almost a year to run, so there is no possibility of immediate relief in that direction. But an attempt will be made to obtain lower freight rates from the Kansas field to the Missouri River at the hearing before the Interstate Commerce Commission in Kansas City starting May 17.

Strike Threat for Nationalization of Coal Mines Looms, Says Cornwell

John J. Cornwell, former Governor of West Virginia, told the members of the National Association of Manufacturers, in convention in New York City on May 16, that the coal miners are contemplating a nationalization of the mines, but that it was a question whether they would make the effort at the expiration of their present contract or wait until later.

"There is one thing of which I do feel certain," said Mr. Cornwell, "however, and to my mind it is just as sure as anything in the future can be, and that is that sooner or later, and I do not think it is very long off, the miners' organization will make an issue of the 'nationalization' of the coal mines and fight it out with a strike on that line.

"It is the basic demand of the United Mine Workers' organization and the officers are intent upon pressing it at the proper moment. There is a lull now, while the Government Fact Finding Commission makes its investigation, but if that commission's report is not satisfactory to them, and it will not be satisfactory unless it flatly advocates 'nationalization' of the mines, then the storm will break again and the agitation begin.

"If the United Mine Workers and those who agree with them—in other words, other organized labor groups—become powerful enough to force Congress to pass a bill 'nationalizing' the mines, they will also be powerful enough to fix the rates of pay as high as they like and to make the working conditions whatever they care to have them. And if, at any time, Congress should refuse or fail to enact the legislation demanded, it goes without saying that they would strike as quickly under government ownership and control as under private ownership and operation. So, there would be no relief coming from government ownership or 'nationalization' of the coal mines.

"It may be that the Coal Commission created by authority of Congress and now investigating all the phases of this question can find some method by which the industry can be stabilized and the situation improved, but, while I am not pessimistic about it, I am not very hopeful that it will be able to do so. I am rather inclined to the view that the large consumers, as a whole, might aid in stabilization were they willing and able to store a larger quantity of coal than they ordinarily do and thus stretch the production of coal over the entire year rather than have the demand come intermittently and sometimes fiercely, causing a great depression in the industry at certain seasons and unduly high prices at others, things which happen almost every year."

J. H. Sanford Disposes of $5,000,000 Coal Properties in Pittsburgh District

Bituminous coal properties in Washington and Allegheny counties, Pennsylvania, with an actual annual production of 3,000,000 tons, dock and yard sites and undeveloped or virgin coal lands in the Pittsburgh district are involved in the sale just completed by J. H. Sanford, of Pittsburgh, of his interests in the Carnegie Coal Co. and subsidiary corporations to John A. Bell, president of the Carnegie Trust Co. Five million dollars is said to be the price paid by Mr. Bell.



J. H. SANFORD

The following corporations and properties are included: the J. H. Sanford Coal Co., with mines at Racoon Station; the Carnegie Coal Co., with seven mines, at Oakdale, McDonald, Primrose, Racoon, Burgettstown, Atlasburg and Cedar Grove; the Pittsburgh & Lehigh Dock Co., with docks at Duluth, Minn.; the Carnegie Dock & Steel Co., operating at the Superior Dock, Superior, Wis.; the Chartiers Mining Co., with 44 acres of yard sites at Duluth, St. Paul and Minneapolis, Minn., and 1,500 acres of virgin coal lands, and the Carnegie Supply Co., with stores in Allegheny and Washington counties, Pennsylvania.

With this sale Mr. Sanford practically retires from a field in which he has been a dominating factor in the Pittsburgh district for over forty years, though he still retains his interest in the Chartiers Creek Coal Co., of which he is vice-president and which produces 500,000 tons annually of gas coal from operations near Cannonsburg in Washington County, Pennsylvania.

Under the name of the Jesse H. Sanford Co. he bought his first mine, the Leesdale, just above Carnegie in Allegheny County, Pennsylvania, at the age of twenty-eight. In 1899 his holdings had been increased to three mines, which were sold to the Pittsburgh Coal Co. The following year he bought 1,000 acres of coal land at Frederick, Pa., with Brown & Co., and at the same time organized the Carnegie Coal Co. with his father-in-law, the late R. P. Burgan. The latter sold his one-third interest a few years later to Mr. Bell, who now takes entire control of this corporation.

Northwest Dock Rate Decision, Expected July 1, May Bring Long List of New Complaints

It is now confidently expected by most interested parties that the Interstate Commerce Commission will return its decision in the Northwest dock rate cases, or at least the principal ones, by July 1. The hearing in Minneapolis on the dock operators' complaint of discriminatory rate relations ended May 8. Oral argument in Washington June 14 winds up the public action and leaves the commission free to arrive at its conclusion as soon thereafter as possible. It is prophesied by many midwesterners that the decision will be against any disturbance of the present rate schedules between the docks and inland Northwestern points and between Illinois and the same territory. However, if the commission orders southern Illinois rates changed, inevitably there will ensue a filing of many new complaints to secure new differentials between Illinois groups. Much tentative preparation is now being made.

The hearing ended Tuesday, May 8 with very little that was sensational on any hand. There was a little chance for grand stand play in the fact that the appeal for adjustment might have been for a reduction of lake-rail rates. This would have received considerable popular acclaim. Instead the situation was outlined by the docks as discriminatory and relief asked, the form to be left to the decision of the commission. It may be assumed that any relief based upon an increase in the rates from the all-rail fields would be received with vigorous and emphatic opposition from the general public in the Northwest as well as from public officials and politicians.

Various representatives of the Twin City coal dealers entered opposition against any move that would deprive them of the favorable all-rail rates now enjoyed and predicted that any adjustment which increased the all-rail rates would result in higher prices to the public.

A. J. Holmes, of the Holmes & Hallowell Co., stated that in North Dakota last winter 71 per cent of the fuel consumed was lignite, due to the high price of soft coal from Illinois and Indiana. A. J. Eckstrom, of the Flour City Fuel & Transfer Co., Minneapolis, testified in opposition to any increase in rates, stating that 75 per cent of his company's business was in Illinois or Indiana coal; 20 per cent dock coal and 5 per cent all-rail Eastern coal.

The railroads were generally opposed to any adjustment that involved any reduction in freight rates, on the ground of loss of revenue to themselves. Some of them did not indicate why they were so staunch for sustaining the low rates from the all-rail fields made by connecting lines, as against a lower rate from the docks, wherein they would have the entire revenue to themselves. They testified that any increase of the rates from Indiana and Illinois to the Northwest would result in forcing coal from those fields off the market in this territory.

A representative of the Minnesota Railroad and Warehouse Commission testified that any adjustment involving an increase of any rates now existing would be opposed as being bound to increase the cost to the consumer, and would also discourage industry. This position was supported by traffic experts from the St. Paul Association and from the Minneapolis Traffic Association.

Cross-examination of the carrier representatives brought out the admissions that the all-rail rates were favorable as compared with rates on other commodities, but they insisted that the railroads could not stand any loss of revenue.

Judge Berkey Permanently Enjoins Union In Somerset County

Judge John A. Berkey, in the Somerset County Court on Friday, May 11, after an all day hearing, made the injunction sought by the Quemahoning Creek Coal Co., operating mines at Harrison, Somerset County, Pa., permanent against the officers and members of the United Mine Workers, prohibiting the union from picketing and otherwise interfering with the company's operations.

The coal company has 200 men employed at Harrison, with whom it has a contract that they will not join the union during a fixed period. A temporary injunction was granted previously and the final hearing brought out important testimony to the effect that the union held meetings weekly in the vicinity of the mine; that the union organizers accosted non-union miners, appealing to them to "quit scabbing" and "join the strike." The defendants also were charged with contempt of the court's order of last year enjoining the congregating of strikers around mining property.

Reading Company Files Third Modified Plan Of Segregation; Government Objects

The Reading Company on May 10 filed a third modified plan of segregation with the U. S. District Court of Philadelphia providing an increase in the interest rate on the bonds to be issued by the segregated companies. The plan provides for the payment of 5 per cent interest on approximately $31,000,000 of new bonds on the company's property, instead of 4 per cent, and 4½ per cent interest on approximately $63,000,000 bonds to be issued by the Reading Company, instead of interest of 4 per cent, as heretofore provided. The new mortgage on the railroad will be known as an open-end mortgage, and the plan provides for the exchange of general mortgage bonds outstanding for one bond of Reading Company at 4½ per cent and one of the coal company at 5 per cent.

The coal bonds are to mature in fifty years and the railroad bonds will mature in seventy-four years.

The Attorney General has filed a brief in the Reading segregation case in which objection is made to certain provisions of the third modified plan. The government objects to increasing interest rate on the bonds on the ground that such additional charges would result in higher prices for coal. The government asks that the District Court determine the amount of compensation to be paid in cash.

Fuel Association Meeting Program Complete

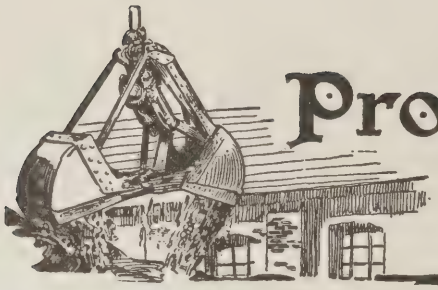
The program of the fifteenth annual convention of the International Railway Fuel Association, at Cleveland, Ohio, May 21-24, embraces a large number of speakers, who will discuss topics of pressing interest. T. K. Maher will welcome the visitors on behalf of the coal operators. Among those who will make addresses are Julius Kruttschnitt, George H. Cushing, whose subject will be "Classification of Coals"; C. E. Maurer, president Glens Run Coal Co.; H. M. Griggs, manager Ore & Coal Exchange, Cleveland, "Lake Coal Handling"; and C. S. Beyer, Jr., consulting engineer, Labor Bureau, Inc., "Incentives for Promoting Fuel Economy."

The local committee in charge of entertainment has announced a program of entertainment as follows:

Monday, May 21, afternoon, theater party for ladies at Keith's Palace theater; evening, Get-together reception at 7:30. Moving pictures of oil production and usage will be shown at 8:30 by courtesy of the Southern Pacific Co., followed by a dance.

Tuesday, May 22, afternoon, educational trip to American Steel & Wire Co.'s Newburg and Cuyahoga plants, or to coal- and ore-handling docks. Automobiles will be provided by Cleveland coal operators. In the evening the annual dinner and dance will be held.

Wednesday, May 23, noon, luncheon for ladies at Cleveland Art Museum, followed by a personally conducted tour of the museum and drive around Cleveland; evening, entertainment given by Cleveland coal operators.



Production and the Market



Weekly Review

Prices of soft coal have advanced a trifle from last week. Buying continues quiet but inquiries increased and there was an apparent attempt to buy at present prices for future delivery which is taken by operators and shippers as an inclination on the part of consumers to guard against future transportation difficulties.

Bituminous-coal output continues above 10,000,000 tons per week, although it has declined slightly during the past three weeks. Production so far this year is larger than for any similar period for six years.

Price changes show either up or down in all districts except Mt. Olive and Pittsburgh. The greatest advance was made by Cambria, Somerset and Clearfield coals, with Pocahontas following closely. The biggest drop was in Kanawha coals. *Coal Age* Index of spot prices for bituminous coals was 226 on May 14, as compared with 220 for the previous week, with an average price of $2.73.

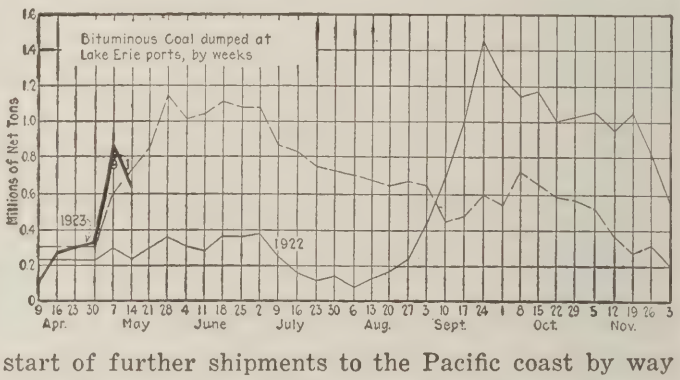
Mine Closings Continue in Middle West

More mines closed in the Midwest, causing spot prices in these districts to advance a trifle. In the East there is considerable optimism and operators feel confident that fuel stocks are low. Warnings issued by the Department of Commerce and by organizations, including the Chamber of Commerce of the United States, to consumers to buy coal now have resulted in more inquiries and while few orders have been placed producers and shippers are hopeful. There is a strong feeling that industrial plants are preparing to store.

Contracting has taken on new life and some contracts were reported closed. The U. S. Shipping Board opened bids last week for furnishing 1900 gross tons of either Pool 9 or 71 coal alongside New York harbor and received tenders ranging from $5.43 to $7. Contracts for small tonnages for industrial plants were closed on a basis of $3.25 per net ton f.o.b. mine for Pool No. 9, and at $3 per net ton f.o.b. mine for Pool 10 coal.

The export market continues flat. There were some inquiries but no definite business was reported. A couple of charters for French Atlantic destinations for old business were reported. Shipments from Baltimore during the first seven days of May amounted to 73,526 tons of cargo and bunker coal, and 26,780 tons of coke, a total of 100,306 tons of coal and coke.

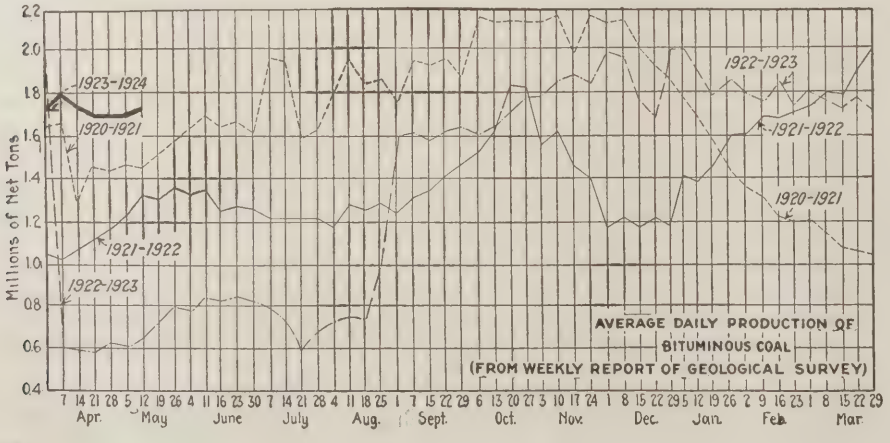
A shipment that attracted considerable interest in Baltimore took place on May 11, when the steamship Winnebago loaded 5,229 tons of smithing coal for Portland and Seattle. This shipment is looked upon as the



start of further shipments to the Pacific coast by way of the Panama Canal. The vessel took bunker coal at Norfolk.

The Lake season has opened in nearly all directions. Shipments are heavy, close to a half million tons having arrived at the Head-of-the-Lakes during the first week of navigation.

"For the third successive week production of soft coal declined slightly," says the Geological Survey. "The total output in the week ended May 5 is estimated at 10,010,000 net tons, a decrease of 93,000 tons from the figure for the week preceding. May Day was partially observed as a holiday in some districts, and over the country as a whole it appears that it counted for about



Estimates of Production
(Net Tons)

	1922	1923
BITUMINOUS		
April 21 (*b*)	3,575,000	10,221,000
April 28 (*b*)	4,175,000	10,103,000
May 5 (*a*)	4,164,000	10,010,000
Daily average	694,000	1,668,000
Calendar year	148,693,000	189,506,000
Daily av. cal. year	1,396,000	1,776,000
ANTHRACITE		
April 21	6,000	2,065,000
April 28	5,000	2,116,000
May 5	6,000	2,021,000
Calendar year	21,809,000	35,739,000
COKE		
April 28 (*b*)	94,000	338,000
May 5 (*a*)	95,000	406,000
Calendar year	2,400,000	6,824,000

(*a*) Subject to revision. (*b*) Revised from last report.

90 per cent of a full working day. Preliminary reports of cars loaded during the week of May 7-12 indicate slightly better conditions and it seems probable that production will total about 10,200,000 tons."

Dumpings at Hampton Roads during the week ended May 10 for all purposes totaled 359,002 net tons, as compared with 355,271 net tons in the previous week.

Production of anthracite continues on a basis of about 2,000,000 tons weekly. Domestic sizes are scarce, with demand heavy. Considerable coal is going into Canada. The steam sizes are slowing up, some producers sending heavy tonnages to storage, which enables the independent operators to dispose of their output to better advantage.

Midwest Slowly Slogs Along

The Midwest coal region is slogging along more and more slowly. A few more mines in both Indiana and Illinois have shut down, many of them for the summer. In central Illinois so few mines are operating that little but contract mine-run is shipped and as a result screenings are scarce. The spot price has risen a little as a consequence, but nobody needs to buy. Southern Illinois, gathering in about all the domestic business the state gets just now, is shipping enough lump and egg to bring out a steady flow of steam coals of ample volume to meet most requirements. losing only a little bit of rush steam business to the Springfield district.

Franklin County, though nearly half shut down and getting but 40 per cent running time for the other half, is preparing for an advance in domestic price June 1 from $4.10 to $4.35. The big operators insist they are going through with the plan of advancing the price 25c. a month throughout the summer, and that there will be few deviations. Just now there are a good many independents in the Carterville region offering lump, egg and nut at $2.75 @$3 and some of last month's orders have been extended by the bigger shippers at the April price of $3.85.

The Duquoin and Jackson County fields are shipping a little domestic up to $3.50 and screenings at $1.60. Mt. Olive district is almost at a standstill.

St. Louis "Quiet and Easy"

The St. Louis market is "quiet and easy." A little anthracite and smokeless is placed right along and there is not enough coke to meet a slow demand. However, there is

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

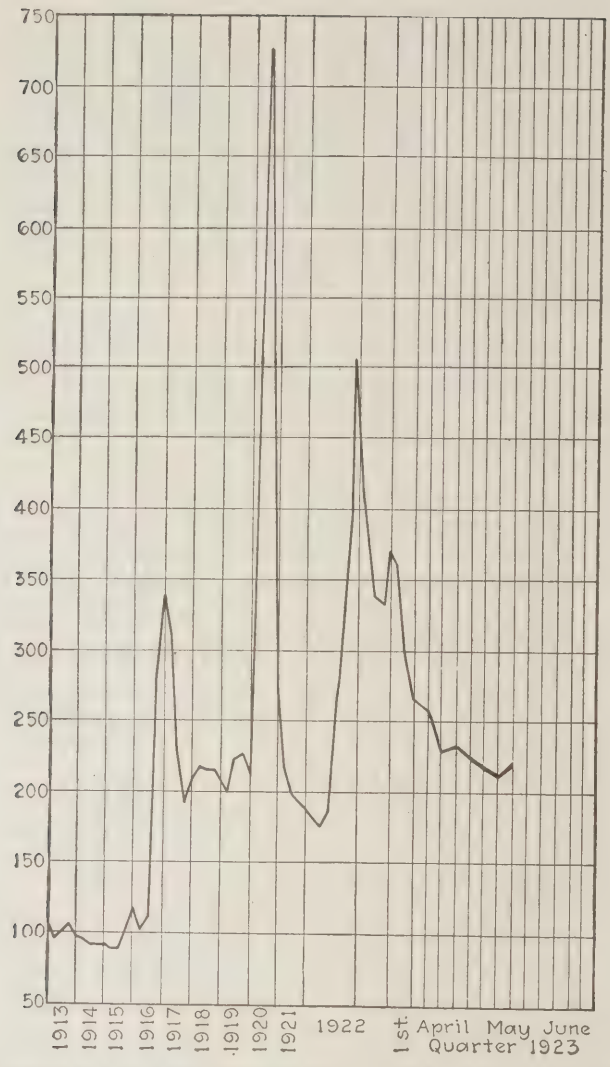
Low-Volatile, Eastern	Market Quoted	May 15 1922	Apr. 30 1923	May 7 1923	May 14 1923†
Smokeless lump	Columbus	$2.85	$6.10	$6.15	**$6.00@$6.50**
Smokeless mine run	Columbus	2.90	4.10	4.00	**3.85@ 4.35**
Smokeless screenings	Columbus	2.90	4.00	3.75	3.50@ 4.00
Smokeless lump	Chicago	2.90	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	2.70	3.85	3.85	3.75@ 4.00
Smokeless lump	Cincinnati	3.25	6.00	6.00	6.00
Smokeless mine run	Cincinnati	2.90	3.85	3.85	**4.00@ 4.50**
Smokeless screenings	Cincinnati	2.75	3.85	3.85	**4.00@ 4.25**
*Smokeless mine run	Boston	6.75	6.35	6.35	**6.75@ 7.00**
Clearfield mine run	Boston	3.25	2.60	2.50	**2.25@ 3.25**
Cambria mine run	Boston	3.75	3.35	3.10	**3.25@ 4.00**
Somerset mine run	Boston	3.50	3.00	2.75	**2.75@ 3.50**
Pool 1 (Navy Standard)	New York	.....	4.00	3.75	3.50@ 4.00
Pool 1 (Navy Standard)	Philadelphia	3.95	4.05	4.05	*3.80@ 4.20*
Pool 1 (Navy Standard)	Baltimore	4.00	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	4.00	3.10	2.80	**2.60@ 3.25**
Pool 9 (Super. Low Vol.)	Philadelphia	3.75	3.10	3.05	*2.70@ 3.35*
Pool 9 (Super. Low Vol.)	Baltimore	4.00	2.90	2.80	*2.65@ 2.85*
Pool 10 (H.Gr.Low Vol.)	New York	3.75	2.60	2.50	2.25@ 2.75
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.60	2.50	2.45	*2.20@ 2.60*
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.75	2.50	2.25	2.25
Pool 11 (Low Vol.)	New York	3.65	2.25	2.20	1.90@ 2.50
Pool 11 (Low Vol.)	Philadelphia	.....	2.10	2.00	1.85@ 2.20
Pool 11 (Low Vol.)	Baltimore	3.50	2.15	2.00	2.00
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	.....	1.80	1.80	**1.75@ 2.00**
Pool 54-64 (Gas and St.)	Philadelphia	.....	2.05	1.85	1.75@ 2.00
Pool 54-64 (Gas and St.)	Baltimore	.....	1.95	1.80	1.80
Pittsburgh sc'd gas	Pittsburgh	.....	2.85	2.85	2.75@ 3.00
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	1.60	1.75	1.75
Kanawha lump	Columbus	3.15	3.60	3.50	*3.00@ 3.50*
Kanawha mine run	Columbus	3.00	2.25	2.25	*2.00@ 2.40*
Kanawha screenings	Columbus	2.95	2.10	2.05	*1.60@ 1.90*
W. Va. lump	Cincinnati	3.10	3.75	3.50	**3.09@ 4.50**
W. Va. Gas mine run	Cincinnati	3.00	2.40	2.35	*1.90@ 2.50*
W. Va. Steam mine run	Cincinnati	3.00	2.40	2.35	*1.90@ 2.50*
W. Va. screenings	Cincinnati	2.90	2.25	2.10	*1.75@ 2.25*
Hocking lump	Columbus	3.15	2.85	2.85	*2.60@ 3.00*
Hocking mine run	Columbus	2.90	2.00	1.95	1.85@ 2.10
Hocking screenings	Columbus	2.85	1.70	1.60	1.50@ 1.75
Pitts. No. 8 lump	Cleveland	3.25	2.85	2.90	2.35@ 3.50
Pitts. No. 8 mine run	Cleveland	3.25	2.15	2.15	2.10@ 2.25
Pitts. No. 8 screenings	Cleveland	3.25	1.80	1.80	*1.50@ 1.75*
Midwest					
Franklin, Ill. lump	Chicago	3.95	3.65	3.80	3.50@ 4.10
Franklin, Ill. mine run	Chicago	4.15	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	4.15	1.85	1.85	*1.60@ 1.90*
Central, Ill. lump	Chicago	.....	2.70	2.30	2.25@ 2.35
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.55	1.55	**1.75@ 2.00**
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	.....	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.55	1.55	**1.60@ 1.75**
Standard lump	St. Louis	.....	2.50	2.50	**2.50@ 2.75**
Standard mine run	St. Louis	.....	1.85	1.85	*1.75@ 1.90*
Standard screenings	St. Louis	.....	1.10	1.50	1.50
West Ky. lump	Louisville	3.15	2.60	2.60	2.50@ 2.75
West Ky. mine run	Louisville	3.15	1.95	1.90	1.85@ 2.00
West Ky. screenings	Louisville	3.15	1.85	1.75	*1.50@ 1.75*
West Ky. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
West Ky. mine run	Chicago	.....	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.50	2.70	2.70
Big Seam mine run	Birmingham	1.70	2.10	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	1.95	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	.....	3.75	3.75	3.50@ 4.00
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	3.15	4.00	4.10	*3.50@ 4.50*
S. E. Ky. mine run	Louisville	3.00	2.75	2.45	**2.25@ 2.75**
S. E. Ky. screenings	Louisville	3.00	2.25	1.90	1.80@ 2.00
S. E. Ky. lump	Cincinnati	3.00	3.50	3.35	2.75@ 4.00
S. E. Ky. mine run	Cincinnati	3.00	2.25	2.25	1.75@ 2.25
S. E. Ky. screenings	Cincinnati	3.00	2.00	2.00	*1.60@ 2.00*
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.15	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.65	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	May 7, 1923 Independent	May 7, 1923 Company	May 14, 1923† Independent	May 14, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.00	8.00@ 8.35	$8.50@11.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.25	6.00@ 6.30	6.30@ 7.25	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.25@ 3.50	3.50@ 4.15	2.25@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.60@ 2.50	2.50	*1.50@ 2.50*	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	1.50@ 1.60	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 226, Week of May 14, 1923. Average spot price for same period $2.73. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

little else doing on that market except a thin, but steady Standard district steam trade. Buyers will not believe that coal is going to go up during the summer. They appear to be waiting for another drop. One reason for this attitude is that the retailers failed to make good on their hint that they would raise prices May 1 when the field circular on many domestics went up 25c.

Kentucky Mildly Active

Eastern Kentucky is doing a little business every week but the desired rush of Lake trade has not been strong enough to create any furor. Industrial consumption and railroad business is light. Business generally is quite fair. The western end of the state, having recently settled its strike, is harder put for trade than the Harlan and Hazard fields because little of that coal goes to the Lakes, and it is difficult for it to penetrate the Chicago and Midwestern market because of Illinois and Indiana competition. Steam coal is generally draggy and not much activity is expected by most operators before the middle of June or the first of July. Prices have shown no marked change.

Northwest Wide Awake Now

Navigation opened with a rush at the Head-of-the-Lakes. It is the second latest opening of record, according to Duluth historians.

The new list of prices has been announced. They range as a whole about $2 below last year's opening: Kentucky lump, $8; splint lump, $7.50; Youghiogheny lump, $7; Hocking lump, $6.75; Youghiogheny & Hocking run of pile, $6; Youghiogheny screenings, $4.50; Hocking screenings, $4.25; Pocahontas lump, $12.50; mine run, $9; screenings, $6.75. Other prices have not been announced. Anthracite is selling at last year's figures. It is expected that prices will be announced at the end of this week.

The Milwaukee market is very quiet though the sharp reduction in price of Eastern bituminous coal on May 1 had the effect of stimulating buying in industrial circles to some extent. In addition to the arrival of forty-three cargoes of coal, car ferries brought in 18,427 tons of anthracite and 80,176 tons of soft coal during the month of April. The railroads contributed no anthracite, but delivered 109,612 tons of soft coal.

Western Business Quiet

Colorado bituminous producers had a fair week with no recessions in prices but the pick-up in their business was slight. There is a real demand both for bituminous and lignite slack at fair prices, not because the demand is stronger than usual at this time of year but because there is less coal screened now than is normal.

Business for Utah mines remains quiet. Weather is warm and working time has dropped so low that many experienced miners are leaving the field. Prices continue to fluctuate.

In the region around Kansas City, field prices have not changed and the situation is in no way improved over that of the last few weeks. Nobody is buying for storage. Householders are not taking advantage of slight reductions in retail prices and industrial consumers and railroads assert that Kansas coal will not store, hence they would be foolish to try it. The industrial contract market remains fairly steady, however.

Ohio Markets Show Little Change

Trade is quiet in the Columbus market. Buying for steam purposes is at a minimum and the general prosperity in industrial circles is not reflected in the coal trade. Large users are using their reserve stocks and show little inclination to come into the market. In the Cincinnati market the lower grades were kept moving by low prices, with better grades holding their own. A little spurt that resulted in better car supply in the Pocahontas fields is said to have been responsible for a better market for those coals. Operators and jobbers in the Cleveland market say that the general steam demand is no better than it has been for some weeks.

Demand for gas coal in the Pittsburgh district continues of fair proportions but there is no snap to the market. The utilities are running as well as usual at this time of the year, while the steel industry, which consumes considerable gas coals is running at a new high record rate.

In central Pennsylvania the new mine ratings under recently established distribution rules became effective on the Pennsylvania R.R. on May 10 and are being watched by operators. Under the new ratings some companies will get more cars and others less. Production during April in central Pennsylvania was 69,567 cars as compared with 79,542 cars in March.

Consumers in the Buffalo market see no reason for buying coal when supply is greater than the demand.

New England Markets Apathetic

The leading feature in the New England market is the distinctly firmer trend of Hampton Roads prices. With a relatively small output there has been enough increase in buying to warrant higher quotations f.o.b. vessel, but not only is there no improvement in demand at various rehandling plants but there seem few indications of prices any higher than those that have prevailed for nearly sixty days. Purchases continue on a hand-to-mouth basis and not yet have buyers generally shown any disposition to place orders more than a month or two in advance. Reserves are of only moderate size, but water power is ample in large areas and there continues the same apathetic attitude toward coal

that has been characteristic since quotations began to recede earlier in the year.

Higher prices at the Virginia terminals resulted in slightly better inquiry for Pennsylvania coal, although thus far what small business has come into the market has been confined almost exclusively to the choice grades. Even these have sold at what operators regard as bottom figures, costs considered, but frequent embargoes which shut off deliveries on contract also have had their bearing. At one time recently all five of the Hudson River gateways were practically closed to bituminous coal and shippers were obliged to send output temporarily in directions where coal does not usually flow in such volume. Part of the depression in Pennsylvania quotations the past week has been due to this factor.

While tonnage for transshipment at New York and Philadelphia is by no means heavy the aggregate for May probably will show an increase over totals for April. Transportation conditions by rail, of course, have contributed to tidewater movement. A considerable share of the coal actually dumped is for gas-making purposes and for railroad fuel, and there also is a certain amount that continues to go forward to points not easily accessible from Hampton Roads. Coastwise freights are easy at $1, Hampton Roads to Boston, on large vessels and barges, with steamers at 90@95c.

Slow Demand in New York Market

In New York demand was slow. Some operators assert that they are sold up for certain grades well into June while others complain of lack of business. Inquiries are on the increase, however, and operators and shoppers are optimistic. There were 3,400 cars at the local terminals on May 12. Philadelphia consumers are unwilling to buy anything out of the ordinary. Feelers have been put out by some consumers on big blocks of coal to run from one to two months. The feature of the Baltimore market centers in the export situation. Local demand is slow.

Lack of market for steam coal is serving gradually to reduce production in the Alabama field. Many mines dependent almost entirely upon spot demand are either closed or have curtailed production considerably.

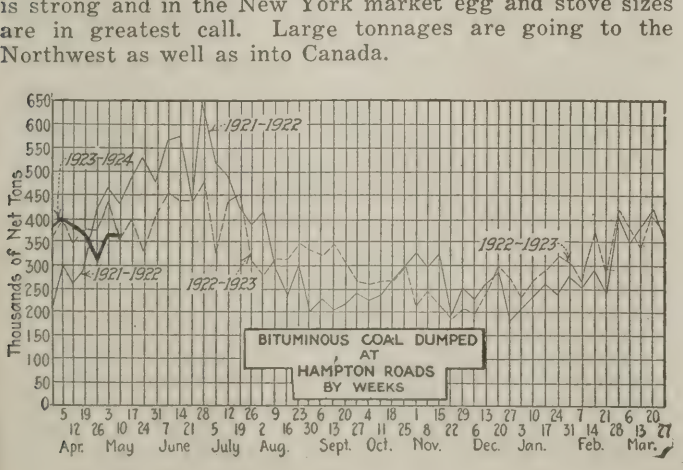
Lake Navigation Gains Strength

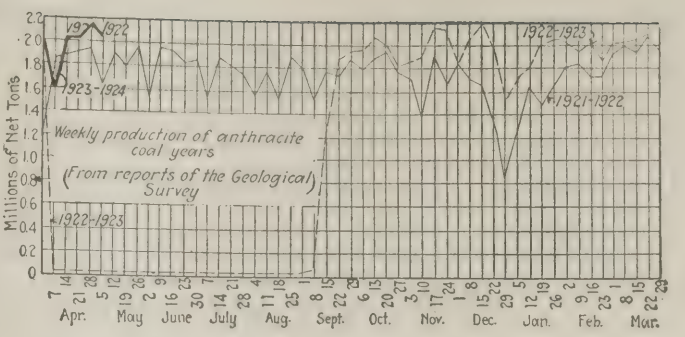
Lake navigation, while not active from all ports, is gaining strength. More than 500,000 tons of coal have arrived at Duluth since May 5, when the first shipment was received, among it some anthracite, and other cargoes of hard coal are reported on the way. Arrivals at Milwaukee during the first ten days of May consisted of 80,629 tons of anthracite and 281,761 tons of soft coal. In the Columbus market the Lake trade is expected to be under full headway the latter part of May. Loading of bottoms is going on briskly.

During the week ended May 14 Lake dumpings amounted to 582,486 net tons of cargo coal and 23,525 net tons of fuel coal, making the season's dumpings to date 2,376,169 net tons of cargo coal and 94,277 net tons of fuel coal.

Strong Demand for Domestic Anthracite

Anthracite domestic sizes are readily absorbed. Demand is strong and in the New York market egg and stove sizes are in greatest call. Large tonnages are going to the Northwest as well as into Canada.





"The production of anthracite was well maintained during the first week of May," says the Geological Survey, "even though there was a slight decline in output. The nine principal anthracite carriers reported loading 38,643 cars, from which it is estimated that the total output, including mine fuel, local sales, and the product of dredges and washeries, was 2,021,000 net tons.

"Preliminary reports of loadings during the week May 7-12 indicate a higher rate of production during the week."

Production of Coke Declines Slightly

Production of coke in April was 3,206,000 net tons, as compared with 3,256,000 net tons in March, says the Geological Survey. To manufacture this tonnage of coke it is estimated that 7,408,000 tons of coal was consumed, of which 4,607,000 tons were used in byproduct ovens and 2,801,000 tons in beehive ovens. During the week ended May 5 the total output is estimated at 406,000 net tons, a decrease of 18,000 tons as compared with the week previous.

F. R. Wadleigh, Federal Fuel Distributor, has requested the National Retail Coal Merchants' Association and the American Wholesale Coal Association each to name a representative from its organization for membership on his Advisory Committee to study community coal storage, coal sales agencies and distribution.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Apr. 28, 1923 Inclusive	Week Ended April 28, 1923
U.S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	32.5	(a)
Panhandle, W. Va.	51.3	57.3	55.7	58.2
Westmoreland	58.8	65.8	56.3	61.3
Virginia	59.9	55.7	56.3	65.3
Harlan	54.8	22.1	23.9	29.0
Hazard	58.4	16.4	23.6	39.3
Pocahontas	60.0	36.6	38.2	38.7
Tug River	63.7	28.8	35.9	43.4
Logan	61.1	26.2	31.4	38.2
Cumberland-Piedmont	50.6	31.7	49.2	54.2
Winding Gulf	64.3	30.4	35.3	42.0
Kenova-Thacker	54.3	42.4	35.8	49.9
N. E. Kentucky	47.7	28.4	28.4	34.1
New River	37.9	31.6	36.7	42.1
Oklahoma	59.6	59.1	44.0	54.3
Iowa	78.4	75.9	74.7	43.6
Ohio, Eastern	46.6	40.8	36.0	39.7
Missouri	66.8	76.3	72.1	50.0
Illinois	54.5	49.9	45.6	33.2
Kansas	54.9	55.9	46.4	40.9
Indiana	53.8	37.7	50.3	37.2
Pittsburgh†	39.8	41.2	36.2	51.1
Central Pennsylvania	50.2	53.4	48.5	55.0
Fairmont	44.0	35.5	36.4	44.5
Western Kentucky	37.7	32.4	32.4	25.2
Pittsburgh*	31.9	56.1	60.5	73.9
Kanawha	13.0	15.6	23.5	25.9
Ohio, Southern	24.3	38.1	31.5	24.1

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended April 28, 1923	963,694	180,127
Previous week	957,743	179,762
Same week in 1922	751,111	75,389

	Surplus Cars		Car Shortage	
	All Cars	Coal Cars		
April 30, 1923	13,556	2,849	35,282	17,634
Same date in 1922	371,764	229,892	....	....
April 22, 1923	11,062	2,582	44,299	20,725

Foreign Market And Export News

British Production Absorbed by Active Market; Output Sold Ahead

During the week ended April 28, Great Britain's mines produced 5,721,000 tons of coal, says a cable to *Coal Age*. This is a decrease of 104,000 tons from the output of the previous week, but within 21,000 tons of the weekly record output for 1922.

The Welsh coal trade, compared with its condition of a few weeks back, has become irregular. The unsettled state of other British markets has not yet affected Newcastle. Production of all classes of coal is now sold up for weeks to come, and it is not believed there can be no appreciable falling off in the volume and value of trade until July 1.

For the period ending June there is an active inquiry. Sellers ask for full rates, and get them without any difficulty. Supplies are very scarce all around, particularly in coking coals.

Efforts to reach a settlement of the question of the three-shift operation at the Welsh coal ports have not been successful. Following the refusal of the coal tippers and trimmers to accept the provisional agreement made with the operators, attempts have been made to secure a guarantee that the present high earnings, ranging from £6 to £9 per week will continue in force, but the operators decline to give any such guarantee. The Industrial Court appointed to inquire into the position will not resume its sittings until a deadlock in the negotiations is reported.

Statistics of the Board of Trade on coal exports for the month of April compared with the same month of 1922, follow, in tons:

	1923	1922
Germany	1,715,000	257,000
France	1,543,000	955,000
Italy	754,000	541,000
Other countries	2,829,000	2,343,000
Total	6,841,000	4,096,000

Export Demand at Hampton Roads Strong

Business at Hampton Roads had a livelier tone last week, with export trade booming and threatening to break all records for the past twelve months. A pick-up in trade with France and South America was one of the outstanding features of the market.

Stocks at the piers were cut down, and prices stiffened. The Norfolk & Western R.R. routed a large tonnage by rail to the West, and the result was reflected in diminished stocks at the piers. Coastwise trade was on the decline, but the bunker business held firm.

A generally optimistic tone was heard throughout the trade, with prospects for increasing business bright. Export trade is expected to continue to grow. Domestic business was falling off to the usual season's minimum. The car situation was improved, being about 75 per cent of normal, from the best opinion in the trade.

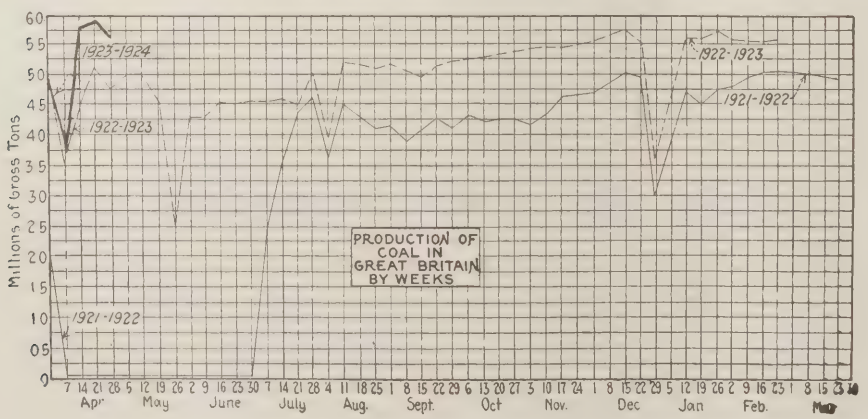
Export Clearances, Week Ended May 5, 1923

FROM HAMPTON ROADS

For Brazil:	Net Tons
Grk. SS Maria Stathatos, for Rio de Janeiro	6,013
Br. SS Sallust, for Pernambuco	1,986
For Canada:	
Du. SS Tenbergen, for Three Rivers	6,994
Nor. SS Corona, for St. Johns	5,022
For Egypt:	
Br. SS City of Adelaide, for Port Said	2,569
For France:	
Ital. SS Livenza, for Marseilles	8,124
Br. SS Kastalia, for Marseilles	6,729
Br. SS Sedgepool, for Havre	8,543
Br. SS Hindustan, for Havre	7,444
Br. SS Bakana, for Marseilles	6,560
For Germany:	
Br. SS Maid of Psara, for Hamburg	5,436
For Greece:	
Ital. SS Salina, for Piraeus	8,061
For Holland:	
Du. SS Uredenburh, for Rotterdam	10,395
Du. SS Flensburg, for Rotterdam	9,918
For Porto Rico:	
Amer. SS Evelyn, for San Juan	3,994
For Uraguay:	
Br. SS Trevarrack, for Montevideo	6,371
For Venezuela:	
Amer. Schr. Mabel A. Frye, for Tucacas	1,936
For West Indies:	
Br. SS Elswick Tower, for Fort de France	5,719

FROM PHILADELPHIA

For Brazil:	
Br. SS Sweethope, for Bahia Blanca	
For France:	
Br. SS Halesius, for Dunkirk (coke)	2,903
Nor. SS Loch Tay, for Dunkirk (coke)	3,182



French Coal Imports and Exports

IMPORTS

Coal	March	Three Months
Sarre	4,432	499,697
Great Britain	1,729,418	4,134,647
Belgium	177,857	545,414
Germany	46,661	354,416
Spain	30	820
Netherlands	64,159	135,272
Other countries	130	1,685
Totals	2,022,687	5,671,951
Coke		
Great Britain	55,242	157,638
Belgium	18,431	120,988
Germany	24,924	303,283
Netherlands	26,830	79,824
Czecho-Slovakia	1,443	24,858
Other countries	54	8,575
Totals	126,924	695,166
Patent fuel:		
Great Britain	9,102	33,335
Belgium	26,764	120,800
Germany	3,880	44,521
Other countries	2,030	4,748
Totals	41,776	203,404

EXPORTS

Coal	March	Three Months
Belgium and Luxemburg	242,912	477,099
Switzerland	33,688	61,382
Spain	475	475
Italy	2,274	43,310
Germany	.....	39,349
Other countries	10,982	42,943
Bunkers { French steamers	8,516	35,877
Bunkers { Foreign steamers	3,127	10,329
Totals	301,974	710,764
Coke		
Switzerland	8,526	17,534
Belgium and Luxemburg	308	1,678
Spain	302	720
Italy	14,810	62,522
Germany	.....	1,560
Other countries	493	4,209
Totals	24,439	88,223
Patent fuel		
Switzerland	22,078	42,988
Belgium and Luxemburg	387	4,942
Italy	113	6,835
Other countries	2,246	19,619
Bunkers { French steamers	350	1,726
Bunkers { Foreign steamers	17	110
Totals	25,191	76,220

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	May 3	May 10
Cars on hand	1,178	828
Tons on hand	76,049	51,724
Tons dumped for week	89,758	113,678
Tonnage waiting	.....	16,000
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,641	1,509
Tons on hand	94,660	87,130
Tons dumped for week	126,152	132,741
Tonnage waiting	10,500	38,100
C. & O. piers, Newport News:		
Cars on hand	1,927	2,096
Tons on hand	101,900	108,525
Tons dumped for week	101,297	74,119
Tonnage waiting	13,185	5,250

Pier and Bunker Prices, Gross Tons

PIERS

	May 5	May 12†
Pool 9, New York	$5.75@$6.25	*$5.75@$6.00*
Pool 10, New York	5.20@ 5.70	*4.90@ 5.50*
Pool 11, New York	4.25@ 5.00	*4.00@ 4.75*
Pool 9, Philadelphia	6.20@ 6.70	*6.15@ 6.60*
Pool 10, Philadelphia	5.25@ 5.65	*5.20@ 5.60*
Pool 11, Philadelphia	4.20@ 4.65	*4.20@ 4.60*
Pool 1, Hamp. Roads	6.25@ 6.50	**7.00**
Pools 5-6-7, Hamp. Rds.	5.50	5.50
Pool 2, Hamp. Roads	6.25@ 6.50	**6.75**

BUNKERS

Pool 9, New York	6.05@ 6.55	*6.05@ 6.30*
Pool 10, New York	5.50@ 6.00	*5.20@ 5.80*
Pool 11, New York	4.55@ 5.30	*4.30@ 5.05*
Pool 9, Philadelphia	6.60@ 6.75	*6.50@ 6.70*
Pool 10, Philadelphia	5.50@ 6.00	*5.40@ 6.00*
Pool 11, Philadelphia	4.50@ 5.00	4.50@ 5.00
Pool 1, Hamp. Roads	6.50	**7.00**
Pool 2, Hamp. Roads	6.50	**6.75**

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	May 5	May 12†
Admiralty, large	38s.@ 40s.	**39s.@ 40s.**
Steam, smalls	26s.@ 30s.	**30s.**
Newcastle:		
Best steams	34s.6d.@ 35s.	*34s.@ 35s.*
Best gas	33s.@ 35s	*32s.6d.@ 35s.*
Best bunkers	34s.@ 36s.	**35s.@ 35s.6d**

† Advances over previous week shown in **heavy type**; declines in *italics*.

News Items From Field and Trade

ALASKA

The Alaska Legislature has taken action which will permit the territorial government **to co-operate with the U. S. Bureau of Mines in the maintenance of a mine-inspection system.** Under this arrangement B. D. Stewart will be mine inspector for the territory and supervising mining engineer for the Bureau of Mines, as well as the representative of the Secretary of the Interior in matters pertaining to leasing. The proposal to establish an Alaska Mining Development Board was defeated by one vote. The purpose of this board was to devise means whereby the mineral development of the territory could be stimulated. The bill carried an appropriation of $40,000.

ILLINOIS

The Pennsylvania Crusher Co., of Philadelphia, has opened an office in the Monadnock Building, Chicago, with C. S. Darling in charge.

The Illinois Mining Institute will hold its summer meeting on one of the Eagle boats, leaving St. Louis on the morning of Thursday, June 7, and cruising up the Illinois River to Starved Rock, near La Salle, Ill. The boat will return to St. Louis, arriving there about noon on Saturday, June 9.

Arrangements are being made to hold **an Illinois first-aid contest at Collinsville** on Saturday, June 23. The local arrangements are being taken care of by a committee of residents of that city, composed of two operators, two miners and three members of the Civic Association.

Sinking of the new Nason mine in Jefferson county has begun at last. Late in April work started on both the main shaft and the air shaft.

Donk Bros. Coal & Coke Co. is erecting one of the largest tipples in the state at Mine No. 4, near Edwardsville, Ill. The airshaft has been hoisting coal for two years and now the main shaft is about ready. The tipple will be wide enough for six tracks and will have a capacity of 6,000 to 8,000 tons of coal daily. It will be 85 ft. in height. The company also will install one 750-kw. and one 1,000-kw. turbine generators. Electric current will be supplied to the mine at Maryville as well as No. 4 mine.

The Chicago Collieries Co. will sink a mine three miles north of Catlin, near Danville. The shaft will be near the present workings, where a vast amount of coal is being stripped. The company controls 2,800 acres of land lying between the Kistler hill, west of Batestown, and the village of Catlin. At present the big shovels are stripping coal south of the hill and it is planned to sink the shaft at a point further south, which will give employment to more than 300 men. Railroad connections will be made with the Wabash at Catlin and with the Big Four and Illinois Traction System west of Danville.

INDIANA

The Akin-Burton Coal Co. is the name of a newly organized company in Terre Haute. The company will do a general mining business and has a capital stock of $50,000. The organizers are Charles T. Akin, Sedgwick R. Akin and Charles R. Burton.

The Glendale Coal Co., of Terre Haute, has filed a preliminary certificate of dissolution, as did the **Home Coal Co.** of the same city.

For the purpose of dealing in coal lands and leases, the **Bertelsen Coal Co.** has been organized in Evansville with a capital stock of $10,000. The organizers of the company are Jeppe Bertelsen, Katherine Bertelsen and Lowry Bertelsen.

The **Williams Coal Co.** has been organized in Evansville, with a capital stock of $200,000 to own and dispose of mine workings and mining grounds. The organizers are Robert R. Williams, Joseph Wastjer and William W. Gray.

Jos. W. Hays is just completing the organization of a corps of consulting combustion engineers to be known as **Jos. W. Hays and Associates.** The headquarters of the organization will be Michigan City.

Le Noir Coal Co. has changed its domicile from Terre Haute to Indianapolis, and created $150,000 of preferred stock.

The McDonald Block Coal & Clay Co. has been incorporated at Terre Haute; capital, $50,000; directors, Henry F. McDonald, Jesse W. McDonald, J. C. Coleman, Theodore S. Biggs, Harley McDonald, Fred Hermeling and Harold H. McDonald.

A committee representing the Indianapolis Federation of Community Civic Clubs will confer with officials of the Citizens Gas Co., of that city, in an endeavor **to induce the company to sell its coke direct to consumers.** The coke is now sold, it is claimed, to a Cincinnati jobber, acting as sales agent, who sells it to Indianapolis retail dealers. The gas company produces enough coke to supply every household in Indianapolis.

At the initial session for May of the Vigo County, Ind., Board of Mine Examiners, **permits to work with qualified miners were granted to 27 persons and certificates of qualification were issued to 23.** The board of examiners is composed of George H. Richards, Squire J. Carithers and George Stilwell. Due to scarcity of mine work at the present time the number of applicants is said to be smaller than the average.

IOWA

The Anderson mine, near Knoxville, Iowa, has been abandoned after 15 years' operation. Recently the mine began to fail and last week the machinery was pulled out. At one time over 100 miners were employed and a miners' train was operated between Knoxville and the mine.

J. A. J. Powers, of Knoxville, **has purchased 502 acres of coal land in Monroe County,** near Lovilia, where a stope mine has been in operation on the land for several years. Connections will be made with the Chicago & Northwestern R.R.

The Elmyra Coal Co., of Kansas City, has been incorporated under the Missouri law, with a capital of $40,000.

Tests made in Cedar township and Orange township, near Albia, **show a vein of coal at a depth ranging from 150 to 600 ft.** below the surface. Ten test holes have been sunk and it is expected to complete the tests by July 1. If the coal deposits prove as good as are now indicated a local mining company will be incorporated to operate the mine.

KENTUCKY

The following coal companies were recently incorporated: **Burclut Coal Co.,** Bell; capital, $30,000; incorporators, J. W. Burnett, W. L. Burnett, G. A. Clutts and A. E. Clutts, all of Middlesboro. **Doward Manning Coal Co.,** Jefferson; capital, $24,000; C. P. Downard and Elmore Manning, Louisville, and A. A. Deuser, New Albany, Ind.

The Elkhorn Coal Corporation has resumed dividend payments on its preferred stock by the declaration of a payment of 75c. a share payable on June 11 next to stockholders of June 1. From 1916 until December last year the company had paid dividends regularly at the annual rate of $3 a share on the preferred stock, but in February this year the action on the dividend was deferred. At the time the reason for the action was said to be conditions in the coal industry.

MASSACHUSETTS

James J. Phelan, State Fuel Commissioner, in his final report filed on May 5, **recommends that Massachusetts continue the use of substitutes** for anthracite, and consumers wherever possible should have their winter coal delivered during the summer.

Clinton S. Marshall, general manager of the Worcester division of the American Steel & Wire Co., has announced that because of the high cost of coal that plant will substitute electricity for power. The concern will continue to use coal for its heating plants, but will purchase power.

MINNESOTA

J. H. Bell, one of the largest stockholders of the Carnegie Fuel Co., and **J. N. Stonerood,** both of Pittsburgh and on the company's directorate, inspected the docks of the company at Duluth, May 1. Mr. Bell said that the docks had never been so bare of coal in their history and that he took a pessimistic view of the anthracite outlook. His company, he said, would accept no large contracts for anthracite and would supply the retail trade to a large extent.

MISSOURI

Thomas Wood of Centerville, Ia., has **leased 2,000 acres of land west of the Kirksville** city reservoir and extending to large leaseholds held by another Iowa firm in the same district. Wood will develop the field and will sink a mine.

The Big Creek Coal Co., of Kirksville, Mo., has announced that it **will install machines in its mines** there and has reached an agreement with the miners on a machine scale, as a result of which there should be a marked decrease in the price of coal in Kirksville next winter. According to officials of the company coal mined in this manner will cost about $5 or $5.25 a ton next fall, while this same coal was selling for $7 a ton last winter.

NEW YORK

E. J. Leonard, of Syracuse, has been awarded the contract for furnishing and delivering 3,000 tons of bituminous coal to the Onondaga Sanitorium. The awarding of contract for delivering 2,000 tons of similar coal to the County Home at Syracuse was deferred.

In keeping with the program mapped out by the Association of Railway Executives in their meeting in New York last month **the Erie RR. has been storing coal steadily,** Frederick S. Underwood, president, said recently. "We now have a supply of thirty-six days' coal on hand, and by Sept. 1 will have stored up a supply for ninety days. The Erie's shops have now brought the road's locomotive equipment up to normal, bad-order locomotives averaging about 15 per cent of the total on line, and by Oct. 1 it is expected that freight cars awaiting repairs will be reduced to 5 per cent of the total on line."

OHIO

The following coal companies were recently chartered: **The Webster Coal & Iron Co.,** Dayton; capital, $10,000; incorporators: Oscar Blum, Joseph Eselafsky, Esther Eselafsky, Bessie Blum and Maurice M. Linder. **The Blowers Coal Co.,** Bellaire, $200,000; George A. Blowers, M. M. Weinstein, C. H. Poole, A. E. Clark and D. B. Brooks. **The Nelsonville Consolidated Coal Co.,** Nelsonville; $25,000; D. H. Armstrong, R. S. Oxley, D. F. Shafer, A. H. Schory and O. P. Amann. **The Commercial Coal & Coke Co.,** Cleveland; capital, $10,000; Frederick L. Leckie, Tracy H. Duncan, Theo. C. Robinson, Lee C. Hinslea and Joseph A. Schlitz. **The Euga Coal Mining Co.,** New Lexington; capital, $5,000; J. A. Curtis, R. F. Roberts, M. Herstam and E. Holwick.

The Bingham Coal Co., Cadiz, has been incorporated with a capital of $250,000 to mine and sell coal in the eastern Ohio field. Incorporators are: Charles W. Wenner, F. J. Reese, A. H. Finnical, R. L. Timmons and Albert Wagoner.

The L. & L. Coal Co., of Bellaire, has been chartered with capital of $10,000 by W. J. McGraw, Joe Hodge, Paul V. Waddell, and James O. Wagoner, to mine and deal in coal and coke at wholesale and retail.

H. K. Keyser has succeeded O. M. Richardson as manager for the Old Dominion Coal Co.

Engineers have begun preliminary work for **construction of a fifty-one coke oven unit and byproducts plant** for the Trumbull Cliffs Furnace Co. at Warren. Construction will cost $3,000,000.

J. W. Johns, chairman of the nomination committee of the American Wholesale Coal Association, has asked that the preferences of the members be forwarded to him in

care of the Atlas Fuel Corporation, of Pittsburgh, as soon as possible, so that it may be known who has been settled upon for election as officers when the organization meets in Cincinnati, June 11 and 12. **Charles L. Dearing has been asked by President Morton to act as toastmaster at the annual banquet.**

The Columbus Board of Education has settled its coal problem for the coming year by purchasing 12,000 tons of mine-run Hocking coal from the Colonial Coal Co., of Columbus, at $4.29 delivered. This is a saving of approximately $20,000 over last year when 1½-in. lump was purchased at $6.19. Bids on mine-run which were opened May 7 ranged from $4.29 to $5.79 per ton delivered to the various school buildings.

PENNSYLVANIA

Senator Joseph O. Clark, Indiana, May 7, **introduced a series of four bills relating to the mining laws** of the State. One of these amends an act of 1921 relating to anthracite mine inspectors and relieves the inspectors from furnishing bond to the commonwealth. Another amends an act of 1911 relating to bituminous inspectors, relieving them of furnishing the bond. Two other Clark bills amend the same laws, one making a change in respect to Anthracite Mine Inspectors' Examining Board which under the act of 1921 could not sit more than forty days. This limit is removed by an amendment and the Chief of Mines is given the right to determine from time to time the maximum number of days for which the members of the board shall receive compensation. A minor change is the elimination of the requirement that the board's clerk shall also be a stenographer. The Bituminous Mine Inspectors' Examining Board under the act of 1911 was not restricted as to the number of days it could sit, but the Clark amendment provides that the Chief of Mines shall have the same right given him under the anthracite board bill amendment to fix the maximum number of days.

A bill offered by Asa K. DeWitt, Luzerne, **provides for approved electric motors and requires attendants at ventilating fans in anthracite mines.** The measure prohibits one year after the passage of the bill the use in any anthracite mine of electric motors in which locked safety lamps are used, unless they bear the approval plate of the U. S. Bureau of Mines and have also been approved by the Chief of Mines of Pennsylvania. An attendant must be constantly at fans used to supply air to underground workings and he shall regulate the speed of the fan according to the instructions of the mine foreman. Violators of the measure are subject to a fine of $100 to $200 or two months' imprisonment, or both.

Following an experiment in the **use of carbonic-acid gas in an attempt to extinguish mine fires,** a group of scientists headed by Dr. W. A. Hamor, assistant director of the Mellon Institute of Research at Pittsburgh on May 10 entered the Bitner coal mine of the H. C. Frick Co., near Connellsville, which has burned continuously since November, 1922. **A partial exploration of the burned underground area failed to disclose any fire** in the coal seams that have housed a roaring furnace for six months.

Agreements have been filed in the Dauphin County Court **withdrawing three appeals involving the state anthracite tax.** They were in the cases of the Kingston Coal Co., the Lehigh & Wilkes-Barre Coal Co. and the Spencer Coal Co. The appeals were dropped pursuant to an agreement that they would be withdrawn if the Supreme Court sustained the decision of the lower court in the test case of the Thomas Colliery Co. State coal taxes involved and now payable to the State aggregate $11,807.57.

The Amend Coal Co., of Greensburg, has contracted with the Roberts & Schaefer Co. for the installation of a Marcus screen in its tipple at Newcomer.

A delegation of twenty-five Senators and several bituminous operators on May 8 called upon Governor Pinchot to **urge him to favor an amendment to the administrative code by which the Department of Mines would be retained.** The code makes the department a bureau in the Department of Labor and Industry and the Senators told the Governor they believed that the mining industry and mine workers would be better protected if the present plan is continued. Governor Pinchot said he had not changed his mind relative to the advisability of creating a bureau for the regulation of mining, but that he would take the matter under advisement.

State charters have been issued at Harrisburg for the following bituminous companies: **Little Alps Coal Co.,** Newell; capital stock, $25,000; treasurer, A. M. Speers, Belle Vernon. Incorporators: C. O. Downer, Newell; S. M. Speers, Belle Vernon, and Arthur Hawthorne, Monessen. Purpose: Mining and preparing coal for the market. **Argentine Coal Mining Co.,** Pittsburgh; capital, $300,000; treasurer, E. A. Morris, 2023 Wendover street, Pittsburgh. Incorporators: E. A. Morris and R. M. Carpenter, Pittsburgh, and Will R. Crowthers, Mt. Lebanon. Purpose: Mining coal and buying, selling and dealing in coal lands.

Union workers in the Jermyn colliery of the D. & H. Co. at Jermyn **are preparing to make a membership drive** among the employees at that mine before declaring a button strike. This action was decided upon at a meeting which was addressed by District President William J. Brennan, who advised the men to first conduct a drive to affiliate all employees with the organization before calling a strike.

Fire of unknown origin on April 20 totally **destroyed the washery of the Susquehanna Collieries Co.** at Nanticoke, causing a property loss of approximately $150,000 and causing idleness of sixty employees. The structure, which was one of the largest washeries in the anthracite region, was situated near the site of No. 7 colliery of the Susquehanna company, which was destroyed by fire on Feb. 6.

The Berwind-White Coal Mining Co. presented a petition to the Somerset County Court on May 10 asking for a rule to show cause why an attachment should not be issued for Powers Hapgood, Joseph Foster and John Brozzini, organizers of the United Mine Workers, for contempt of court for alleged violation of the strike injunction granted a year ago. A rule was issued by Judge John A. Berkey and made returnable at Somerset May 21. It is alleged by the coal company that the defendants stopped working miners of the Berwind-White company on their way to work in Windber during the last few days. The petition sets forth that the defendants told the miners that the company's mines were a prison and workmen were not Americans unless they joined the strikers.

After a four-day hearing on a petition to make permanent the receivership of the Von Storch Collieries Co., of Scranton, **Federal Judge C. B. Witmer dismissed George R. McLean,** of Wilkes-Barre, **as temporary receiver** and directed that Edmund B. Jermyn, Scranton coal operator, be elected a member of the company's board of directors. Judge Witmer said that **Mr. Jermyn would represent the court as referee** and that no other order would be made at this time. He added that he hoped the "warring interests" of the company would agree, and if they could not he would direct that an answer be filed to the plaintiff's bill of particulars and appoint a permanent receiver to wind up the concern's affairs, if necessary. Mr. McLean was appointed receiver last week at the request of Henry E. Meeker, of New York, owner of 40 per cent of the company's stock. Mr. Meeker also filed the petition for a permanent receiver.

W. P. Boland, an independent coal operator of Scranton, **has offered the officials of Wilkes-Barre a flat rate of $1 for every ton of coal mined from under the river common.** Two other offers of something like 47c. and 52c. per ton were received, but the identities of those making the tenders were not divulged. It is estimated there are at least 1,000,000 tons of coal under the common.

Members of the United Mine Workers in the anthracite fields have been asked to contribute to a fund of between $75,000 and $80,000, which is being raised to pay for the John Mitchell memorial monument to be erected in Scranton.

After being idle for five weeks, **350 miners employed at the Mount Lookout colliery** of the Temple Coal Co. at Wyoming **are back at work.** Their strike was ended by the company's promise to furnish places for forty men previously laid off because of a squeeze in an underground tunnel. The strike was one of the longest affecting a single colliery in recent years.

W. P. Jennings, general superintendent of the Pennsylvania Coal Co., **entertained the executive force** of the Underwood colliery, located at Throop, at a dinner recently at the Scranton club to celebrate the record made by the colliery in preparing and shipping 10,000 tons of coal in one working day of eight hours. It is believed that this is the record for any colliery in the anthracite region.

H. C. McIlveen, formerly with the Phelps-Dodge Corporation, Clifton, Ariz., is now connected with the engineering department of the Hillman Coal & Coke Corporation, of Pittsburgh.

Twelve additional ovens have been rebuilt by the Corrado Coke Co. at the old Nellie plant near Vanderbilt, making a total of 56 now in blast. Eighty-seven ovens are burning at the Clarissa plant of the same company.

The bituminous coal tax bill of Representative Kohler was **recommitted to the House** Ways and Means committee for a hearing on May 1. The bill provides for a 1½ per cent tax on soft coal, providing for a tax similar to the anthracite tax law.

The plant of the American Briquet Co. near Lykens was destroyed by fire on May 7. The loss is estimated at about $400,000. The plant produced an average of 8,000 tons monthly and gave employment to 55 men.

Notice of a change of corporate name has been filed by the **Berge-Fraser Co.,** Lackawanna County, which will be known as the **Berge Coal Co.**

A charter was issued recently to the **Irwin Valley Coal Co.,** Philadelphia, with a capital stock of $10,000. Warren W. Rush, of Melrose Park, is treasurer. The purpose of the company is mining and preparing coal for the market. The incorporators are William H. Shuster, Wayne; Warren W. Rush, Melrose Park, and George H. Detweiler, Tutledge. Another company incorporated was the **Provins-Ainsley Coal Co.,** Masontown, $10,000 capital H. Gilmore Provins, Masontown, treasurer. Purpose, mining coal and manufacturing coke. Incorporators: George P. Cox, Brownsville; H. Gilmore Provins, Masontown, and James Ainsley, Masontown.

The Fairmont Mining Machinery Co., Fairmont, W. Va., has been awarded the contract **to install new shaker screen tipple equipment for the Bertha-Consumers Co.,** at its Gould Mine, Wilson, on the Peters Creek branch of the Monongahela division of the Pennsylvania R.R.

The Crawford Machinery Co., of Pittsburgh, has removed from the House Building to 1117 Bessemer Building.

Henderson Steele, of Uniontown, has been **appointed ancillary receiver of the Southern Connellsville Coke Co.** by Judge R. M. Gibson in the U. S. District Court at Pittsburgh. The company has a branch office at Cheat Haven, Fayette County. The appointment was made on the petition of George W. Thompson, of Connellsville, a stockholder of the company, in which it was averred that on March 1, 1923 Judge Baker in the U. S. District Court of the northern district of West Virginia, appointed J. H. McDermott, of Morgantown, W. Va., receiver for the company.

A corps of engineers attached to the **Western Maryland Ry.** are located at Meyersdale and ,it is reported, **will survey a branch line** from that place to **Jennings, Md.,** with a view of tapping rich coal deposits in southern Somerset County and northern Garret County, Maryland.

A state charter has been issued for the **Cherry Valley Anthracite Mining Corporation,** of Mildred. Its capital stock is $5,000 and Joseph P. Murray, 921 South Fiftieth Street, Philadelphia, is the treasurer. The treasurer, Frank S. Muzzly, 7320 Bryan Street, Mt. Airy, and F. Stanley Saurman, Churchville, are the incorporators.

The Sober Coal Mining Co. has been incorporated in Delaware with a capital of $50,000 by James Sober, Washington, Pa.; J. L. Brenner, J. M. Brenner, Pittsburgh.

The Glen Alden Coal Co. has purchased the Exeter Machine Co. works and property at West Pittston. The deal is said to have involved an outlay of $500,000. W. W. Inglis, president of the Glen Alden Coal Co., stated that the company does not contemplate immediately to operate the plant, but made the purchase for emergency purposes to provide a suitable machine shop for the manufacture and repair of breaker and mine machinery for its use when deemed advisable to take over operation of the shop.

Herbert Lloyd, president of **The Electric Storage Battery Co.,** Philadelphia, **has announced a plan by which employees** who have been continuously in the service of the company for two years or more **may become stockholders in the company.** The plan permits employees to purchase one share of common stock of the company at $53 per share for each $500 of his or her annual compensation, but not exceeding 20 shares to any one employee.

The Link-Belt Co. has removed its **Pittsburgh branch office** from 1501 Park Building to new and more commodious offices at 335 Fifth Avenue. T. F. Webster, manager of the Pittsburgh office, says that larger space and the more convenient location was imperative because of the large volume of business transacted during the past year and which promises to continue during the coming fiscal year.

A state charter has been issued at Harrisburg for the **Amy Coal Co.**, Philadelphia, the purpose of which will be to mine and deal in coal and coal lands. The company has a capital stock of $500,000 and its incorporators are Harry E. Bird, treasurer, Fifteenth and Market Streets, Philadelphia; John Barnes, Haverford, and E. L. Clarks, Cheltenham.

The following bituminous coal companies have been incorporated: **Brooks Coal Co.**, Normalville, capital $20,000; J. C. Henry, Connellsville, treasurer. He, with C. H. Brooks and Carl C. Brooks, Normalville, are the incorporators. **Nicewonger Coal Co.**, Greensburg, $25,000; Vance E. Booher, 140 North Main Street, Greensburg, treasurer. The incorporators are Lewis Nicewonger, Luxor; Hallis E. Nicewonger, Greensburg, and John H. McElveen, Greensburg. Both companies will mine coal and manufacture coke and byproducts.

SOUTH CAROLINA

Sealed proposals will be opened by the Superintendent of Lighthouses, Charleston, at noon, May 25, 1923, for approximately **4,000 tons of steam coal** (bituminous) and **175 tons stove coal** (anthracite), as required during the fiscal year 1924, delivered at Charleston. Information upon application.

WEST VIRGINIA

Output of the Island Creek Coal Co. in April amounted to 204,000 tons and brought the four months' total up to 830,000 tons, compared with 1,348,000 tons in the first four months of 1922. The four months' earnings were approximately $7.50 a share, or within 50c. of the yearly $8 dividend requirement.

A fire completely wiped out the town of Burke, McDowell county, 25 miles west of Bluefield, April 20, rendering more than a thousand persons homeless and destroying property valued at a million dollars. The fire was checked after it had spread to the adjoining village of Keystone and had destroyed three buildings there. More than 100 buildings in Burke were burned, including 25 cottages belonging to the Houston Coal & Coke Co.

J. W. Swanner and Edward Reynolds, West Virginia miners, **were shot and killed** at the mining camp of Vulcan, near Pomeroy, May 9, by J. E. Miller, a coal miner. Miller gave as his reason that he feared the two men had come to kidnap him and take him back to West Virginia in connection with the Logan armed march. That the killing of Swanner and Reynolds, witnesses for the state in the cases against C. F. Keeney and others for complicity in the murder of Logan County deputy sheriffs, was a part of a plot is charged by A. M. Belcher, of counsel for the state, and the charge is also made by L. Crary Davis, prosecuting attorney of Meigs County, that the killing of the two witnesses was cold-blooded murder. Swanner had in his pocket a letter from A. M. Belcher offering Miller immunity if the latter would return to West Virginia to testify in the armed march trials.

The Sanfield Coal Co., of Fairmont, has been organized with a capital stock of $1,700,000 for the purpose of operating in northern West Virginia. The size of the capital stock presages operations on a large scale. Heavily interested in the new company are M. W. Ogden, C. F. Crane, M. C. Lough and A. C. Lyons, of Fairmont; Harry E. Davisson and James G. Kidwell, of Clarksburg.

The King Fuel Co. expected to begin the production and shipment of coal about May 1, after two years preparation in constructing a modern plant not far from Christian, near the dividing line between Mingo and Wyoming counties.

Charters were granted recently to the following coal companies: **Appalachian Fuel Co.**, Fairmont; capital, $50,000; incorporators, Harvey H. Staggers, Mabel F. Staggers, Dan R. Lawson, Edith A. Lawson and E. A. Russell, all of Fairmont. **White Rose Coal Co.**, Shinnston; capital, $75,000; incorporators, Irvin Smith, H. J. Wagner, George Beck, William Beck, Smithton, Pa., and John Parachino, Greensburg, Pa. **Preston Smokeless Coal Co.**, Fairmont; capital, $75,000; incorporators, J. S. Mallory, Gertrude W. Mallory, Shinnston, W. Va.; H. S. Keister, Toyie A. Keister and M. B. Simonds, Fairmont.

The G. E. Burgess Coal Co. will operate in the neighborhood of Sand Run on the Charleston Division of the Baltimore & Ohio R.R., having just been organized with a capital stock of $10,000. Organizers of the new concern include G. E. Burgess, D. F. Fenney, D. F. Bearus, of Sand Run; Ray Jones and L. W. Jones, of Elk Garden.

A number of the smaller mines along the line of the Baltimore & Ohio in northern West Virginia are closing down because of low prices and lack of orders.

Five West Virginia coal companies have surrendered their charters and discontinued business. They are the Wanego White Ash Coal Co., Big Clear Creek Coal & Land Co., Carmen-Litten Coal Co., the Ritter Coal Co. and the Aileen Coal Co.

The tipple and bin at Mine No. 7 of the **Carbon Fuel Co.** on Cabin Creek, in the Kanawha field, having been destroyed by fire about two years ago, **a new tipple and bin has been in process of construction** embodying many improvements. Work on the new structure is nearing completion and the company will be able in a short time to use the new equipment which was installed by the Kanawha Manufacturing Co., of Charleston, at a cost of about $60,000.

The power house of the Hutchinson Coal Co., near Mason City in Mason County, **was destroyed by fire** a few weeks ago. There is a difference of opinion as to what caused the fire, one report received being to the effect that it was as a result of an overheated smokestack, and one to the effect that it was of incendiary origin.

WASHINGTON, D. C.

The Interstate Commerce Commission announces **the resignation of Robert E. Quirk as chief examiner**, effective June 15. He is to be succeeded by Ulysses Butler, formerly assistant chief examiner, who will in turn be succeeded by Charles F. Gerry, who has been an attorney-examiner for the commission.

Frank McManamy, of Washington, D. C., has been appointed a member of the Interstate Commerce Commission to succeed W. W. Daniels, of New Jersey, resigned to become professor of transportation at Yale University. Mr. McManamy is the labor representative on the Commission. He is 53 years old and has been connected with the I. C. C. and the Railroad Administration for 15 years. Prior to entering the government service he was a railroad worker.

A paper on "The Origin and Destination Weighing of Coal in Carload Lots" will be delivered during the course of the sixteenth annual conference on weights and measures which will be held at the Bureau of Standards in Washington May 21 to May 24. Another paper is entitled **"Retail Sales of Coal and Coke."**

CANADA

The Denver Rock Drill Mfg. Co., of Denver, Col., has discontinued its branch at Toronto and has established **a new branch at Montreal.**

Jung Low, a Chinese miner, was responsible for the explosion in No. 4 mine of the Canadian Collieries at Cumberland, Feb. 8 last, that cost the lives of Jung and 32 other miners, according to the report of an investigation of the disaster made by George Wilkinson, official investigator for the government. According to Mr. Wilkinson evidence obtained indicated that while working in the mine Jung attempted to light a cigarette, when the charged atmosphere exploded and burst into flames.

Thomas G. Shiels, of the Elias Rogers Co., Toronto, told the Commons committee investigating the fuel situation that last summer he had brought in a carload of **Alberta anthracite and had found that it in no way compared with American anthracite.**

The Toronto Wholesale Coal Dealers Association is making arrangements to send a large delegation to the annual convention of the American Wholesale Coal Association in Cincinnati on June 12 and 13.

The British Empire Steel Corporation reports coal production for the first four months of the year of 1,851,954 gross tons, as compared with an output of 1,074,045 gross tons during the corresponding period

The Vancouver city council has denied the application of a local syndicate, asking **for right of entry into Stanley Park** for the purpose of developing a seam of coal that has been found on the shore of the park.

The Mount Cavel Collieries, Ltd., of Edmonton, Alta., has been incorporated to acquire and operate mines in Jasper Park, Alta., with an authorized capital of $200,000, by Samuel L. Crocker, Samuel R. Wallace, H. McCoy and others.

Alexander Howat, deposed Kansas District president of the United Mine Workers of America, who was detained at McAdam Junction, N. B., by the Canadian immigration authorities while on his way to address the coal miners in Cape Breton, which detention was later affirmed by the Department of Immigration at Ottawa, has left Houlton, Me., for New York, according to a newspaper dispatch. "The action of the Canadian authorities in denying me admission to the country is an outrage," Howat said before leaving. "If I am stopped any other working man can be refused admission when there is no just cause."

W. F. Carroll, chairman of the House of Commons Committee investigating the coal supply, states that **English capitalists are prepared to open up and operate undeveloped coal areas at Mabou**, on the western coast of Cape Breton, if the government will facilitate transportation by providing railway extensions. The area has the advantage of possessing a harbor much closer to Montreal than Sydney or Louisburg. A representative of the British interests concerned is now in Canada and prepared to go ahead with the project.

An agreement has been completed between operators of coal mines in the Grand Lake district of New Brunswick and the Canadian National Railways, under which **much larger quantities of coal from the Minto mines will be used by the railways** during the coming year than ever before. Details of contracts calling for the tripling of the tonnage for the year have been arranged. Construction of a new spur line five miles in length to connect Minto with the Canadian National Railways at Chipman also is planned.

Obituary

E. L. Stafford, superintendent of the Carlswell shafts of the Houston Collieries Co., Carlswell, W. Va., died suddenly on May 2.

Joseph Reese, who for more than 20 years had been superintendent of the Temple Coal Co. at Blakely, Pa., died on May 5. Mr. Reese was 68 years old. He was placed on the retired list a few years ago.

John Irwin, 84 years old, the first H. C. Frick Coke Co. pensioner, died at his home in Connellsville, Pa., on April 29. He had been in the employ of the H. C. Frick Coke Co. 27 years at the time he was placed on the retired list.

William H. Reynolds, well known to a large number of friends in the Pittsburgh district as a miner and writer of mining life and experiences, died at his home, Butler, Pa., April 24, 1923, following an operation for appendicitis, at the early age of 47 years. Mr. Reynolds is best known and will be long remembered by many who have read with deep interest his book entitled "In the Carbon Hills." It is a true picture of mining life, filled with pathos and humor. Mr. Reynolds is survived by two brothers, J. T. and S. C. Reynolds, both now acting as mine inspectors.

Alexander H. Ross, a member of the firm of A. H. Ross & Co., coal dealers, Newark, N. J., died May 1. He was seventy-four years old. His brother, Robert L. Ross, with whom he was in business, is a former Receiver of Taxes and also was a member of the City Tax Board of Newark. Alexander Ross was born in New York, Sept. 11, 1848. He started in the coal trade fifty-seven years ago as an employee of the Delaware & Hudson Canal Co. In 1889 he organized the Ross concern with his brother. Mr. Ross was not married. Besides his brother, he is survived by a sister, Miss Elizabeth J. Ross.

Trade Literature

"Oswego" Internally Fired Water-Tube Boilers. A. D. Granger Co., New York, N. Y. Bulletin No. 2. Pp. 19; 8 x 10 in.; illustrated. Describes both the type A and type B boilers, the latter having downdraft Hawley type grates. Key tube plates are also featured, the use of which eliminates the gasket joints on the head.

M-S-A Playground Equipment. Mine Safety Appliances Co., Chamber of Commerce Building, Pittsburgh, Pa. pp. 25; 8 x 10 in.; illustrated. This book contains a complete list of outfits for playgrounds. Among some of the apparatus shown are slides, ocean wave, merry-go-round, rocking boat, teeter ladders, swings, and horizontal bars. Information is given as to size and arrangement of playground, surfacing and grading, fencing, lighting, with plan of a typical school playground. The H-H inhalator is shown with description of method of procedure in its use. Price list accompanies the bulletin.

Graver Zeolite Water Softener. Graver Corp., East Chicago, Indiana. Bulletin 509. Pp. 8, 8 x 11 in., illustrated. Describes the effect of the softener on hard water.

Bristol's Recording Gauges for Pressure and Vacuum. The Bristol Co., Waterbury, Conn. Catalog No. 1006. Pp. 83, 8 x 10 in., illustrated. Contains charts showing ranges covered and describes utility of recording gauges, also liquid level gauges, simplicity of construction, with partial list of applications.

Traffic News

The embargo placed by the New York Central R.R. against all freight destined to points on or via the Boston & Maine R.R. was **entirely cancelled May 10.**

The embargo placed by the New York Central R.R. against all freight destined to points on or via the Boston & Albany R.R. was **entirely cancelled May 10.**

An issue of $17,000,000 railroad equipment trust certificates has been authorized by the directors of the New York Central, Michigan Central and the Big Four railroads. Orders for the equipment, costing about $23,000,000, that is to be obtained through the funds from these certificates and cash from the company treasury, have already been placed, it is understood.

In a complaint brought by the Milwaukee-Commerce Commission, **the Tioga Coal Co.,** operating coal mines in the Gauley region of West Virginia, **urges that the Baltimore & Ohio R.R. be instructed to extend to it an adequate daily car-rating allotment,** joint through rates, and rates which are not higher than the "outer crescent" basis of rates to Western points of destination, and rates not more than 15c. per ton over the Fairmont district rates to Eastern points of destination.

S. D. Warriner, president of the **Lehigh & New England R.R.**, in his report for the year ended Dec. 31, 1922, says that the **strike in the anthracite region caused a decrease in the railway operating revenues** from anthracite freight of $565,437.88, as compared with 1921, while revenues from bituminous-coal freight and from merchandise freight show increases of $68,-120.83 and $406,702.38, respectively. Miscellaneous freight carried by the road during 1922 was 6,327,114 net tons of which there was 2,579,470 net tons of anthracite, 1,603,634 net tons of bituminous coal and 23,871 net tons of coke. In 1921 5,943,780 net tons of miscellaneous freight was carried, of which 2,840,356 net tons was anthracite, 1,492,643 net tons bituminous coal and 26,996 net tons coke.

Rates charged on coal in carloads from and to points in Missouri during the federal control of railroads were not unreasonable, in the opinion of I. L. Koch, an Interstate Commerce Commission examiner. In a tentative report on the complaint made by the McGrew Coal Co., of Lexington, Mo., he recommends that the complaint be dismissed. That rates lower than those charged the McGrew company were contemporaneously in effect for greater distances is not held to be a sufficient reason to condemn a rate. The coal company also declared that the rates were violative of the Constitution of the State of Missouri. In that connection the examiner says: "The commission's powers to adjudicate complaints of this nature are derived solely from the transportation and interstate commerce acts. Those laws do not give it jurisdiction to administer either the common law or any state constitution or statute. The standard of reasonableness embodied in the Missouri Constitution is not controlling up this commission.

The valuation set on the Virginian Ry. and its terminals by the Interstate Commerce Commission **will be discussed at a public hearing** to be held in Washington May 23.

The New York Central R.R. issued an embargo May 9 on all freight destined to all points on or via the Central New York Southern R.R., on account of advices from the Central New York Southern R.R. as to inability to operate.

C. E. Tuttle, of the Tuttle Coal Corporation, of New York City, **has been elected a director of the Pittsburgh & West Virginia R.R.** Henry E. Farrell, of Pittsburgh; William R. Nicholson and Asa S. Wing, of Philadelphia, and Ernest Stauffen, Jr., of New York, were re-elected directors. The following executive committee was chosen: William H. Coverdale, John B. Dennis, Henry E. Farrell, Haley Fiske, George P. Smith and Richard Sutro.

The Sewell Valley Ry. is not entitled to a larger proportion of joint rates on coal than it is now receiving from the Chesapeake & Ohio, in the opinion of William B. Hunter, an attorney examiner for the Interstate Commerce Commission. In his report to the commission, Mr. Hunter recommends that the Sewell Valley company's complaint be dismissed. The Sewell Valley company contends that the coal traffic delivered it from the Greenbriar & Eastern must be hauled up a steep ascent of 21 miles, which results in operating expenses which make its share of the joint rate non-compensatory. Mr. Hunter suggests that the Sewell Valley is not suffering from the alleged unremunerative coal traffic from the Greenbriar, but probably from its control in the financial interest of the Meadow River Lumber Co. and the Lookout R.R. and from the fact that it has not been equipped to handle its freight traffic economically.

One of the largest railway electrification projects yet undertaken is involved in the contract just closed by the Westinghouse Electric & Manufacturing Co. with the Virginian Ry. It calls for the electrification of 213 miles of track between Roanoke, Va., and Mullens, W. Va., and includes an order for electric locomotives, power house, transformer stations and other necessary apparatus. The division to be electrified crosses the Alleghany Mountains. The contract involves the expenditure of $15,000,000.

In a complaint bronght by the Milwaukee-Western Fuel Co. the Interstate Commerce Commission decided April 26 that rates were unreasonable on coal, in carloads from the Princess, Kilgore and Norton branch on the Ashland Coal & Iron Ry. to Toledo for transshipment by lake during federal control. A rate of $2.15 a ton was charged. The commission held $1.55 to be a fair rate and ordered reparation with interest paid on rates more than $1.55 a ton.

The Coal, Coke & Iron Ore Committee, Central Freight Association Territory, announces a public hearing at 10 a.m. (daylight-saving time), May 24, at the Chamber of Commerce Building, Pittsburgh, Pa., **to consider the rate on bituminous coal,** carloads, from mines on the Baltimore & Ohio R.R. in the Pittsburgh-Youghiogheny (Connellsville-Finleyville, Pa., etc.), to Cincinnati and Hamilton, Ohio. It is proposed to advance the rate to $2.33 per net ton, to correct a clerical error. At that time also a hearing will be held to consider the **rate on bituminous coal, carloads, to Westerville, Galena and Sunbury, Ohio, via the Pennsylvania R.R.** from mines on the Sandy Valley & Elkhorn, Long Fork and Millers Creek railroads. It is proposed to advance the rate to $2.14 per net ton to remove Fourth Section violation.

The net income of the Pennsylvania Railroad and its affiliated companies in 1922, according to the annual report, was $32,382,058, an increase of $8,074,389.15 when compared with 1921. There were carried over its lines 194,856,802 tons of miscellaneous freight. The value of the anthracite carried over the lines of the company was placed at $12,503,649; bituminous, $108,502,266, and of coke, $10,-356,060. Fuel for yard locomotives cost $9,081,512 and for train locomotives, $41,-060,682, an increase in both items of $6,773,355. The Pennsylvania Lines consist of over 600 constituent transportation corporations, including five coal-land companies and two coal-land companies classed as inactive. Its net railway operating income was $73,405,325.69, a return of 3.72 per cent upon the investment in road and equipment.

Coming Meetings

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting May 23 and 24 at Wilmington, Del. Secretary, W. M. Bertolet, Reading, Pa.

American Association of Mechanical Engineers will hold its spring meeting at Montreal, Quebec, Canada, May 28-31. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24, Secretary-treasurer, J. G. Crawford, Chicago.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Michigan-Ohio-Indiana Coal Association will hold its annual convention at the Hotel Sinton, Cincinnati, Ohio, May 22-24. Secretary, B. F. Nigh, Brunson Bldg., Columbus, Ohio.

West Virginia Coal Mining Institute has tentatively set June 5 and 6 for its annual meeting, to be held at Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Retail Coal Dealers' Association of Texas will hold its eighteenth annual convention at Galveston, June 11 and 12. Secretary, C. R. Goldmann, Dallas.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

The Illinois Mining Institute will hold its summer meeting on board a boat on the Illinois River, cruising between St. Louis, Mo. and La Salle, Ill., June 7-9. Secretary, Martin Bolt, State House, Springfield, Ill.

West Virginia Coal Mining Institute has set June 12 and 13 for its annual meeting, to be held at Hotel Waldo, Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Negation Not Good Publicity

WHATEVER may be the ultimate outcome of the controversy over unionism, how it thrives, expands, contracts and controls, the coal industry must continue to live with the public. At a recent gathering in New York, Lawrence Abbott, of *The Outlook*, remarked that coal is the worst-hated industry in this country today, and no coal operator took exception to this sweeping assertion. One ventured the virtue of the anthracite operators as the reason for such gross misunderstanding of coal; others set it to plain lack of understanding. We venture to note that this lack is no more with the public than with the rank and file of the coal operators themselves.

Put aside for the moment the outstanding men in the industry, both among operators and labor unions, and give thought to the men—numbering thousands among operators and hundreds of thousands among mine workers—who take no part in association or union activities, who do not participate in the national thought of those few who are the reputed leaders of their respective groups. Interest in and knowledge of the larger happenings affecting their industry are subordinated to the immediate problems of the day. Contact with the public is loose and appreciation of the public's attitude toward coal is hazy and uncertain.

The coal operator, whether in the hills of Virginia, Kentucky or Utah, knows that when he has orders, cars and men he can ship coal and he will take almost any price he can get, whether high or low. That is all there is to his business. Give him orders and cars and men not on strike and he performs all that society desires or requires. Until a few years ago there was no question regarding the price, save that from the producer's standpoint it was too low. Car shortages were exceptionally few, national strikes of mine workers unknown, demand was regularly irregular and therefore consistently unsatisfactory. Small wonder then that today's hue and cry over coal is least of all understood by the coal man. Prevent strikes and furnish cars, says the coal operator, and there will be no com plaint by anyone. And he is quite right.

It is right here, however, that the trouble begins. The railroads, it is quite generally understood, are handicapped in their ability to supply unlimited transportation to coal by reason of regulation over many years that has restricted their expansion. The negligence of years is not to be overcome in a day. The LaFollettes and Brookharts preach further restriction. The public alone can decree a more liberal policy toward the carriers, and the public is slow to learn and to give voice to its desire. When railroads were young they were reverenced; now they are too often reviled. The coal industry must do more than blame the railroads for lack of transportation; it must help bridge over the gap until such time as the country may again have transportation in measurable surplus.

Nor will it avail to convict the miners' union of every high crime on the calendar. The railroads are regulated by federal and state officials and by laws that are expression of public opinion, but the United Mine Workers recognizes no law save of its own making. Its creed is simple—More Power; its policy simple—No Reduction in Wage.

There is nothing in the spirit of this land encouraging the belief that organized labor can be controlled in these matters by law. There remains only the organized economic strength of the operators as a bulwark for the safety of the country.

It therefore follows that until the union operators are agreed on a policy and program of united aggressive bargaining with the union of the miners, they have nothing to tell the public; the industry otherwise can but make apologies for that which happens beyond its control.

Prospects in the Export Situation

ON THE whole the European coal situation is becoming easier. It is now quite apparent that Germany has had large stocks on which to sustain her industries throughout the last four months and that although very little coal or coke is being allowed to sift eastward through the French blockade, Germany is not suffering from lack of fuel, as is had been expected that by this time would be the case.

Accounts vary as to the quantity of coke France is getting from the Ruhr. The highest estimates are from English sources, showing 10,000 tons per day, compared with 12,000 tons per day before the occupation. A special dispatch to the *New York Times* dated at Paris May 20 says that the maximum so far received has been 8,000 tons of coke per day. Other figures are lower. At any rate it is becoming increasingly evident that France and Belgium are getting more nearly their needed requirements of blast-furnace fuel. The export demand for coke has fallen off materially on this side and in England as well. Although in January there were 116 furnaces in blast in France compared with but 77 today, production of French iron and steel is gaining and their products are again competing in the Continental market. In Germany, coal prices are receding and German buyers are much less active in the English market. By the end of April there was a congestion of coal-loaded steamers waiting to discharge at the German ports. It is further reported that German buyers of English coal have in recent weeks been reselling purchases made earlier.

There is nothing in the situation today to warrant high hopes of active foreign demand for American coal this summer. True, some continue to anticipate it, but the wish must be father to the thought. As has been noted here in the past, prediction on this score is futile in view of the complications abroad, with much ground for believing that if Europe develops a real want for our coal, it will not be evident until late this year.

Crystallization

FOR generations we have proclaimed that our American civilization was still fluid, that we were always ready to correct the ill-chosen and to root out the inefficient, ready for a second thought to displace a first, if by chance the first was not the best. Insensibly, however, we bind fetters on ourselves while marveling that other nations older than our own are bound by chains of custom and convention.

Of this one cannot but be reminded by the decision of the umpire of the Anthracite Conciliation Board of May 16 that the Hudson Coal Co. must remove the system of checking in and out at the East End, Baltimore No. 5 and Marvine collieries. Doubtless the umpire's decision is perfectly just legally, though he himself probably is quite clear in his mind that practices which are inherently loose and unbusinesslike should be done away with.

He states in his decision that the company has "no right to make any changes without the consent of the other party." Seeing, however, that no changes in the working agreement except to raise wages have been made since 1902, it would seem that the standard of that year has been unduly persistent. With the mine workers demanding all manner of facts from the coal companies, involving weeks of bookkeeping—concessions from them that are not demanded of any employers of labor except the railroads—it seems strange that those employers cannot meet the fabulous statements of the miners with facts based on a knowledge of the hours spent underground. Hardly any employer of labor anywhere is so ignorant of this important element of operation as is the mine operator, and this ignorance has been and is by this decision forced on him. As a result what he knows and can assert qualitatively he cannot declare quantitively and the public, which expects an exact measure in hours and minutes and looks suspiciously at guesses, is little disposed to put any credence in the operator's statements.

Here is a matter that need not be one of doubt. Here is a figure that every company but a coal-mining company can give definitively. What is wrong with the coal operator that he alone cannot give this information which everyone knows is more vital than any other in the settlement of labor disputes? The mine worker quite readily says that in the anthracite region the working time is eight hours when it isn't more, and as the contract calls for hours of that kind for some of the employees the public cannot understand how others of them, not so bound, are leaving the mines after a much shorter period of time. What wonder, then, that it questions the existence of a shorter day which the operator asserts is worked without being able definitely to delimit it!

This is only one of many features that have been crystallized in anthracite operation since 1902 and that tend to become fixed in bituminous mines also. When the contracts are signed smaller matters are brushed aside. The wage becomes the sole consideration, and both sides, as well as the public after a protracted idleness, resent the consideration of any matter, however important, that holds up settlement.

Unfortunately the same public that cannot understand why agreements are a matter for haggling and delay is always disposed to look at the contract when signed and to ask why it did not contain certain provisions and did contain others and to wonder whether the faults of the contract, whether as to wages or conditions, are not the outcome of a sort of treasonable collusion to take advantage of the public. Consequently every effort should be made to incorporate provisions that the interest of the consumer in cheaper coal demands. The Coal Commission has found that the operators have given it all it asks and that the only item it has had denied to it is information as to working time, and that could have been obtained had the union not made every effort to keep it secret.

Less Disturbance, Please

IN ILLINOIS the state teachers' association, perceiving that a tax on coal at the mines might be a source of revenue for increased teachers' wages and for state educational work, are trying to induce the Legislature to levy an 8c. tonnage tax. There really is no likelihood of an 8c. tax bill being enacted. Nobody expects that; not even the teachers. But were the bill amended, reducing the proposed tax to 1c. or 2c. the probability of its enactment would be much greater. That is exactly what will be done if the bill is pushed far enough to be reported out of committee. Then the fight will be on in the House and Senate of the Legislature, and another disturbance will be started in the coal industry.

This case illustrates the old truism that coal is a fair target for any marksman. Here is coal being taken from the ground. From 60,000,000 to 80,000,000 tons of it is mined in Illinois every year. Why not tax it? What a gold mine that would be for the tax diggers of the state! Even 1c. a ton would yield $600,000 a year at least. Two cents would make it $1,200,000. Now if the teachers of the state could only add that $1,200,000 to their salaries! Why not try? It is always easy to raise a popular clamor against the coal barons vividly pictured fattening gluttonously from the shriveling bank account of the abused and helpless public. Why not make the barons pay the $1,200,000?

Would they merely take it away from the people in higher coal prices? Well, let them. It's only 2c. a ton, and anyway a good deal of it would be collected from consumers outside the state, so what do the Illinois teachers care? But the teachers doubt whether the barons actually would be able to raise the price to the people. Wouldn't competition from nearby states prevent that? It can be said to the teachers that large volumes of coal from outside Illinois are sold in that state, some of it in direct competition with Illinois coal. A good deal of this is placed because the Illinois mining companies labor under compulsory regulations covering compensation, safety and the like which add to the cost of production an item far above that of competing regions. Every new law such as the proposed severance tax swells this compulsory cost. The larger this margin, the stiffer the competition from outside coal. So something might be said to the teachers about the goose and the golden egg.

But the main argument just now against taxing the coal of Illinois or Kentucky or any of the other coal-producing states whose legislatures have coal-production tax bills on their dockets, is that the United States Coal Commission is doing its best to find solutions for the complex problems of the coal industry, and if the people of this country want remedies applied they should aid that commission in every way possible. Setting up state disturbances in the coal industry is a poor way to aid. Let all coal tax bills wait.



Mining Methods in the Elkhorn District Conserve the Coal and Retain It in Its Original Purity

Parting Loaded or Gobbed Before Coal Is Shot—Shovel on Boards or Coal Floor—Parting Barred Loose and Both Kerf and Room Ends Swept Clean—Cutting Machines Cleaned and Inspected Daily

By Alphonse F. Brosky
Assistant Editor, *Coal Age*, Pittsburgh, Pa.

THE Elkhorn Division of the Consolidation Coal Co. is now operating fourteen mines in the Elkhorn district of Kentucky, which are better known as the Jenkins-McRoberts plants. Eight of these mines are off the Sandy Valley & Elkhorn R.R. and the other six lie close to the Lexington & Eastern R.R. The openings of Mine No. 204 are at Jenkins, those of Mines Nos. 203 and 205 are on the outskirts of that village. Mines Nos. 201 and 202 are entered at Burdine and Mines Nos. 206, 207 and 208 are at Dunham, the latter two dumping over one tipple. This completes the list of those on the Jenkins side of the mountain. On the McRoberts side of the property are Mines Nos. 210, 211 and 212, which dump over one tipple, and Mines Nos. 213, 214 and 215, which are operated as individual plants.

All these mines eventually will be connected with each other; at present Mine No. 204 connects with Mine No. 207 by an outside tramroad on the Jenkins side of the property, and the latter connects with the workings of Mine No. 214 on the McRoberts side, so that any of the coal, whether near Jenkins or McRoberts, may be dumped on either side of the mountain, and the McRoberts mine, with a minimum of transportation difficulty can obtain supplies from the central shops in Jenkins, which also can make repairs whenever they may be needed.

Most of the 100,000 acres held by this company in eastern Kentucky lies in the Elkhorn field and about 12,000 acres is now under development. With all mines in the division working the daily output is about 10,000 tons. Mine No. 204 is the largest operation; it contributes 1,500 to 1,700 tons of coal each working day.

In the Elkhorn district most of the mining is in a seam of the same name. The coal is excellently adapted for metallurgical purposes, for byproduct coking and for gas-producing, to which uses is put most of the coal shipped. It is interesting here to note that most of the diligent effort exercised in the production of clean coal is exhibited underground, emphasis being laid upon preventing the coal from getting dirty rather than upon cleaning it when it has become mixed with dirt.

Most mines mix dirt with the coal and then employ men or machines to remove it later—if they can. Preventive measures where the coal is unusually clean, like the Elkhorn coal, are better than those which are merely corrective. It would be fair to describe this method as circumventing trouble at its source. All tipples are equipped with screens but, nevertheless, much run-of-mine coal is loaded, as the demand for unscreened coal from the Elkhorn seam is far in excess of that for domestic sizes.

An analysis of a number of seam samples taken at various mines is as follows: Moisture, 1.62; volatile matter, 36.98; fixed carbon, 59.36; ash, 2.04; sulphur, 0.53 (included also in the ash), and phosphorus, 0.005. The heating value of the coal is about 14,619 B.t.u.

In these mines the thickness of the Elkhorn seam varies from 6 to 10 ft., the average thickness being about 8 ft., though in a few places coal 12 ft. thick may be found. The bed is characterized by a shale parting below the center. which varies from a knife

Note—Headpiece shows tipple of Mine No. 214, McRoberts, Ky. The coal is dumped by means of a crossover dump onto shaker screens. The slate is discharged by a kickback dump into an 80-ton slate bin, shown on the left of the illustration, and is then carried to a hillside dump by an aerial tram.

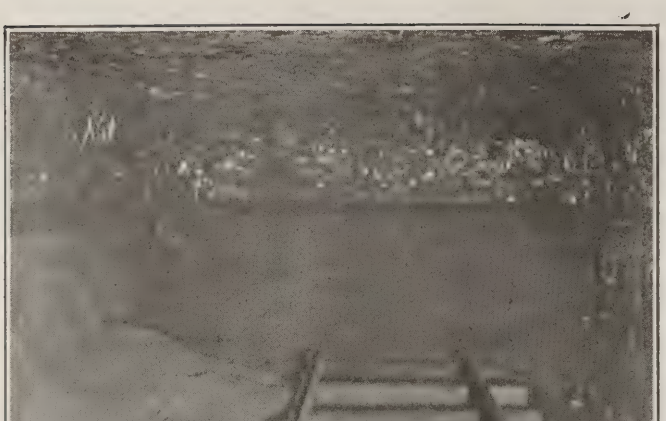


FIG. 1—ROOM ENTRY IN MINE NO. 204, JENKINS, KY.
The parting has been cut by an arcwall machine, the waste material cleaned out and the bottom bench of coal shot and loaded. The parting is of soft shale and usually is from 3 to 6 in. thick. The assertion has been made that an arcwall machine will not cut a straight rib. How about this one? Note particularly the well-squared corners. The cut on the left rib is the first one made in the excavation of a crosscut. Coal is left in the roof, as the high lights on its surface indicate.

edge to a thickness of 18 in. and more rarely of 36 in. Its thickness usually is 3 to 6 in. Because this parting usually is fairly soft, it will break up and mix with the coal unless precautions are taken in the mining, after which it can be separated satisfactorily from the coal by no other means than by washing.

At many mines of the Logan field (West Virginia) most care is exercised in coal preparation on the tipple and less attention than usual is given to preparation or care at the face, while at the mines of the Consolidation Coal Co., in the Elkhorn field, the opposite is true, for in these mines care of the coal at the face is considered highly important. No argument can be based on the difference in the relative reception of the coals from these two fields, for the coals enter different markets. Five seams are mined in the West Virginia field just mentioned, the coals from which in the main are used for general steam purposes and some for domestic use, gas producing and byproduct coking; whereas the Elkhorn coal is used chiefly for the last-mentioned purpose.

The fact that the parting has to be removed in these mines led to the development of the Jeffrey Drennan adjustable-turret mining machine, from which the arcwall coal cutter was developed. For details regarding the cutting of coal in these mines the reader is referred to *Coal Age*, Dec. 20, 1913, p. 926. The arcwall machine is used to do the cutting because only by removing the soft shale parting, then thoroughly cleaning out the cut and sweeping the face and bottom for some distance back before shooting, can a clean coal be loaded into the mine car. As the thickness and the position of the parting in the seam varies from place to place the cutter bar must be adjustable vertically.

About twenty-four arcwall machines, equipped with the latest and improved types of starting box and cutting resistance and carrying a No. 2 all-rubber cable of the concentric type, are used exclusively in the mines of the division. They make a cut 6 to 6½ ft. deep and for the full width of the place, which is in entries 11 ft. and in rooms 12 to 15 ft. wide. One machine has, and will, cut 12,000 tons of coal per month. Yet the machine has not yet cut all that is expected of it. A record of *sixty-two places* in nine hours was attained by a cutting crew using but one machine, whereas twenty-five to forty places are cut daily by each machine, which, when taken on an average for a month's work, yields thirty places per shift.

Often it is said of the arcwall machine that it is not flexible enough in manipulation in a horizontal plane so that it will drive a roadway straight, with the ribs at an even distance. The burden of such complaint usually is attributable to attempts being made to cut places too wide; at other times to the inexperience of the operative.

The arcwall machine can cut a straight-ribbed place, as an inspection of the headings and rooms driven in these mines proves. In fact when the roadway is cut by an experienced runner the ribs are as straight as with any other mining machine. If straight entries, aligned track and a uniform clearance along the walkway in these mines are manifestations of the ability of the arcwall machine to cut a straight rib, then the complaint surely is fallacious.

The more experience a runner has acquired, the quicker will he cut and the straighter will be his rib line. Practice will enable him to set the tip of the cutter bar at the corner between the rib and the face, to sump in under the traction of the truck, to pull the cutter bar across the face by rope and drum until it assumes the exact angle with the lineal axis of the truck to indicate that the correct width is attained, and then to sump out again under traction, straightening the rib line with that of the room or entry. The cycle of the operation is accomplished positively and quickly, with few manipulations, but only after the runner and his helper become experienced in the control of the machine.

Another complaint is that the cutter bar leaves the parting and cuts in the coal. This is not a justifiable complaint, for where such action takes place the machine has been misapplied. Wherever the parting is much harder than the coal containing it, undercutting or topcutting—depending upon the height of the coal and the nature of the roof—preferably should be adopted, so that the coal may be loaded out either in two benches and the slate thus separated, or it may be separated partly at the face after bringing down both benches simultaneously, the refinements of cleaning being accomplished on the tipple. The arcwall cutting machine works at its best in a soft parting such as often occurs in the Elkhorn seam.

At the Elkhorn mines of the Consolidation Coal Co. the machine men cut by contract entirely and agree to keep the machines ready for inspection at any time.

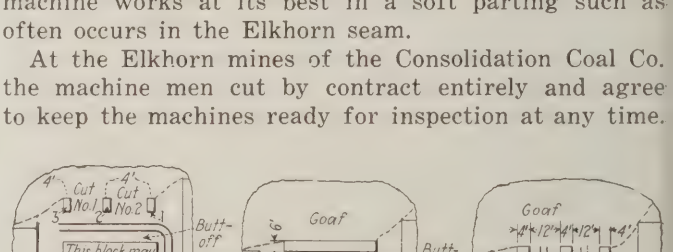


FIG. 2—THREE WAYS OF REMOVING A PILLAR
The first shows the method where the crosscut is so far back as not to weaken the pillar line in any measurable manner. The second shows the same method applied despite the presence of the crosscut. This method is successful if the pressure is not too severe, the coal too friable or the roof weak. The third shows a way whereby the pillar is split by longitudinal roadways from the crosscut. Crosscuts so weaken pillars and interfere with pillaring that one cannot but wonder if General O'Toole does not do well when in an 800-ft. room he burdens himself with but one of them.

By this is not meant that they must maintain the machines in proper repair. They must, however, handle them judiciously and report all troubles. During off-shifts the cutting machines stand in the locomotive barn or under a shed built near the drift mouth. At the close of a shift the machine is returned to its shelter, and consequently the operatives are enabled to use it for riding into and out of the mine.

Upon reaching the surface the crew is required to blow off all cuttings and dust from the cutting machine with air at a pressure of 110 lb., this being supplied by a small compressor unit installed solely for that purpose. Much of the wear on cutting machines is caused by the grinding of cuttings between rubbing surfaces.

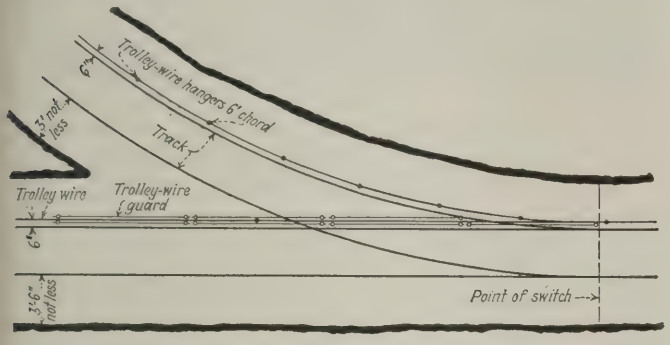


FIG. 3—STANDARD TROLLEY-WIRE PROTECTION
Here the trolley guards are put on either side of the wire where it crosses the branch road. This is a right-hand curve.

Air under a heavy pressure will dislodge all dirt from the exposed surfaces and most of the finer particles from the innermost cracks and crannies. Keep the cuttings off the exposed surfaces as much as possible, and wearing will be minimized on bearings, gears, chains, etc.

The arcwall machines are given a thorough inspection each day by a machine boss or his helper and any defects righted. This accounts for the continuity of service, which is further demonstrated by the low cost of upkeep.

Coal is mined by the room-and-pillar multiple-entry system. Entries are driven 11 ft. wide on 35-ft. centers. The main entry consists of two haulageways, a manway, and two airways on either side which serve as intake, making a total of seven entries. The large sectional area thus provided to the splits permits of a low velocity in the ventilating current. At intervals of 1,400 to 2,200 ft., depending upon conditions, cross-entries are turned from the main entries, and the panels thus formed are developed separately, being isolated from adjacent panels by barrier pillars.

Rooms Driven Narrow Save Row of Timber

The cross-entry consists of two haulageways and an airway which may be either on the right or the left depending upon the territory to be developed. As many room entries are driven off the cross-entries as the crop line will permit. Barrier pillars along the main entry are 200 ft. wide, and those on the cross-entries are about 175 ft.; barriers also are left under the streams on the surface.

After years of experimentation the company concludes that in recovering the Elkhorn seam the narrow room with a length of 200 to 300 ft. gives the best results. Rooms of different widths were driven in some places as a means of determining definitely which cross-section would provide the most ready and economical

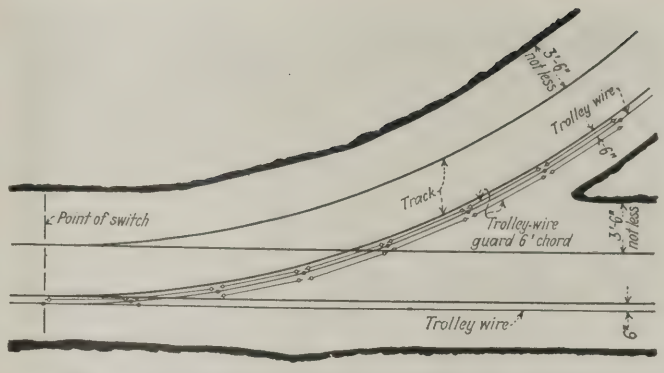


FIG. 4—STANDARD TROLLEY-WIRE PROTECTION
Trolley guards are put on either side of the wire where it crosses the main road. This shows a left-hand curve.

mining. High coal and a roof not too strong make a narrow room necessary. A room no wider than 15 ft. yields the best results. Specifically, a 12-ft. room is favored, for those driven any wider usually must be timbered.

Three representative systems of room layout which have been tried experimentally in these mines now must be mentioned. The first system provided for a 22-ft. room with a center track and with rows of posts on 5-ft. centers on either side of the roadway. Later a 15-ft. room was tried with one row of posts opposite the side from which the pillar is drawn. These posts are placed 30 in. from the rib and 22 in. from the track on 4-ft. centers, though they may be placed as close as occasion demands. The cap piece used is 2 in. thick and 18 in. long. In these wide rooms refuse from the parting and that incidental to preparing for the next cut could be, and was, gobbed.

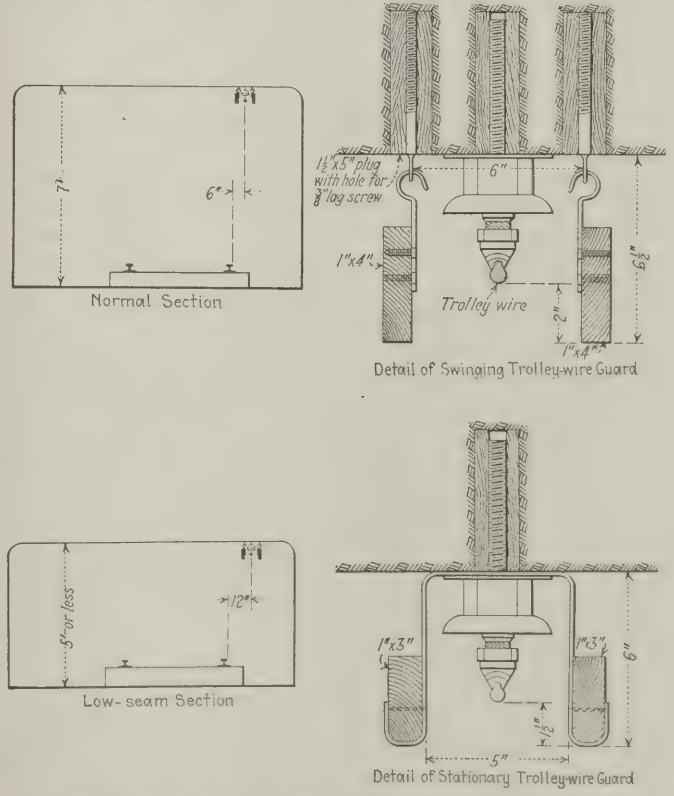


FIG. 5—METHOD OF HANGING GUARDS AND WIRE
The rules of the company say: "All places where men are compelled to pass under the trolley wire should be protected with guards. Trolley wire should be hung 6 in. from the outside of the rail. In low places this can be increased to 12 in. Where the track is straight and level, trolley-wire hangers should be placed every 15 to 20 ft. On curves of 63-ft. and 112-ft. radius, one hanger should be placed every 6 ft. Where the top is irregular additional hangers should be used to maintain the trolley wire at uniform height."



FIG. 6—REMOVING PILLAR FROM A 12-FT. ROOM

The road curving to the right is entering a buttoff, the fourth so far made into the pillar of this room. That there is pressure can be seen by the thin slab of coal to the right of the illustration that has slid to the track. Still conditions are favorable for a good recovery, for the fall in the gob is a good one and comes up to the wing pillar of the buttoff, which is 6-ft. wide. Note how little can be seen in this illustration of the clay parting in the coal.

It was discovered thereafter that a 12-ft. room is easier to keep in condition than wider rooms. The present systsm, based on 12-ft. rooms located on 50-ft. centers, is best because the rooms are easily cut, the top stands well and from all other points of view it makes an excellent working place.

In the event that there is not enough coal in a 12-ft. room to accommodate a diligent loader, the width is increased to 14 or 15 ft. in order to give him enough work; but after the width exceeds 12 ft. a row of posts must be set and as much refuse as possible gobbed in the room.

All fines from the refuse produced in cutting entries and rooms is thrown on the track; the larger pieces coming both from entries and from the narrow 12-ft. room is loaded into mine cars and hauled to the surface. Where seventy-five loaders are engaged each day about eighty cars of refuse are taken from the working places to the waste dump. This means that before the coal is shot at a working place 12 ft. wide, about one car of refuse is loaded out, all of which comes from the parting, for the roof does not scale, being protected by a thickness of coal which is left there for the support of the drawslate. As a place such as this yields approximately fifteen tons of coal per cut, about one car of refuse for each six cars of coal is taken to the surface. In the wider rooms already mentioned the refuse is gobbed, as is also that incident to pillar drawing.

The management furnishes each working place with a scraper, a punch bar and a broom. After cutting with the machine, the miner with the flat scraper and the punch bar cleans out the cut, punching out all overhanging and underlying shale on the top and bottom of the cut. After loading out the refuse into a mine car he thoroughly sweeps the cut, the face and the floor for a distance of 6 ft. from the face, to provide a clean table for shoveling the coal after it is shot down.

Wherever the bottom is soft, boards are laid across the working place, and the coal which rolls out is shoveled from the platform thus formed. Under such conditions the bottom holes are bored high enough to permit leaving a ply of coal 4 to 6 in. thick from which the loader shovels. After the bottom and top benches are loaded out this bottom slab is taken up carefully. The lumps are thrown into the mine car, and the fine coal shoveled on the truck as refuse.

The lower bench is shot and loaded out first and the upper bench last. Two holes in each bench are drilled 12 to 14 in. from the rib. Safety props need not be set during the loading of the lower bench as the shooting is so well regulated and the coal so solid that the upper bench hangs unsupported; in fact, this coal has been known to hang for years.

Unless the roof of shale is protected from the air, to which it is markedly susceptible, it is held only with difficulty; otherwise it will spall and flake badly. Consequently 10 to 14 in. of coal is left in the roof on the entries and about 12 in. in the rooms. This holds the roof securely in most cases, though where the roof coal comes down on the haulageways, at turnouts especially, steel timbering is applied immediately. In the retreat about 8 in. of this coal is lost, which is unfortunate, as it is of the same quality as that which is recovered.

In order to be sure that all cuts are properly cleaned, all blasting of the coal is done by a shot foreman who makes a careful inspection of the cut, the face of the coal and the bottom. If the work is completed as prescribed by the company and the holes are correctly drilled, he loads and shoots them. Monobel No. 5 is used as an explosive and is fired by an electric detonator with a small magneto battery.

Samples, taken monthly at the face of each working entry, are sent to the laboratory of the company, where accurate analyses are made; and from time to time samples are taken from the coal at the tipple in order to check the care with which it is being prepared.

Several methods of pillar drawing have been tested, among others slabbing, drawing on the advance and drawing on the retreat. Pillars are pulled retreating except in some few sections where a system is already established necessitating pillar drawing on the advance. The former method has been adopted as standard because it is the most economical and safest.

Pillars are brought back generally by butting-off with a place 12 ft. wide (equal to the width of the room), leaving a wing rib 3 to 6 ft. wide toward the gob. In excavating this buttoff and in other pillar work no coal is left in the roof, contrary to the custom in

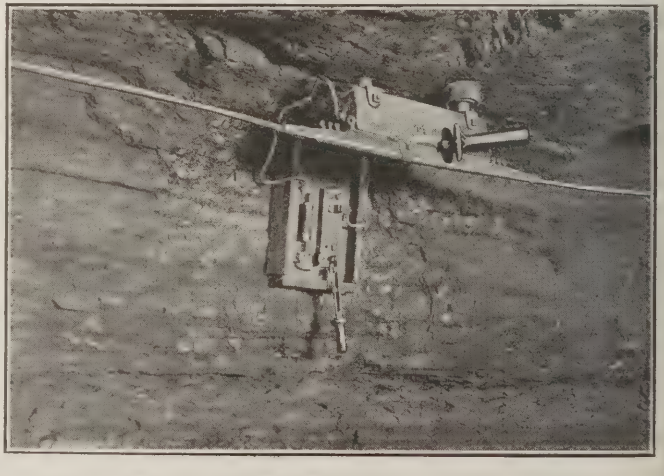


FIG. 7—FUSES PROTECT POWER LINES AT NIGHT

During the day a section needs plenty of power for mining machines and locomotives. Should a wire fall and a short-circuit occur, a fire might be started, but there would be men nearby who could cope with the trouble. At night, however, it might not be so. Consequently the line switch is thrown and a fuse switch, which will melt if more than 60 amperes is passed through it, is used to protect the current. Note the size and character of the shale parting.

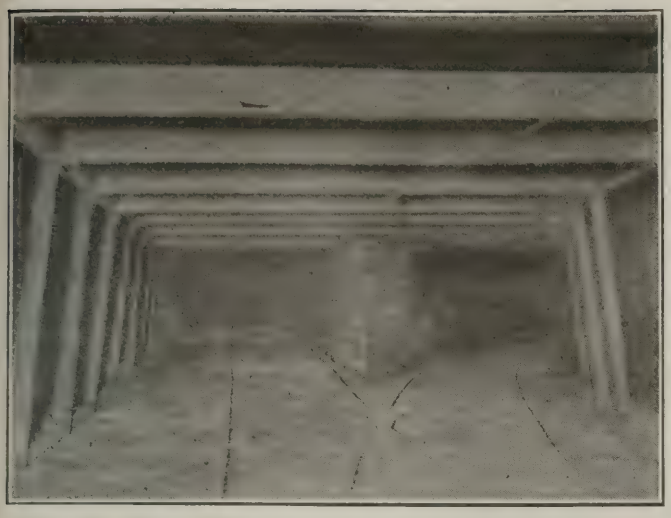


FIG. 8—STEEL SETS AT TURNOUT, MINE NO. 201
The longest of these beams is 20 ft. These are standard sets made of 12- and 6-in. I-beams on 5-ft. centers. Note the strength of the concrete pier, which is faced on its edge with two rails.

driving rooms and entries. On the other hand about 8 in. of coal is left in the roof above the rooms and entries in the retreat. If the roof load is not excessive a 6-ft. wing is butted off. Then a machine cut 12 ft. long is made through that half of the wing farthest away from the working room, leaving a 4 x 6-ft. stump to be drawn by hand picks.

The second cut of the same length is made between two 4 x 6-ft. stumps, thus completing the extraction of that wing as in Panel A, Fig. 2. Usually the same method is continued toward the entry. Sometimes a thinner wing is split from the pillar. If possible, the narrow pillar, approximately 3 ft. wide, is cut by the machine, but wherever the roof will not permit of machine cutting the wing is drawn by hand picks.

About twenty split posts are used in each cutoff, only a portion of which are recovered. The loss of steel is small. In the rooms 30-lb. and in the buttoffs 20-lb. rail are used. Short jumper lengths are placed in the butoff beyond the curve so that the track may be more readily torn up on the retreat.

If the pillar between the fall and one of the crosscuts driven on the advance is approximately 24 ft. wide and roof is fair, the block may be butted off, developing wings on each side, both of which can be brought back together as in Panel B, Fig. 1. If, however, the roof is bad the block may be worked from the breakthrough by driving two subrooms bounded by subpillars 4 ft. wide, as in Panel C, Fig. 1.

In driving entries track is laid on the advance in alternate crosscuts. These are closed by doors. The other crosscuts are sealed with permanent stoppings. A row of posts is carried up the center of all room and entry crosscuts whether they are closed by brattices or stoppings, except, of course, those laid with track. This is done to keep up the roof and insure an open place in case the pillar when being extracted has to be split. Usually these props are not recovered.

Ventilation at the larger mines is accomplished by a 14 x 5-ft. fan belt-driven by a 150-hp. alternating-current motor. This fan is set in a brick building with a fan casing of brick and steel, which is provided with reversible doors and protected by light explosion walls which form part of the air conduit to the mine. The fan speed, being fixed by the size of the pulley on the motor, always is constant except when starting.

Like all other high-volatile coals, that from the Elkhorn seam ignites readily, so extreme care must be taken to prevent mine fires. A number of years ago the company had a fire in one of its mines, which caused it to adopt as a fixed ruling the requirement that all mines must be equipped with a fuse switch in conjunction with the line switch. During the day's run, while all men are working, the line switch is closed; but during the off shifts this switch is opened and the circuit closed through a fuse switch. A Buss shellacked fuse with a capacity of 60 amp., furnished by the Bussman Mfg. Co., of St. Louis, is found well suited for the purpose. If, because of a roof fall, the line is knocked down the circuit is broken by the blowing of this low-amperage fuse, before the line can set fire to the coal on the floor.

Where loose roof is encountered along the entries steel sets and beams are applied in a manner best suited to the local need. In one place I found sets of steel on 6-ft. centers composed of an 8-in. I-beam cap resting upon 4-in. I-section legs of the batter type. Sometimes straight legs are employed but batter legs have the preference. These timber sets are strung with two courses of locust posts and filled to the roof with similar material. Where the timbers are not protected by a concrete wall they are braced with 6 x 6-in. oak.

In another place, at a turnout, 60-lb. rails on 3-ft. centers are used to support the roof. Hitch posts in either rib rest on the lower bench of the coal just below the parting and support the rails, of which there are thirty-five, varying in length from 12 to 24 ft., and strung with split-timber lagging. Posts are set in both ribs, which procedure is unusual, for at most coal mines where hitch posts are used only one hitch post is employed for each cap. Both posts, being of the same length and supported on the same coal surface, settle gradually and equally under the load imposed on them.

At another turnout nine sets of steel timbers made up of 12-in. beams for caps and 6-in. sections for legs are set up on 5-ft. centers. These are braced between by heavy oak at both the top and the bottom. The roof above these sets is high, and in consequence cribbing has been built to the roof above a course of 3-in. lagging. The corner of the concrete pier at this place is faced with two 40-lb. rails and the concrete likewise is reinforced with scrap iron. Sometimes 10-in. beams and 5-in. legs are used at turnouts where the roof is stronger than that at the place just described.

Ford Paid $2,783,000 For Kentucky Land; Now About Ready to Build Railroad

All speculation as to the price paid for the Peabody Syndicate coal-land holdings in eastern Kentucky came to an end last week when the Fordson Coal Co., in answer to interrogatories in the T. C. Fuller suit to set aside the sale, showed that it paid $2,783,000 for the 120,000 acres, including interest from Jan. 1, 1923, to March 17, when the option was exercised, the real value having been $2,750,000. Previous estimates of the sale price ran as high as $15,000,000. Fuller had claimed a share and demanded an accounting on the ground that the price was higher than had been announced.

Maysville on May 3 reported that surveyors had completed a survey down Brush Creek in Ohio to the Ohio River, opposite that town, and advised farmers not to plant crops on the survey this year. This is the route which it is believed will connecte the Detroit, Toledo & Ironton, the Ford railroad, at Maysville, with a branch line of the Louisville & Nashville into the southeastern Kentucky coal fields.

How the Law Shaft Is Protected Against High Water

Ideal Arrangement Is to Put Pumps in a Shaft of Their Own, Making Pipes the Only Connection with the Mine — Law Shaft Has Slope Sealed Against Workings, Giving 66,000,000 Gallons of New Storage

By Dever C. Ashmead
Kingston, Pa.

IN AN ADDRESS before the Engineers' Society of Northeastern Pennsylvania, H. H. Kudlich, superintendent of the Jermyn colliery of the Hudson Coal Co., outlined the difficulty experienced at that mine during the flood period in June and July, 1922, which, however, it may be said, did not differ materially from the difficulties that have had to be contended with at many times in numerous collieries in the anthracite region.

When a mine becomes flooded, the water often rises in the mine workings more rapidly than the pumps that have been installed can remove it, and as they are stationed near the lowest point in the mine, it is not long before they are under water and, in consequence, cannot be operated. For this reason auxiliary pumps have to be installed to remove the water that has accumulated from the flood.

In many instances the water in times of heavy rainfall has risen two hundred or more feet in elevation, and a volume of water has accumulated that can be measured only in billions of gallons. Before operations can be resumed water has to be removed, and as the main pumping plant has been flooded it cannot be used until almost all the water has been removed from the mine and the pumps put in condition for operation.

The question has arisen in the minds of many operators whose mines are subject to flood conditions, Is it possible to so design pumprooms that they will not be flooded in times of high water? This, indeed, is possible and has been done successfully in the anthracite region in three instances to my knowledge.

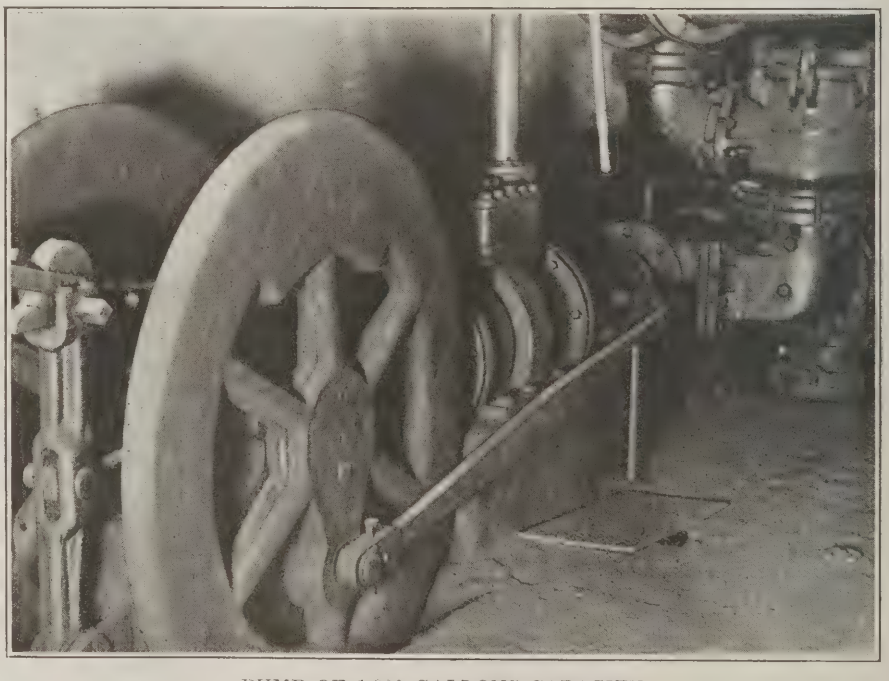
The best and safest method of constructing such a pumproom is to sink a separate shaft or slope to the point where the pumproom is to be located. If it is in the rock it is safer than if it were in the coal. Then the only connection from the pumproom to the workings should be by the pipes by which the pumps receive their water. Where such a provision is made, practically no water can enter the pumproom except through the proper means of entry, the intake pipes of the pumps. This permits the pumps to be operated no matter how badly the mines are flooded.

If this is impracticable, however, then the next best method is to use an old slope in the mine. The pumproom would be placed at the foot of this slope, and all openings into the mine would be sealed off by means of dams. This would prevent the water entering the slope or the pumproom. If the mine were deep, however, then a point would be reached where the head of water possibly would be too great for the safety of the pump runners in the pumproom, for the dams might fail and let in a deluge.

Though in this case it would be necessary to abandon the pumps before the failure took place, the chances are that the dams would hold, and when the water receded to a point at which it would be safe for the men to work, the pumproom could be re-entered and, the pumps being entirely uninjured, they could be started without any delay. They would then be able to assist in the lowering of the water. In many operations, however—even in case of a flood—the water would not rise in the mine above the danger point on the slope, and the pumps could be continuously operated, thus rapidly lowering the water in the mines. This is particularly true where the mines are shallow and subject to flooding and where the measures are flat and the water can spread over a large territory without any great increase in height.

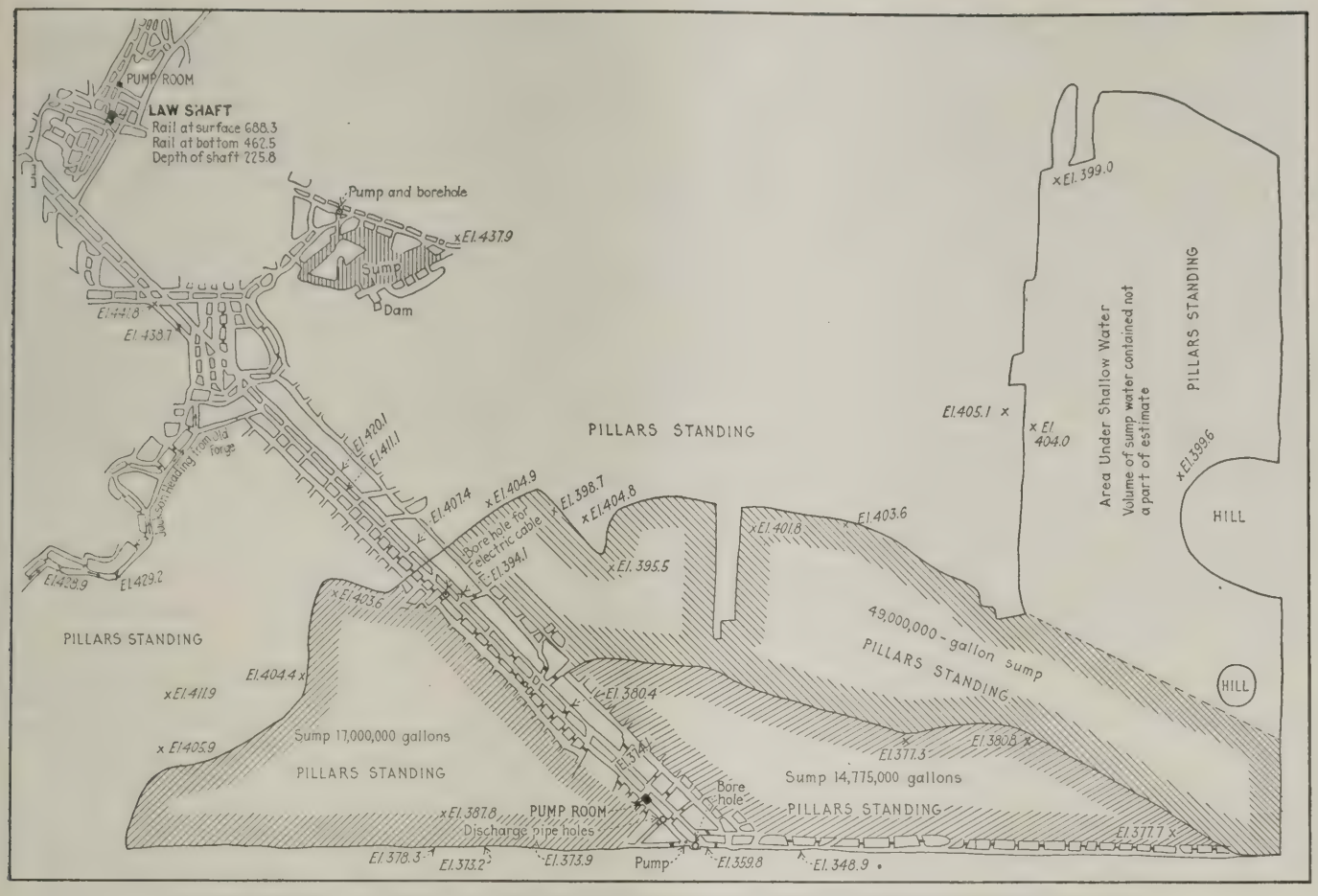
The Pennsylvania Coal Co. has made a careful study of the construction of "concealed," or submersible, pumprooms and has two of them at its operations. One of these, which is located at the Law shaft of the Central colliery near the town of Old Forge, Pa., will be described in this article.

Law shaft, No. 13 shaft of Central colliery, No. 1 and No. 2 shafts of Old Forge colliery and the Sibley shaft are all interconnected underground, making an immense



PUMP OF 1,000 GALLONS CAPACITY

This pump is of Dunmore type and is one of those in use at the Law shaft. Flywheels help the steam to maintain an even pressure on the water throughout the stroke. Some pumps of this type are used in the main pumproom at the foot of the shaft, in the old slope and at No. 2 Old Forge colliery but not in the submersible pumproom, to which, indeed, steam is not taken.



SUMP SYSTEM AT THE LAW SHAFT SHOWING AREA AVAILABLE FOR WATER STORAGE

All over the area shown pillars are standing, some near the shaft having been packed with rock. The level of the water at the lowest pump is about 360 ft., yet the water can rise till it reaches an elevation of about 400 ft. before that pump is drowned. It might not be safe to work around the pumps when under such a head, but at least they will be protected so that they can be started as soon as the water has been lowered to a point that is sure to afford safety, and, furthermore, the pumps can be arranged so as to operate continuously without attention. Of course, provision would have to be made for pumping out of the pumproom any water that might seep through the walls or floor for in a submerged room there is no place where water can drain.

area of communicating workings. The lowest of these are in the Law shaft, and naturally most of the water that is produced in these collieries could drain to this point. Part of the water, however, is collected and pumped to the surface from the pumprooms established at each of the different shafts.

In case of a flood the workings in the Law shaft would be completely flooded and the usual difficulty would be encountered in using portable pumps or pumping arrangements for dewatering the mine in case of a flood. Further, if no arrangements were made to handle the water that would collect in the lower workings it could easily rise to a sufficient height to drown out the main pumping room at the foot of the Law shaft.

In the past the water has risen until it was 3 ft. deep in the pumproom. If arrangements had been made so that the pumps in the lower levels could be operated during such inflows of water, the water level in flood periods could be kept at such a point that the water could not drown out these pumps, which are those having the greatest aggregate capacity.

In order to realize the quantity of water that has to be handled in periods of flood it may be well to enumerate the number and capacity of the pumps that are now in place in these collieries. The main pumproom, which is at the foot of the Law shaft, contains one Aldrich triplex pump with a capacity of 1,000 gallons per minute and driven by a 120-hp. motor, two Jeanesville centrifugal electric pumps, one with a capacity of 1,000 gallons and one with a capacity of 700 gallons, one Scranton pump with a capacity of 1,000 gallons, one Dunmore steam pump with a 1,000-gallons capacity, two Dunmore steam pumps each with a capacity of 1,469 gallons and one Scranton pump with a capacity of 2,000 gallons, or a total capacity of 8,939 gallons per minute.

Down in the old slope from the Law shaft is one 1,000-gallon Dunmore pump. At the No. 13 shaft of the same colliery are two old Cornish pumps having a capacity of 800 gallons each, and also one 1,000-gallon centrifugal pump. At the No. 2 shaft of the Old Forge colliery there is one 1,000-gallon Dunmore pump, two Scranton steam pumps of 1,800 gallons capacity each, and one new Barrett Haentjens electric centrifugal pump having a capacity of 2,500 gallons. At the No. 1 shaft of the same colliery is an 800-gallon Cornish pump. At the Sibley shaft are two Scranton centrifugal pumps pumping against a head of 300 ft. with a capacity of 1,800 gallons each.

This makes the total pumping capacity of the different pumprooms 24,038 gallons per minute. This capacity was not considered sufficient for protection against floods, so it was decided to establish another pumproom down the new slope from the foot of Law shaft. In this pumproom were placed two 1,500-gallon Allis Chalmers electric centrifugal pumps. These pumps worked against a head of 325 ft. This gave a total capacity of 27,038 gallons per minute for the colliery.

As it would not be difficult to drown out these pumps by flooding it was decided to make a concealed, or sub-

mersible, pumproom in which to place these new pumps. In the first place, all of the openings on the left-hand side of the slope were sealed by dams to a point about 750 ft. from the bottom of the slope. This made a sump that had a capacity of 14,775,000 gallons. Then it was decided that it might be advisable to seal by dams the three openings above these on the slope, which would increase the capacity of the sump to about 49,000,000 gallons.

If the twenty-two openings on the right-hand side of the slope were sealed, it would further increase the storage capacity by about 17,000,000 gallons, giving a total capacity of 66,000,000 gallons. This would store all the water received by the mine in 24 hours and not evacuated by the pumps, should the flood bring in 72,000 gallons per minute. It is probable that the pumps at the foot of the slope would greatly exceed their rated capacity, for the flooding would cause the water entering the pumps to be under a heavy pressure, thus lowering the actual lift. When the water reaches the height at which it will enter the slope and run down to the pumproom its free surface will be about 40 ft. above the pumps.

In order that the water might flow freely from the Old Forge colliery to the Central colliery the ditch in what is known as Jackson's heading was cleaned, and the water can be run directly into the sump at Law shaft. Not only are there these large new sumps in which to store water but there still remain the old sumps and these could hold back a large quantity of water. By this arrangement the danger of flooding is materially reduced.

Colleges Offer Summer Mining Courses

IN THE summer months the coal mines run only irregularly, and the short summer mining courses afford to men who desire to acquaint themselves with the science of mining an excellent opportunity to do so without losing many actual working days. Most of the mining schools have short courses arranged to accommodate those who are willing to make the slight sacrifice. The course usually lasts from a month to six weeks, and it is sufficiently long to enable a man to prepare for the mine foremen's examination and to fit him fully for the duties he must perform while acting in that capacity, not only from a safety and hygienic point of view, which is the state's concern, but from an economic point of view as well.



SOME OF THOSE TAKING THE SHORT MINING COURSE AT WEST VIRGINIA UNIVERSITY, 1922

A. C. Callen, professor of mining, is fourth from the right in the second row from the bottom. In 1922 there were 69 scholars and in 1921, 106.



MINE RESCUE TEAM AT SHORT MINING COURSE, WEST VIRGINIA UNIVERSITY

These men were trained by the West Virginia Department of Mines and are shown wearing their mine rescue equipment.

In fact, it is somewhat generally conceded that the mine foremen's examination is not comprehensive enough and should embrace first aid, mine-rescue training and enough mapping to prove that the would-be foreman is thoroughly competent to read a mine map. Perhaps the fact that many mine inspectors are not trained in first aid and mine rescue is a reason why examinations do not in any way cover these necessary requirements. It is quite probable that before many years no new mine inspectors will be appointed who have not taken at least the short mining course. It is quite conceivable, in fact, that the requirements as to academic training may be made more drastic, but this small concession to the importance of having such a grounding in the art of mining as training at a college confers doubtless will be required.

Those who have attended some such course will be enabled to find out whether they are mentally qualified and psychologically inclined to take the longer course of training that will fit them for the superintendency. The industry is not going to be content much longer to accept for the highest positions men who do not know the fundamentals of mechanical and electrical mining engineering and who consequently must rely entirely on the expert work of others.

As it is now the superintendent often is so grossly lacking in the elements of both these essential branches of a mining education that he cannot even understand the advice of those whose work it is to formulate plans for the conduct of the mechanical and electrical details of the plant. They use what is to him an unknown tongue. Certainly the least we can ask of the superintendent is that he shall learn to understand what they say.

But this is getting somewhat apart from the main subject—that of the shorter mining course. The School of Mines of Pennsylvania State College holds a free course for bituminous and anthracite mine workers from June 25 to July 28 of the present year. This is five weeks of study, but if the student cannot spare that length of time he will be welcomed for four. The first week, June 25 to June 30, will be devoted to mine safety work. In this period there will be 30 hours of intensive training in this important subject, which, as

Airplane View, Pennsylvania State College

This university — for such it really is —has an excellent School of Mines presided over by E. A. Holbrook, for a while acting director of the U. S. Bureau of Mines. It is an ideal place for a summer course in mining as it is on the high ground of the Appalachian Mountains where the student will escape much of the overpowering heat that is so distressing to those who are accustomed to be in the cool of the mines during the heat of the day. *(Courtesy U. S. Army Air Service)*



has been said, should be understood by every fireboss, foreman and inspector. Thereafter the work will be divided as shown in Table I. There will be courses for beginners and for those capable of taking more advanced studies.

TABLE I—FOUR WEEKS CURRICULUM AT PENNSYLVANIA STATE COLLEGE

Preliminary Course		Advanced Course	
Study	Hours	Study	Hours
Mining law	24	Mining law	24
Mine gases	18	Electricity in mines	12
Safety lamps and gas detectors	20	Advanced mine ventilation	12
Mine fires and explosions	6	Fan testing and ventilation practice	20
Mine ventilation	30	Use of explosives	5
Mine drawing and mapping	20	Choice of mining methods	5
Explosives	5	Timbering	5
Mining methods	10	Pumping, hoisting, haulage	12
Mining machines	5	Mine management	12
Timbering	10	Surveying	40
Total	148		147

The figures in Table I are minimums, and men who desire to spend more time in obtaining greater proficiency in certain lines will be given the opportunity. Night study will be expected. The Bureau of Mines safety car will be at the college to assist in the safety training work of the first week. Provision has been made for training teachers, and a special certificate will be given to those qualifying for this work.

The school has a 300-ft. tunnel with three steel mining fans of different types, a Clifford lamp-testing gallery, the most complete safety-lamp exhibit in the world, a smoke room, oxygen apparatus and gas detectors, mine and breaker models, an air compressor and a great variety of drills. Any man may enroll who has had at least one year in practical work in or around the mines. On completion of the five weeks' course a certificate will be awarded showing subjects studied and another will be given to those who have attended the full course for two years.

Lodging costs from $2 to $3.50 per week and board from $6.50 to $7. The location of State College, in a beautiful country town 1,200 ft. above sea level, where the air is cool and bracing, makes the opportunity attractive. Studying is a pleasure under such conditions, and the trip will prove to be a vacation rather than an unpleasant duty.

E. A. Holbrook, dean of the school, was for many years a leading official in the Bureau of Mines and for a while acting director. Apply to him and make all arrangements. At the close of the course the state will hold examinations for mine foremen and firebosses, July 27 and 28, at Tyrone, Pa., and at some point in the anthracite region.

A summer mining school will be held also by the Carnegie Institute of Technology, Pittsburgh, Pa., June 25 to July 20. This will be a single course only. The classes in the morning will be held in the Institute, when the subjects will be mine laws and regulations, mine ventilation, mine gases, safety lamps, methods of working, mine explosives, mine timbering and mine haulage. The afternoon classes will be held at the U. S. Bureau of Mines, the subjects being mine-rescue and first-aid training and mine safety. Demonstrations will be given at the Experimental Mine to exhibit the action of coal dust and the use of permissible explosives.

The fee for the course is $12. Students can live at home or obtain a room in a dormitory of the Institute for $2.50 a week, meals being purchased at restaurants close by. More information may be obtained by addressing the Supervisor, Co-operative Department of Mining Engineering, Carnegie Institute of Technology, Pittsburgh, Pa. Only twenty-five men will be accepted. The Institute will award certificates, as also will the U. S. Bureau of Mines, each in its respective field.

The department of mining of West Virginia University, Morgantown, W. Va., which limped along with a beggarly three students in its summer course of 1913, 1914 and 1915, which had only eight students in 1916 and fell back again with a dull thud to four in 1917, has in recent years received all manner of support, reaching to 106 students in 1921 and 69 students in 1922, and in 1918, 1919 and 1920, 23, 57 and 68 respectively. A. C. Callen is particularly well fitted for the matter in hand, having a remarkable enthusiasm for this kind of service. This course lasts six weeks, from June 11 to July 21.

At the close of the course the State Mining Department will conduct an examination for mine foremen and firebosses. The subjects are mining arithmetic, explosives, methods of working, timbering, mine gases, electricity in mines, drainage and pumping, mine ventilation, haulage, mine fires and explosions, first aid,

mine management, mining machinery, drawing, safety lamps and mine-rescue work. The instruction in first aid to the injured and mine-rescue training will be in charge of the West Virginia Department of Mines, and under the personal direction of Robert Lilly. No more than twenty-four men will be in a section, consequently each man will receive all necessary attention. The tuition is free. Books and supplies will cost less than $2, and board and lodging will be about $8.50 per week.

There are no entrance requirements or residence rules. Anyone engaged in mining who can read and write English and who really desires to advance himself in the industry will be welcomed. The course is given primarily for West Virginians, but arrangements will be made to take care of a few students from outside the state.

The staff of instruction comprises A. C. Callen and C. K. Brown, of Morgantown; Adam Crawford, of Fairmont; William Norris, Jr., of Welch; E. E. Criswell, of Beckley; L. C. Hutson, of Mount Hope; J. P. Madden, of Logan, and J. H. Haskell, of Montgomery. Further information may be obtained by addressing the Department of Mining Engineering, West Virginia University, Morgantown, W. Va.

The School of Mines of the College of Engineering of the University of Alabama, University, Ala., will hold a four-weeks summer course in mining, June 4 to June 30, which will give an exceptional opportunity to those who desire to pass state mine examinations. The subjects taught are listed in Table II.

TABLE II—FOUR WEEKS CURRICULUM, UNIVERSITY OF ALABAMA

Study	Hours
Alabama coal-mining law	18
Geology of coal and mining methods	18
Electricity, haulage, hoisting, pumping and mine machines	18
Practical mathematics	24
Drawing and study of mine maps	18
Mine gases, ventilation, fans, safety lamps and safety	18
Mine-rescue and first-aid course given by U. S. Bureau of Mines (optional)	20
Total	134

Special provision will be made for advanced work for those desiring to go further. A certificate will be given to each man showing the subjects taken and the credit received. The instruction is given without charge. Lodging at the university or in Tuscaloosa will cost about $2 per week. Board will cost from $5 to $6.25 per week. The U. S. Bureau of Mines, Southern Experiment Station, which is located at the university, will assist in the training. The university is only one mile from Tuscaloosa and can be reached by street car. H. D. Pallister, professor of mining engineering, is in charge of the courses and further information can be obtained from him.

At the University of Kentucky the short mining course is not given during the summer months but during the last half of the second semester of the regular college year. The course this year opened April 2 and will close May 26, lasting eight weeks. The number of men attending the course varies from year to year and ranges between 30 and 70, depending upon conditions prevailing in the coal field. The number attending this session is 30, but it usually runs between 40 and 50.

C. J. Norwood, head of the Department of Mines and Metallurgy and professor of mining, writes, "I am under the impression that the course given here for 'practical miners' was the first course of the kind established in any of the state universities or state colleges. It was established, at my request, by the board of trustees of the Agricultural and Mechanical College (now the University) of Kentucky in 1907, at a time when mine foremen did not have to be certified in this state."

Like most of the others this is a free course. It grants a certificate to every man who takes the instruction. The studies are arithmetic, mine layout, blasting, timbering, shaft and slope sinking, ventilation, drainage, mine gases, safety lamps and testing, explosions, mine fires, rescue and relief, surveying and map drawing and Kentucky mining law.

It may be added that the School of Mines of the University of Pittsburgh, not desiring to enter into competition with or duplicate the work of the Carnegie Institute of Technology, does not hold a summer school.

Building a Town for a Mountain Community

G. W. HAY, general manager of the Consolidation Coal Co., Elkhorn Division, at Jenkins, Ky., calls attention to the fact that two provisions for making the Elkhorn district self-sufficing were a hospital and a dairy, facilities that should not be overlooked in the creation of any group of mining villages. These items were omitted in an article entitled "Building a Town for a Mountain Community," in which were described the social developments at Jenkins and McRoberts. The



HOSPITAL OF CONSOLIDATION COAL CO., AT JENKINS

Set in the woods and facing, from spacious sun porches, Elkhorn Creek, the Elkhorn Hospital affords an opportunity for the early convalescence of the sickly or injured members of the Consolidation's villages in Kentucky.

illustration herewith shows the hospital. It serves not only for the care of the families of the mine workers but for the needs of others not in any way employed by the coal company.

About two miles from Jenkins along Elkhorn Creek is the dairy, which is operated by the Consolidation Coal Co. as a hygienic measure. The plant has 75 head of Holstein cattle which are regularly tested to ascertain if by any mischance they may have contracted tuberculosis. Milk has been found one of the grievous causes of morbidity among mine workers, and progressive companies following the Ellsworth Coal Co., are installing such dairies as a measure of protection.

IMMERSE AND SPRINKLE COAL TO PREPARE IT FOR MARKET.—At the Manchester and Saragossa strip pits, in Walker County, Alabama, the coal is dumped through a hopper into a washing pan, where it is immersed in water. This soaks off any fireclay that may be adhering to the coal. It is lifted out of this pan by two cast-iron screw conveyors. The coal is then screened and sprayed, thus improving its appearance and quality.

Clean Coal Is Broken Up and Screened Out, Leaving Rock and Bone as Oversize

MANY are of the belief that we are unduly complicating the work of cleaning coal by the use of too many screens, jigs, tables, elevators, settling tanks and dewatering devices. Every week we are hearing of new links in the chain of contrivances and attempts have been made to reduce the long chain by a short-cut method which avoids the use of water and is applicable to certain kinds of mine product where the bone, and of course the slate, is less friable than the coal. One of the most attractive of these simple and dry methods for cleaning bituminous coal is that devised by W. S. Ayres, a consulting mining and mechanical engineer of Hazleton, Pa. It eliminates all fine crushing and the greater part of the screening necessary in other processes.

It is designed to treat that class of bituminous product in which the impurities (bone, slate and rock) are tough and less friable than the coal. This condition is particularly true of many West Virginia coals.

The machine consists of a long cylinder into which the coal is fed, which is so designed, equipped and adjusted that the coal is disintegrated, the impurities remaining practically in the same condition as when fed to the machine. Its capacity as thus far tested is 8½ to 10 tons per hour.

When the slack in the run-of--mine without any treatment is clean enough for making coke, the process is very simple. The run-of-mine is first passed over a 2½-in. or 3-in. mesh screen. The product which passes through the screen is passed direct to the disintegrator. That passing over the 2½-in. or 3-in. mesh is fed to rolls which crush it to 3-in. mesh. This 3-in. product is then passed to the disintegrator. Where there is but little bone in the coal, and consequently but few pieces having fuel value in the refuse from the disintegrator, the tailings can be discarded without re-treating. Where the mine product contains much bone the tailing can be re-treated on the Ayres separator, originally designed for the treatment of anthracite, as shown in the illustration. This bone, or indurated coal, is too high in ash, as a rule, for coke, but it can be used for steam or domestic purposes.

Where the slack in the run-of-mine contains too much ash for use in the manufacture of coke, the disintegrator will reduce the usual equipment of tables and crushing machinery by removing the slate and rock, and by doing the greater part of the crushing before the coal is passed to the machinery for fine grinding.

A test made on a sample lot of West Virginia coal on the disintegrator-separator set, gave the following results: Coal recovered, 98.40 per cent, containing 7.05 per cent ash; coal lost in tailings, 1.60 per cent.

This process, which is covered by basic and combination patents, is entirely dry and is so simple that the machinery installed for its accomplishment occupies but little space, has a comparatively low first cost and can be operated without any attendant other than the oiler.

The separator consists of an apron conveyor set at an angle so steep that the coal which has the least frictional resistance refuses to travel upward with it. The slate having a greater frictional resistance or steeper angle of repose is readily carried upward and discharged at the head of the conveyor. When used in conjunction with the disintegrator only the bone is fed to it which has been more or less rounded by the tumbling in that cylindrical screen. The good bone being more perfectly rounded is disposed to roll to the bottom of the incline, where it can be gathered and used for such purposes as do not need exceptionally clean coal or at places so near the point of operation that the freightage cost of the impurity is not sufficiently great to make the presence of the bone particularly undesirable.

Thus the separator and disintegrator operate on two distinct principles. One depends on the difference in the angle of repose of the pure and impure product and the other on the greater friability of pure coal as contrasted with the strength and cohesion of such associated material as contains a large percentage of ash. Neither is dependent on specific gravity, as are dry and wet tables, jigs, rheolaveurs, Chance separators and similar contrivances, nor on surface tension, as are oil-flotation devices.

Mining Courses by Radio to Be Given by Pennsylvania State College

ENGINEERING extension courses by radio may be established at the Pennsylvania State College, Dean Sackett, of the School of Engineering, said last week. The department already reaches 9,000 industrial employees each year with class and home-study courses.

The Dean announced, "We may find it possible to have the necessary lesson charts and diagrams sent in advance by mail to the radio enrolment, and then the college classrooms can be taken into the shop or home for the benefit of the men who cannot go to college.

It is possible that the day is not far distant when these men and the hundreds of miners in similar classes conducted by the College School of Mines will be able to listen in on scheduled class instruction from the college broadcasting station.

Separator and Disintegrator

The disintegrator on the right breaks the clean coal and screens it out. The separator on the left lifts the slate and silicious pieces and allows the rounded pieces of banded coal—bone to roll to the base of the table, making a second or middlings product for use in steam raising.



Cost of Timber in Illinois Between One And Sixteen Cents per Ton Mined

HARRY E. TUFFT has made an inquiry into the kind and cost of timber used in the mines of Illinois as part of a study to be made by the U. S. Bureau of Mines with the co-operation of the U. S. Forest Service, the purpose being to ascertain ultimately what economies could be effected by better selection, preparation and storage of timber and especially to ascertain how the life of timber may be prolonged by the use of preservatives.

He finds that the cost of timber in the longwall mines of northern Illinois varies greatly from mine to mine. In 1914* the average total cost of timbering in eleven mines was stated as 5 to 8c. per ton of coal produced. The props are usually 3½ to 4 in. in diameter at the small end. The cost of props in 1914 was 0.5 to 1c. per lineal foot. Costs for average sizes of crossbars delivered to the mine were as follows: 6-ft. bar, 8-in. diameter (average), 15c.; 7-ft. bar, 8 in. diameter, 16c.; 10-ft. bar, 10 in. diameter, $1.25; 14-ft. bar, 12 in. thick, $1.90.

The costs of mine timber in 1921 delivered to the mine in this district were stated by one of the large operators as follows: Mine props, 4½ ft. long, 4½ in. small end, 5¾ to 6c.; a 6-ft. prop costs 7½c., a 7-ft. timber, 25c., and an 8-ft. timber, 35c. The average cost for props and mine ties at this company's mines in 1921 was 15.36c. per ton of coal mined.

Cost for Timber Almost Doubled Since 1914

Thus it will be seen that the average cost for longwall props in this district has advanced from 0.75c. per lineal foot in 1914 to 1.25c. per lineal foot in 1921, and that a 7-ft. timber costing 16c. in 1914 now costs 25c. It also will be observed that the maximum cost given in 1914 is 8c. per ton of coal mined, whereas the cost at the mine above mentioned is now 15.36c. for the same unit of output.

The timber used in the coal mines of Illinois is practically all of mixed hardwoods, little soft wood being used. In the room-and-pillar mines both round and split props are commonly used, although some operators prefer round props, as these are said to give better service than those that have been split from a log, especially in the smaller sizes. In the timber specifications of the different companies much variation is found as to the acceptable minimum diameter of props and crossbars. Some companies accept props containing only 4 to 5 sq.in. of wood in the small end, the actual diameter ranging from 2½ to 3 in. Others specify a minimum diameter of 4 in., and a few require a diameter of 5 in. Lengths range from 4½ to 10 ft. and average 6 to 8 ft. Oak receives preference in Illinois.

Most of the operators use practically any kind of hardwood timber for props, but a few endeavor to obtain as large a percentage of oak as possible. Probably more than 65 per cent of the prop timber is mixed oak (red, white, burr, and other), the rest being sycamore, hickory, elm and other varieties.

Crossbars are principally white oak, with some red oak, burr oak, and a little walnut. The diameter at the small end ranges from 4 to 8 in., 6 in. being perhaps the diameter of those most commonly used. The lengths vary from 8 to 20 ft., depending on the width of the opening to be supported. Most operators use only white oak for mine ties, although many accept any kind of hardwood.

Much of the mine timber used in Illinois mines is shipped from outside the state, chiefly from Missouri. In some of the mining districts the local supply of timber obtainable for mine use is limited in quantity and of inferior quality. The cost at the mine varies, according to the length of haul and minimum diameter that the operator will accept, from 16c. for a locally grown 7-ft. prop with 2½-in. tip to 28c. for a Missouri white-oak prop of the same length and measuring 5 in. in diameter at the small end.

The average cost in 1921 for mine props in lengths ranging from 4½ to 9 ft. and measuring 4 to 5 in. in diameter for various mines throughout the Illinois districts is compared in Table I, with the average price for 4½-in. props in one of the Illinois districts, as published in a report issued in 1915 by the University of Illinois.†

From this table it will be observed that the cost of props has increased greatly in the past seven years. Comparative figures for mine ties and crossbars are not available, but individual comparisons indicate a corresponding increase.

TABLE I - AVERAGE COST OF MINE PROPS IN ILLINOIS (DELIVERED)

Length Ft.	Cents per Prop 1914†	1921	Length, Ft.	Cents per Prop 1914†	1921
4½	4½	8	6½	13	17
5	5	10	7	17	24
5½	6½	12	8	25	30
6	10	15	9	30	35

TABLE II—AVERAGE COST OF TIMBER-SET MATERIAL AND MINE TIES (DELIVERED)

	Length, Ft.	Diameters, Small End, In.	Price in 1921
Round oak post	6	6	$0.45
Oak crossbar	10	6	.75
Oak crossbar	10	8	.85
Oak crossbar	16	6	1.50
Oak crossbar	16	10	2.60
Oak crossbar	20	6	2.00
Mine ties, length, 5 ft. 3x4 in. cross-section			.22
Mine ties, length, 5½ 6x6 in. cross-section			.42

In 1905 the average cost of round timber was 6c. per cubic foot in Illinois. In 1921 the cost of round mine timber delivered to the mine ranged from 17c. per cubic foot upward for a number of representative mines in different districts. From this it is seen that the cost of mine timber in Illinois has increased three-fold since 1905.

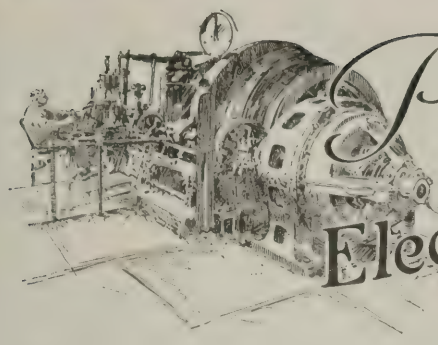
In 1921 the cost for prop timber delivered to the mine in twelve mines in southern Illinois was 0.9 to 3.6c. per ton of coal hoisted, and averaged 1.9c. per ton. The cost per ton of coal mined for all mine timber used underground delivered to the pit mouth ranges from 3 to 10½c. for thirty operators producing about 22,000,000 tons annually in different districts, the average being approximately 4.7c. per ton. The consumption per ton of coal mined at these mines ranged from 0.09 to 0.39 cu.ft. per ton, and averaged 0.23 cu.ft.

The report of Mr. Tufft concludes with the statement that one of the ways in which coal-mine operators can reduce their timbering expenses is by treating with a proper preservative the timber to be placed in the more permanent openings.

A GROUP OF FINANCIERS in which the Stinnes interests are prominent is reported to be acquiring participations in upper Silesia iron and coal properties, the first step being the purchase of a large block of shares in the Bismarck works.

*Bulletin 5, *Illinois Coal-Mining Investigations*, "Mining Practice in District 1 (Longwall)," July, 1914, pp. 34-35.

†Andros, S. O., Coal-mining Practice in District IV, Bulletin 12 Illinois Coal Mining Investigations 1915, p. 43.



Practical Pointers for Electrical and Mechanical Men



Demand for a Knowledge of Electricity and Its Application to Mining

THE rapid progress and the growing application of electricity to coal mining has brought about a condition which demands that almost everyone working in or about the mines know a little at least about the theory and application of electricity. In fact it is highly desirable that all those in charge of mining operations know a great deal about electricity that they may be able to direct their workers and their personal efforts to better advantage.

With this expansion of electrical application has come an increased demand for more electrical data and information like that which *Coal Age* has been supplying, but there has also come a demand for some more general explanation of the fundamental principles of electricity, such as may readily be understood by the average practical man about the mines. To further increase the service *Coal Age* gives the industry there will appear from time to time short articles explaining the fundamentals of electricity and its application to coal mining.

What is Voltage and Current

The word voltage is one of the most common terms used in electrical literature and it is therefore essential that we have a clear conception of what is meant by the word. Instead of the word voltage the term pressure frequently is used, meaning the same thing.

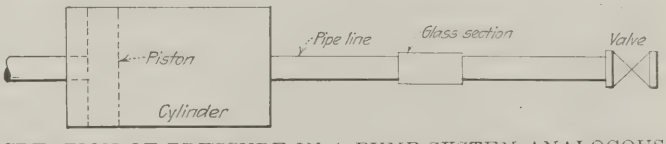
Voltage means electrical pressure and is quite similar to the idea of pressure as used when considering the pressure of the water in a water line. A pump exerts a certain pressure on the water in the pipe line and this pushing effort exerted, say by the plunger of the pump, is transmitted to the water.

Let us suppose we have a cylinder and piston filled with water and connected to a pipe line, with a valve on the end of the pipe as shown in the accompanying figure. If the piston is pushed from left to right there will be created and transmitted to the water a pressure. Should the valve be closed the pressure would still be exerted upon the water but there would be no flow of water; should the valve be opened the pressure would still exist but it would be in use and moving the water in the pipe line. Note that the pressure exists whether or not the water is still or in motion.

Electrical pressure, or voltage, is quite similar to the above. Voltage is electrical pressure which is created and may exist in a conductor or wire ready to cause a current to flow or it may be causing a current to flow. We should note that voltage, like pressure on the water, may exist either when not causing an actual flow or when causing a flow.

If the pressure exerted on the piston is allowed to push the water, the valve being opened, we say that there is a flow of water in the pipe line, similarly, if certain conditions are brought about where we have a voltage, or electrical pressure, on a wire a flow will be created called a current.

In our water analogy with the pump, the flow may be measured in gallons per minute. It is not necessary to determine the rate of flow by measuring the water coming out of the valve at the end of the line because a meter may be inserted anywhere in the pipe line and used to measure the rate of flow. We may even put a glass section of pipe in the line and actually see the water passing through the pipe line. When we see the glass tube full of water we say the rate of flow of water is high and obviously when the tube is not so full we say that the rate of flow is low.



CREATION OF PRESSURE IN A PUMP SYSTEM ANALOGOUS TO CREATION OF VOLTAGE

If the valve in the illustration is closed and the piston is forced from left to right, the water in the pipe will be under pressure although the water is not flowing out of the pipe. If the valve is opened the pressure will be used in forcing water through the pipe. This is similar in the first instance to voltage on an electrical system without current flowing; while in the second instance the electrical pressure or voltage would be producing a flow of current, the rate of which may be measured in amperes.

In measuring the rate of flow of water in a pipe line we usually say that the rate is a certain number of gallons per minute.

When an electrical pressure is used to cause a flow we say a current is flowing, similar to water; but in measuring the rate of flow in the wire we usually use the unit called the ampere. Therefore, the rate of flow of the current in an electrical conductor is expressed as a certain number of amperes.

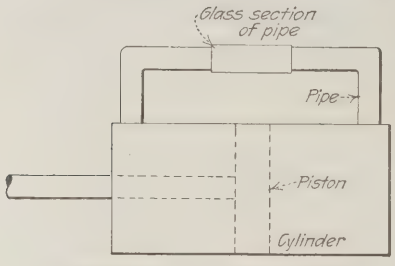
The Difference Between Alternating And Direct Current

THERE are two important different kinds of voltages used around the coal mines, one called direct-current voltage and the other called alternating current voltage. These two terms actually mean that the first named kind of voltage will cause to flow a direct current while the other kind will cause to flow an alternating current.

By direct current we mean current which whenever it is flowing will flow continuously in the same direction in a given wire. This is again similar to a pump line. Whenever a pump is operated, the flow through the column line always is in a direction away from the

pump. With electricity, whenever current flows in the same direction in the wire we are considering, we call it direct current.

In a pumping system the flow of water in the column line always is up or unidirectional, due to the arrangement of the valves, regardless of the direction in which the piston or plunger in the pump may be moved. Such a unidirectional flow is similar to what is termed direct current in electrical language. Moving the piston to and fro in the cylinder shown at left will produce a flow of water which will alternately be moved first in one direction and then in the other, that is, if we look at the water flowing through the glass section of the pipe the flow of water will be alternating from one direction to the other as the piston is moved backward and forward. Such an alternating flow is called alternating current, in electrical language. Note that the motion of the piston creates an alternating pressure and it is necessary to have this alternating pressure to produce an alternating flow of water in the pipe section. Similarly, an alternating voltage is necessary to produce an alternating current.



ILLUSTRATING ALTERNATING CURRENT

Working the piston forward in the cylinder would force the water that was in front of the piston up through the pipe connection and back into the cylinder behind the piston; reversing the stroke would cause the circulation of water to reverse in direction. If the piston were operated to and fro continually, the alternations of the direction of the water through the pipe would give a good example of the flow of alternating current in an electrical conductor. One hundred and twenty such alternations of flow are made each second in a 60-cycle alternating current system.

The Open Delta Connection

WHERE continuity of service is of great importance to an operation it is frequently common practice to install a bank of transformers of excess capacity and connect them in delta. When one transformer burns out or becomes disabled the service may still be maintained by operating the remaining transformers in what is known as "open delta."

The "open-delta" connection is similar to the "delta" connection, previously explained, except that one transformer is left out. This connection is also sometimes called the "V" connection because the delta connection and diagram represents a V when one transformer is omitted.

An important point in considering the "V" connection is that there will be available for load under this connection only 87 per cent of the capacity rating of the transformers, or in case the connection was originally delta the remaining capacity of the bank after one transformer has been eliminated is only 58 per cent of the original capacity. For example, assume each transformer of a delta bank to have a capacity of 50 kva.; the bank will then deliver 150 kva. When two of these same transformers are operating in "open delta" the capacity will be 50 $\times$ 2 $\times$ 87 per cent = 87 kva., the "V" connection capacity; 87 kva. $\div$ 150 = 58 per cent of original capacity.

In localities where repairs cannot be made hurriedly and where the breakdown of a transformer would result in serious consequences this scheme is used. However, to keep down the no-load losses of the transformers where overcapacity is arranged for the extra transformer is left disconnected and the bank operates normally on "open delta." Some means, however, should be made for keeping the spare transformer in good condition and always ready for service. An important factor in this connection is the prevention of moisture getting into the transformer and oil.

Data for Artificial Load by Means of A Liquid Rheostat for Testing

IN RUNNING load tests on new or repaired electrical equipment it is sometimes impossible to use the normal operating load for this purpose because of inability to regulate and control the load properly. In this case recourse must be made to some form of artificial load which can be easily controlled and regulated to suit the requirements of the test. For this purpose there are several methods, some of which are highly efficient and others which dissipate the energy in heat.

In the first class are feed back systems. In this system the machine to be tested usually is operated as a motor and is connected to a generator which is driven by the motor under test; the generator in turn is connected so that it feeds back in the system that drives the motor and thus the power cost of the test is represented by the losses in the two machines.

A more common form of artificial load is the liquid rheostat made up of an electrolyte of either an acid or a salt. The acid electrolyte is frequently a solution of sulphuric acid and the salt electrolyte is commonly made from ordinary table or rock salt and water.

The resistance of ordinary hydrant water per square foot cross section and foot in length is approximately 100 ohms. This is a very high resistance and it is therefore necessary to make an acid or salt solution to reduce it to within a practical range for the test.

The following information will be found useful in making up a solution for a liquid rheostat.

When diluted with commercial sulphuric acid the resistance will be as follows:

Per Cent Acid by Weight	Resistance in Ohms
0.174	4.12
0.435	1.75
0.724	1.10
0.985	0.85

When diluted with commercial table salt the resistance will be as follows:

Per Cent Salt by Weight	Resistance in Ohms
0.23	7.84
0.46	4.65
0.70	3.12
0.93	2.38
1.16	1.90
1.39	1.48

In the barrel-type rheostat where the solution is not agitated and cooled there should be from 600 to 1,000 cu.in. of solution per kilowatt absorbed. The plates of the electrodes should have an area of 1 sq. in. per ampere.

THE MOST SATISFACTORY SUBSTITUTE for coal is spring.—*Associate Editors* (Chicago).

"OUTPUT OF COAL NORMAL"—dispatch. But not the output for coal.—*Norfolk Virginian-Pilot.*

RUHR COAL PRODUCES MORE HEAT than any other fuel of which we know.—*Peoria Transcript.*

Problem of Electric Power Supply for the Coal Mine*

Difficulties in the Way of Adapting Old Plants to New Equipment—Important Economic Considerations in Planning Extensions—Apparent Power Costs and True Power Costs

By A. L. Jones
District Engineer, General Electric Co., Denver, Col.

THE accepted form of power for the coal mines is electric power, and experience has shown us that we are still far distant from the day when further electrification will not be necessary. The executive of a mine which makes its own power is therefore wrestling almost continuously with the problems of his power plant. Either it is overloaded and must be enlarged and rebuilt or its operating costs are excessive, or it breaks down and limits coal output, or someone wants to sell new and improved machinery, until the manager almost hates the thought of such a restless part of his property. If he purchases power, every day a new use for it seems to be found.

In many ways this unrest is due to short-sighted policy toward the problem, and the tendency when the problem of extension has to be met to dispose of it in the cheapest way and without thought as to where the future is leading.

The day when each opening had its own boiler plant, steam hoist, steam driven fans, steam pumps, steam loaders, etc., seems to be far behind us. During the last fifteen years nearly every mine power house has doubled or trebled in capacity, or has been abandoned in favor of purchased power, resulting in greatly reduced labor and fuel costs. Power costs in such isolated plants which were once considered normal would be unthinkable today, in fact probably would cause bankruptcy.

Purchased Power Decreases Cost Per Ton

One property where the main power supply was by compressed air from steam-driven compressors, used under its boilers 8.35 per cent of all the coal mined. The cost of power was 12½c. per ton. Another property having four openings, each with its own boiler plant and usual equipment of steam hoists, pumps, etc., had a power cost of 10.3c. for each ton mined; and these were in the days when the present high prices for coal were not obtainable. Another property operating two mines mostly by steam used 11.1 per cent of the coal output under its own boilers and the power cost was 19.45c. for each ton mined. Each of these properties is now electrified and power costs are from 3 to 4c. per ton mined, and the fuel burned runs from 1 to 2 per cent of the output.

With the broadening market and high prices for slack coal and the high cost of labor in boiler and engine rooms, the cost of steam is reaching a high figure, and efforts must be made to keep this down by a more efficient steam production and by utilizing this steam in improved machinery that will increase the work done by each pound of coal burned. It must not be overlooked either that the plant that is very wasteful of fuel usually is an old one and probably far from being reliable. In a general way the more efficient the plant, the greater its reliability.

Ample and reliable power supply means ability to get out coal when there is a market. The increasing use of purchased power is largely due to changing conditions which are tending constantly to push up the cost of power, unless the most efficient machinery is used and large-scale production is possible. Better load factor and more efficient equipment permit the central station to sell power to mines cheaper than a small plant can produce it—if all the factors of fixed charges are given proper weight.

Frequent Additions to Plant are Costly

Few coal properties start with a full-grown plan of development or with sufficient capital to permit the installation of a power plant much ahead of their immediate requirements and each addition to the plant is only to care for some immediate and pressing requirement. A mine executive might think that this condition of having his power plant always in a state of change is a peculiar condition of his property or his industry, but such is not the case. The public-utility company with power generation its main business recognizes this condition and plans ahead as far as its finances will permit, thus eliminating many of the expensive changes which must be made to a growing mine power plant.

The most important factors in planning any changes in a power house are foresight and confidence that the power plant will subsequently be called upon for a greater output, and it is here that the central-station public utility has a marked advantage.

Assuming an existing power plant consisting of a number of non-condensing steam engines which are proving inadequate for the requirements, what is the best way to enlarge? Before the decision to increase the plant has been reached the margin of safety in spare units probably has been getting smaller and smaller, until during the day shift everything has to be operated. To take full advantage of progress in generating equipment and higher efficiency the new unit should be as big as the combined capacity of the installed engines and enough bigger to provide for the immediate future, the idea being to operate the new unit during the day shift and hold all old units as spares. The new unit naturally would be more economical in its use of steam and if 7,500 kw. or larger, serious consideration would be given to the question of condensing operation, which would use approximately half as much steam as with non-condensing operation, even if this involved the use of a spray pond or cooling tower.

It should also be recognized that the tendency is toward higher steam pressure and superheat and those factors should be incorporated in the new installation.

*Abstract of paper read before Rocky Mountain Coal Mining Institute.

The new equipment should be so located in the power house that the next move, which logically would be to supersede the old engines with still another turbine, would involve no conflicts and the units be so placed that the ultimate goal would be a well laid out power house with ample room both on the turbine floor and around the condensers.

The switchboard for the new turbine should be laid out not to match the old board but with an eye to the future, incorporating modern practice and having ample capacity in oil circuit breakers. The march of progress will wipe out the old board and the standard for the new panels should be raised to that of the future, not lowered to that of the past.

The spray pond would be laid out so that it could be extended as the plant grows, and runs of piping, headers, etc., all laid out to permit making additions in the future with minimum interruption to service. In other words in adding a turbine to the plant one should have in his mind's eye the exact location of still another unit and should make all arrangements accordingly. The practice of placing machinery in any hole that presents itself, without regard to symmetry or correlation with other apparatus, or with no ultimate plan in view, is criminal. Nothing tends to raise the morale of the power-plant operating force more than a well laid out and convenient power house, and high morale means better service, lower costs and high output.

Water Supply an Important Problem

A good supply of condensing water from some stream is the most important consideration in determining the location of the plant and might in many cases justify the location of the power plant miles away from the tipple, involving as this does handling of coal. A spray cooling pond at best is a mighty poor substitute for a running stream. Unfortunately, few coal mines are situated near flowing water and must resort to artificial cooling of the condensing water, so the plant can be located where it will best receive coal and otherwise serve the load. Provision for future growth may show that the existing power plant building is incapable of being extended, in which case the fact must be squarely faced and the first turbine installed on a site and in a building which will permit of the ultimate expansion.

Probably the boilers which supply the original generating equipment are small units, of low-pressure type, in which event it must be remembered from the start that when the plant reaches any considerable size such boilers will have to be superseded by larger units perhaps of different design. The logical working out of the problem would be to install one boiler large enough to supply the first turbine installed, holding the other boilers as spares. This new boiler would be set high and would be so placed that coal- and ash-handling machinery could be provided at a later date with minimum disturbance to service. This boiler, too, would be purchased with the idea that ultimately it would have to operate at much higher pressures. Such a boiler would be twice as high as the old units, and its height, alignment and position should be selected for the future, regardless of how it fits into the present situation. Unfortunately, in most stations tying on to the present layout seems to be the determining factor, regardless of the handicap under which the new equipment may be placed.

The design of a mine power house involves innumerable details, such as selection of jet or surface condensers, type of stoker best suited to the coal to be burned, method of treating feed water, etc. The executive should keep his mind sensitive to the fact that he is not installing one unit only, but is making a start and preparing the ground for future extensions.

The mine power plant operates under a great many handicaps; usually water is scarce and poor, good boiler water frequently having to be hauled or pumped long distances. Poor water in boilers means extremely heavy maintenance, shorter time between cleaning, inability to overload, etc. Cooling water for condensers usually has to be circulated through towers or spray ponds and recooled. While such a cooling device may be used it is at the expense of lower vacuum, scale, high pumping cost and extra cost of equipment.

Mine plants seldom can afford specially trained supervision and the labor obtainable frequently is not the best and is fixed at a high price.

The very existence of a mine plant seems to foster the idea throughout the property that power costs little or nothing and that there is no particular need to conserve it. One property presented a most glaring case of wasted power. This company's problem was to raise a relatively small quantity of water from the mine. A centrifugal pump of many stages was on hand which had been used on much higher head, but rather than get a new pump the runner was turned down so that the motor would not be overloaded, some cable was already installed which was too small, but it was used at the expense of a heavy voltage drop. The steam was made in inadequate boilers and the engines in the power house were practically junk. They drove a jack shaft, which in turn drove back to a generator.

Glaring Waste of Mine-Made Power

Investigation of the efficiency of this pumping showed the situation to be as follows: The engine took 410 b.hp. in steam, 108 hp. was lost between the engine and the terminals of the generator; 65 hp. was lost in the cable, 23½ hp. in the motor, 187 hp. in the pump and 26½ hydraulic hp. of useful work was done—410 hp. in steam to do 26½ hp. of work. This had gone on for years and had caused no comment, because power was thought to be cheap. This is the mine which used 11.1 per cent of its coal output under the boilers. Fortunately, cases as extreme as this are not common. Cheap power is not found around coal mines.

The generation of power is as specialized and distinct a business as that of mining coal, and industry in general is overwhelmingly abandoning its isolated plants and turning to purchased power. In many of the larger coal fields custom power is available and a considerable proportion of coal in such fields is mined by purchased power.

The cost of such power seems high to the mine manager, who may think of his power cost as made up of some slack coal and small payroll, whereas the power company knows all too well that dozens of other factors must be reckoned with, which over a term of years cost real money.

Power may or may not be available to all mining properties, and if it is available the wise executive will look at the long-range and over-all cost of this power, and if he does this he will have more sympathy with the rates charged for custom power.

Any haphazard program of power-plant expansion

costs money and the money stays in the plant, causing the accumulative cost to run into startling figures. All the early equipment is soon practically obsolete, and if not actually thrown out it is worth little more than scrap. The practice of charging 5 to 6 per cent per year for amortization on investment is far too low for a mining property, especially one which develops gradually and where the power plant has to keep pace with an expanding and changing property. Very little equipment for power-house use purchased twenty years ago can compare favorably in efficiency with modern equipment; some of it fell by the wayside in much shorter time than this. It would seem that charging 7 to 8 per cent yearly for the obsolescence of the machinery is not too much.

The public-utility man has the same problem, but with his diversified load and his confidence in future growth he is in a better position to look further ahead, installing larger units, so that his charges on this score, while heavy, are less by a considerable margin than those of the mine plant.

The rate of interest which must be paid on power-plant investment varies from time to time with the money market and the cost of raising this money. The public-utility company with its larger units and better load factor probably has less invested per kilowatt capacity than the mine plant, especially as the spare capacity is available for diversified load, whereas the mine plant naturally requires a larger proportion of idle capacity. Some authorities maintain that it is justifiable to charge against the power plant the profit which money invested in the power plant would have earned if invested in the coal-mining business. This is based on the assumption that there is a limit beyond which the business cannot economically borrow money or beyond which it is not advisable to do so. Few companies would consider an estimated profit of 5 per cent above the interest charges sufficient to undertake the hazard of the business. This may or may not be considered a valid argument. Taxes fall alike on the public utility and on the mine plant. Fixed charges against the mine plant might be taken somewhat as follows: Interest, 7 per cent, taxes and insurance, 2 per cent; amortization, 8 per cent, making a total of 17 per cent.

High Capital Investment in Mine Plant

The amount invested per kilowatt of capacity in the usual mine plant in relatively small units is bound to be high. Almost any mine plant will show an investment of about $150 per kilowatt including boiler plant, building, etc. Then too, this investment is not used to full capacity all the time. In fact few mine plants have as good a load factor as 50 per cent, 33⅓ per cent being nearer the average, and the annual load factor, taking into account idle days, usually is not better than 25 per cent. Load factor in this sense is defined as actual kilowatts produced per month, divided by 720 hours per month, multiplied by maximum 5-minute peak encountered—in other words, the ratio of the actual power produced to that which would have been produced had the plant operated every hour of the month at a rate equivalent to the 5-minute peak encountered.* Over the month or year this represents the use of only 25 per cent of the possibilities of the plant, but the fixed charges, labor charges, etc., are chargeable on the basis of 100 per cent operation.

Taking the fixed charges at 17 per cent and assuming $150 invested in the power plant for each kilowatt output, the fixed charges become

$$\frac{17 \text{ per cent}}{8{,}760 \text{ hours per year}} \times \$150 =$$

0.29c. per kilowatt produced. On the basis of 100 per cent load factor, with actually a 25 per cent annual load factor the charges become 1.16c. for each kilowatt turned out. Investigation of quite a number of situations will show that the fixed charges of a mine power plant will run about 1c. for each kilowatt produced. This must be added to the actual production cost for the true cost of the power. Generation costs in mine plants vary greatly due to the load factor, degree of efficiency, modernity of equipment, character of supervision, etc.

A good size plant having condensing turbines but difficult water conditions had an actual generating cost of 1.37c. per kilowatt-hour. The cost was distributed as follows: Coal, 29½ per cent; labor in boiler and turbine room, 26½ per cent; boiler and stoker maintenance and boiler changing, 24 per cent; water, 20 per cent. Another plant, somewhat larger, and with better water conditions, had a cost of 1.277c., divided as follows: Coal, 52.2 per cent; labor in boiler and turbine room, 27 per cent; boiler and stoker maintenance, 10.8 per cent; water, 10 per cent.

The above were 1916 costs; probably on the basis of today's coal and labor prices they would be double, or 2.74c. and 2.55c. respectively. To these costs should be added about 1c. for fixed charges, bringing the cost to 3.74c. and 3.55c. Modernizing and combining these two plants cut the cost considerably. From these facts we may venture to say that few coal-mining plants can produce power at less than 2c. per kilowatt including fixed charges.

The argument then is that power is not cheaply produced around a coal mine, that purchased power will in many places be a wiser plan than revamping an existing plant or continuing to use an obsolete one. The power companies penalize for poor load factor, but so does the mine power plant, both in operating economy and in fixed charges.

*Basing the load factor on a 5-minute maximum demand is hardly a fair basis, because it would be impractical to operate mine power-plant generating equipment continuously for 720 hours at the 5-minute maximum demand rate. However, intimate contact with thirty coal-mine operations shows that the yearly load-factor is approximately 25 per cent when based on the capacity of the generating equipment.—Editor.

Fill Prospect Drillholes with Concrete

By Carl Scholz
Vice-President and General Manager, Raleigh-Wyoming Coal Co., Charleston, W. Va.

DRILLHOLES put down for prospecting purposes should be filled with concrete as soon as completed to a height of, say, 50 or 60 ft. above the coal. This is of special importance where water occurs in the overlying strata. In developing the Glen Rogers mine a heavy influx of water occurred 450 ft. above the coal, and it readily will be seen that if a roadway were driven under such a borehole without its having been concreted, much material damage might be done.

When the hole is first made its walls are intact and no sediment has filled up the bore, but if the work of concreting is left till later it may not be easy to make so good a job. A borehole is of no further value after the core has been obtained, so nothing is gained by leaving the hole to fill with sediment and to cave, for such a policy will inevitably give trouble.



Problems of Operating Men

Edited by James T. Beard



What Happened to a Pile of Creosoted Timber

Story of an Eye Witness—Pile of Creosoted Mine Timber Fired by Spark from Locomotive—Water Failed to Extinguish Fire

HAVING been a reader of *Coal Age* since its first issue came off the press, more than a decade ago, I feel assured that its editor would not knowingly publish anything if the information conveyed would prove harmful or dangerous to life and property, in mining. It was this thought that has induced me to give the following brief account of an occurrence of which I was an eye witness. The story is in no way exaggerated and I can vouch for its truthfulness.

The incident is recalled to my mind by reading the editorial, "Is Creosoted Timber a Menace?" which appeared in *Coal Age*, Feb. 15, p. 284. The information given in that article tends to show that the creosote treatment of timber does not increase its inflammability. This conclusion is based on the report of a committee appointed by the Missouri, Kansas and Texas R.R. to study the effect of creosoting fence posts, in respect to its effect on their destructibility by fire.

Without questioning the report and conclusions of this committee, as given in the editorial, kindly permit me to recount what I saw take place when a pile of creosoted timber, which had just been delivered at our mine, was fired by a spark from a small locomotive operating on a track in the timber yard.

Story of an Eye Witness

At that time (1910), I was running a mine hoist, at one of the large shaft mines here in Nanticoke. The company had a creosoting plant at one of their other mines and had sent over two flat cars loaded with mine timber that had been treated with creosote. This had been unloaded just outside of the enginehouse door, only that morning.

When I came out in the evening, ready for the night-shift, I observed the small locomotive coming up the track. Just then a signal for lowering men called me to the throttle. The shaft was 700 ft. deep and a single trip of the cage required a minute and a quarter when hoisting and lowering men.

Returning to the doorway, a few moments later, what was my surprise to behold a volume of smoke coming from the pile of timber. Evidently, the fire had caught from a spark or hot coal falling from the engine. Without seeing it, one would hardly believe the volume of dense smoke that was given off from the burning pile. It resembled the discharge from two big locomotives pulling a heavy trip of cars up a mountain grade.

The alarm was quickly given, but water appeared to have no effect to extinguish the fire, which continued to smolder and burn until it had consumed the entire pile. I could not help but think what would have been the result had this timber been sent into the mine and the fire had taken place on the mine road.

The following morning, the mine superintendent was early on hand to view the place. I remarked to him that had the timber been ignited in the mine, not a man or animal inside of the burning section would have been able to escape through the dense volumes of smoke produced by the burning timber. He agreed with me and put himself on record then and there against the use of creosoted timber in the mine.

In closing, allow me to suggest that the use of the cement gun and the coating of mine timbers with "gunite" is of far greater practical value as a preservative of timber and is not a menace to the safety of the mine. I hope this brief account may be of some value in averting disaster.

W. A. Barrett.

Nanticoke, Pa.

Practical Working of Mining Law Requiring Exclusive Use of Locked Safety Lamps

Disputed authority of district inspector referred to Chief of Department of Mines, who appoints other inspectors as committee to investigate and report. Failure to agree then requires submission to Court.

SOME time ago the question was asked in *Coal Age:* "In what respect can our mining laws be improved?" The question did not meet the cordial response that one could hope it would evoke among mining men who read *Coal Age* every week. To my mind the subject is a matter of the gravest importance and should call for earnest thought.

Mining laws should not be like an old fiddle that can be made to play any tune at the will of the operator or mine owner. By way of illustration, let us assume that John Doe and Richard Roe are joint owners of a mine, which they have been operating in the past as an open-light mine.

Somewhat later in the development of the mine the district mine inspector, following one of his visits to the mine, reaches the conclusion that the safe operation of the place depends on the exclusive use of locked safety lamps. Naturally his decision does not meet with favor on the part of the owners, who defy his authority in the matter.

As required by the Bituminous Mine Law of Pennsylvania (Art. 10, sec. 1), the district inspector reports the matter to the Chief of the Department of Mines, and two or three other inspectors are appointed to investigate and report their finding within seven days after their appointment.

In the event that the mine owners still refuse to accept the conclusions of the committee of inspectors, the law allows another seven days in which the owners

are given the right to appeal to the Court of Quarter Sessions of the county. The Court must then appoint five practical, reputable and competent persons, two of whom shall be selected by the owners and two others by the Chief of the Department of Mines and a fifth chosen by the four already named, or by the Court after waiting five days.

A third seven days are allowed, by law, for the formation of this commission, who must examine said mine and report their findings to the Court within ten days. Even then the law provides for the filing of exceptions by the owners or by the Department of Mines within seven days more.

Here, let me ask, What may happen in the mine where dangerous conditions are alleged, and who would be responsible in the event of disaster? Does not the law make the mining staff look like a set of school boys? What does *Coal Age* and its readers think?

Parnassus, Pa. C. W. ATKINS.

Circulation in Safety Lamps

Heating of the gas-charged air within the lamp reduces the pressure in the combustion chamber and increases the velocity of the air entering the lamp.

PERMIT me to correct a misstatement made in the letter of Oscar H. Jones, *Coal Age*, March 22, p. 493, in which he criticizes my theory of the lengthening of the flame of a safety lamp exposed to a firedamp mixture. The misstatement to which I refer grows out of a misconception of the illustration I used to demonstrate my theory.

While seeming to have a clear conception of the theory of the effect of the heating of the air entering a safety lamp, my critic's idea of the conditions on which this theory is based is wrong, and it is this error that I wish to correct. The misconception lies in the difference between the effect of the heating of pure air and air that is charged with gas.

For the same volume of flame, or a given combustion surface, the heating of pure air produces a normal height of flame, in a safety lamp or any other lamp. The lighter methane mixture (firedamp), subjected to the same heating, of course, follows the same natural law. Consequently, there is a reduced pressure within the lamp when the air entering is charged with gas, as compared with the effect of the heating of normal air.

Velocity Increased by Reduced Pressure

Now, it is not my idea that this reduced pressure, in the vicinity of the flame, increases the upward pressure of the air entering the lamp as a fuel supply, as my friend's statement seems to imply; but that the reduced pressure within the lamp increases the velocity of the air entering the lamp when that air is charged with gas. I believe this is strictly in accordance with natural law, the greater the difference of pressure, the more rapid the flow of air resulting.

Exception was taken to my comparing a safety lamp with an ordinary house lamp. While the two lamps are different in construction and use, the principle of ventilation is precisely the same in each, and I used the illustration to demonstrate the fact that the same cause would produce the same effect on the flame, in each lamp, notwithstanding their different construction.

However, the following illustration will serve the same purpose and perhaps be more acceptable. For example, take a safety lamp, burning with an ordinary height of flame in the mine, and carry it into an underground office or shanty where the confined air is at a somewhat higher temperature. Set it on the table and allow it to remain there for a short time.

Heated Atmosphere Causes Lamp to Smoke

Observe the effect produced on the lamp flame now burning in the close heated atmosphere. The flame will soon expand to fill the lamp, soot the gauze and glass and, eventually, will be extinguished by reason of the obstruction of the circulation within the lamp chimney, owing to the deposition of carbon in the chimney, which blocks the discharge of air and gas from the lamp.

Let me ask, What is the cause of the elongation of the flame, in the instance just given, assuming there is a total absence of gas in the air entering the lamp? Is it the "reaching up" of the flame for oxygen, or the forcing up of the flame by the increased velocity of the air supply?

Let me suggest, in closing, if Mr. Jones will try the experiment with the house lamp, which I mentioned in my previous letter and which he objects, he will discover that the flame will become elongated before being extinguished, which was the fact I wished to illustrate.

Washington, D. C. I. C. PARFITT.

ANOTHER LETTER

Practical test shows entry of air through the gauze, as well as through the openings below the flame, in lamps designed on the Eloin principle.

REGARDING the question of whether air ever enters through the gauze chimney, in lamps provided with openings below the flame, permit me to say that the simplest method of deciding this question is to put the lamp to the practical test and observe the results. Nothing is more simple than to show by experiment the flow of the air current entering a lamp and the escape of the products of combustion.

For that purpose, allow me to suggest making this experiment on the surface, and choosing for that purpose any approved safety lamp provided with openings below the glass to admit the air to the combustion chamber. When this experiment is performed in a room on the surface, in broad daylight, and the flame of the lamp adjusted to a height suitable for safe working or for testing for gas, there is no difficulty in observing the circulation of the air currents within the lamp.

In making the test, the lamp should be arranged so that smoke will surround the top of the chimney. When this is done it will be observed that the smoke will enter through the gauze and much of it descend to the flame, while air enters through the lower opening.

Smoke Shows Course of Circulation

In order to observe the discharge of the products of combustion, make another test in which the flame is raised to such a height that it smokes. The course of the ascending current is then shown by the smoke rising until it is discharged at the top of the lamp. Of course, when the test is made in the mine the gas-charged air burning in the lamp raises the temperature and greatly increases the volume of the products of combustion given off from the lamp.

In closing, I may state that, in 1912, two mine ex-

plosions occurred in this country that were attributed to modern double-gauze lamps burning naphtha. In one of these explosions, twelve lives were lost. It was stated that the lamp that failed was not properly assembled, the gasket over the glass cylinder having been found to be doubled, causing the lamp to leak at that point.

A second accident in which several men were burned was said to have resulted from the puller rod, which operates the striker when igniting the lamp, having been left out. I mention these incidents as showing that in each of these cases the firedamp mixture entered at the bottom of the lamp. FRANK PATTERSON.

Eldorado, Ill.

Inquiries Of General Interest

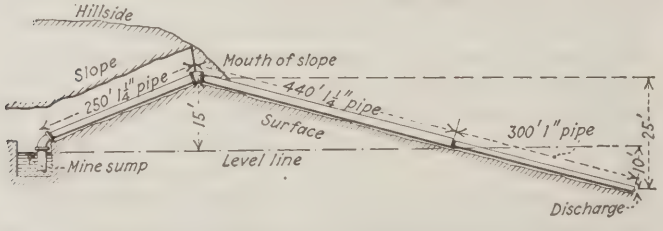
Siphon Problem in Mine Drainage

Flow of Water from Supply Basin Summit Must Equal Flow in Entire Length of Pipe Line, to Insure Continuous Operation of the Siphon

HAVING been an interested reader of *Coal Age*, for several years, and a student of the many practical problems answered in its columns, I take the liberty of asking the solution of a proposition regarding the siphoning of water in a mine. It is as follows:

We are operating a small coal mine that has been opened on a slope. The slope is 250 ft. long and falls, in that distance, 15 or 18 ft. At the foot of the slope we have arranged a sump to catch the water coming from the mine. We attempted to siphon this water out of the mine by laying a 1¼-in. pipe line up the slope and extending it down the hillside, on the surface, to a point considerably below the level of the water in the basin, in the mine.

As shown in the sketch I am sending, there are 250 ft. of 1¼-in. pipe, in the slope, in the mine, and 440 ft.



SHOWING PROFILE OF SIPHON PIPE LINE

of the same size pipe continued on the surface. Then follows 300 ft. of 1-in. pipe, making the entire length of the pipe line 990 ft.

The result is not satisfactory, as the flow through the pipe line is not sufficient to drain the sump, which overflows at times and then baling must be done and the water hauled out of the mine in a water car. The question I want to ask is, Should the smaller 1-in. pipe have been used on the suction end, instead of at the discharge end? Would making this change increase the flow of water in the siphon? D. L. REITZ.

Cairnbrook, Pa.

When using two sizes of pipe, in siphoning, the smaller pipe should always be laid at the discharge end, as in this case. The flow of water in the siphon would not be increased but rather decreased by making the change suggested by this correspondent.

We have made a few calculations to ascertain the probable flow in the pipe line, under the conditions shown in the accompanying figure, which represents the sketch offered by the correspondent, except that we have assumed the total fall, from the crown or summit of the siphon, at the mine entrance, to the point of discharge on the surface as, say 25 ft. Also, as indicated in the figure, we have taken the rise from the water level in the sump in the mine to the crown or summit as 15 ft. This makes the total assumed effective head producing the flow of water in the entire line of pipe 25 — 15 = 10 ft. Then, calling the respective diameters of the two sizes of pipe d_1 and d_2, the respective lengths l_1 and l_2, the effective head, in feet, H, and the flow of water, in gallons per minute, G, the flow of water in the pipe line is given by the formula,

$$G = \sqrt{\frac{800\,H\,(d_1 d_2)^5}{l_1 d_2^5 + l_2 d_1^5}}$$

Then, substituting the given values in this formula, we have for the required flow of water in the pipe, under the assumed conditions,

$$G = \sqrt{\frac{800 \times 10(1 \times 1\tfrac{1}{4})^5}{690 \times 1^5 + 300(1\tfrac{1}{4})^5}} = 3.9 \textit{ gal. per min.}$$

It is never safe to stop here and not ascertain whether the flow of water under the atmospheric head (34 ft., sea level), in the suction pipe, will be equal to or greater than the estimated flow for the entire pipe line, under the effective head (10 ft.). If the flow in the suction end should be less than the estimated flow in the pipe line, the siphon will tend to empty itself in a short time.

The rise on the suction end, in this case, being 15 ft., the effective head producing the flow of water in the suction end, under atmospheric pressure, is 34 — 15 = 19 ft. The length of the suction pipe being 250 ft. and its diameter 1¼ in., the flow of water from the sump to the crown or summit of the siphon is given by the formula,

$$G = \sqrt{\frac{800(34 - h)d^5}{l}} = \sqrt{\frac{800 \times 19(1\tfrac{1}{4})^5}{250}}$$

$$= 13.6 \textit{ gal per min.}$$

This shows that the flow in this pipe line will be continuous, since the flow in the suction end is greater than that in the discharge end of the pipe. These calculations are based on a total fall of 25 ft. from the summit to the discharge end of the pipe. The flow in the pipe line would be much increased by using 1¼-in. pipe throughout, as the small 1-in. pipe, at the discharge end, obstructs the flow. In that case, it might be necessary, however, to use 1½-in. pipe on the suction end, in order to prevent the siphon from emptying itself under the assumed conditions.

[A correspondent whose name is not attached to his letter, writing from Duquoin, Ill., asks: "If it is 8 ft. to the coal, which is 7 ft. thick and so situated that water will drain to the first opening, what kind of a siphon would be most practical to drain the mine?"

This is only a sample of many communications that come to *Coal Age*, in the expectation that an answer will be given, when the necessary data are lacking and there is nothing to show from whom the communication comes.

Another correspondent writing from Hawk Run, Pa., asks for "A little information on how to find the revolution of a fan that produced 30,000 cu.ft. of air. What is the horsepower, also the water gage?" We amplified this question to give an intelligent reply and explained (*Coal Age*, April 5, p. 570) that the speed of a fan, for a given air volume, depends on the water gage against which the fan must operate, as the same fan, running the the same speed will produce different quantities of air at different mines having different resisting powers (potentials).—EDITOR.]

Examination Questions Answered

Mine Managers' Examination, Springfield, Ill., Mar. 19, 1923

(Selected Questions)

QUESTION—*What precautions should be taken in blasting, to safeguard employees in mines that are dry and dusty and generate explosive gas?*

ANSWER—Only permissible explosives should be used in such mines. Where the miners are permitted to charge and fire their own shots, all holes should be examined by a competent person, and no hole should be charged or fired until it has been so examined and permission granted. Before the firing of a shot, the place should be examined for gas, such examination to be made by the mine examiner (fireboss), using an approved type of safety lamp for the purpose. In many cases, it will be safer to employ shotfirers to charge and fire all holes drilled by the miners and deemed safe in the judgment of the shotfirer. This work should be done after the men have left the mine for the day.

QUESTION—*In what season of the year and why are dangers from coal dust to be expected, and to what extent would you allow coal dust to accumulate or to be deposited before considering it dangerous?*

ANSWER—The danger from coal dust is greater in the winter season, for two reasons. First, the air current enters the mine at a temperature generally below that of the mine workings. In passing through the mine its temperature is raised and its capacity for absorbing moisture greatly increased. The moisture thus absorbed by the air current renders the mine dry and dusty and this action is greater in the winter than in the summer season. Second, owing to the increased demand for coal in the winter time, mine activities are increased and larger quantities of dust are produced in the mine workings.

No undue accumulations of dust should be permitted and every practicable effort should be made to prevent the deposition of dust on the timbers and walls in the mine passages and working places. Such accumulations of dust as cannot be avoided should be considered dangerous when the air current carries an appreciable amount of fine dust in suspension.

QUESTION—*What changes are met with in coal, roof and bottom when approaching faults and what dangers may be expected therefrom?*

ANSWER—In driving openings in proximity to faults, a good roof will often become dangerous from the presence of slips or fractures in the strata that make the extraction of the coal hazardous. The coal itself may be more friable and tender. Water or gas will often appear in increased quantities in proximity to a fault. The coal may thin out, the bottom rising or the roof bearing downward and almost squeezing out the coal. At other times, the coal seam is sheared off in a plane with little or no thinning out of the seam.

The dangers that attend the mining of coal, under these conditions, arise from the treacherous character of the roof and the presence of gas in increased quantity in places where open lights have been used and no warning has been given to employ safety lamps instead.

QUESTION—*What would be the horsepower on the air when 120,000 cu.ft. of air is passing per minute, under a water gage of 2.2 in.?*

ANSWER—A water gage of 2.2 in. corresponds to a pressure of $2.2 \times 5.2 = 11.44$ lb. per sq.ft. The horsepower on the air is then

$$H = (120{,}000 \times 11.44) \div 33{,}000 = 41.6 \text{ hp.}$$

QUESTION—*Would you recommend a fan or furnace for a new shaft mine 500 ft. deep? Give reasons for your recommendation.*

ANSWER—Assuming the mine is generating no gas, it will often be advisable to employ furnace ventilation, in the early development of the seam. The depth of a 500-ft. shaft will give a good air column and furnish ample ventilation in the mine, for a considerable time to come. However, in the later development of the mine, the safest plan will be to install a good ventilating fan and abolish the furnace. This is all the more important, because it is not known at what time the workings may generate gas; and furnace ventilation would be extremely dangerous in that event. Furnace ventilation can never be recommended if the seam generates gas, in *any* quantity, on being opened and its development started.

QUESTION—*What precautions are necessary in order to maintain a good current of air throughout the entire workings of a mine?*

ANSWER—First, equip the mine with a good ventilating fan capable of supplying the required quantity of air, against a specified water gage. Adopt a good plan of ventilation in which the main air current is divided one or more times, so as to provide a volume of air in each district of the mine that will comply with the mining law and keep the working places clear of gas. Keep all airways clear of obstructions and make all crosscuts and breakthroughs of equal cross-section with the airways. Erect the necessary doors, air bridges and stoppings to conduct the air forward and build brattices wherever required to make the air sweep the working face. All stoppings must be built in a substantial manner to prevent the leakage of air and special brattices must be provided to enable the current to sweep all falls and void places in the mine.

QUESTION—*What measures would you take to secure the best possible results from a fan, the capacity of which is limited and the demands on which approach dangerously close to that limit?*

ANSWER—Make every effort to reduce the mine resistance, by splitting the air current wherever its velocity will permit and good results are to be obtained; shorten the distance of air travel wherever practicable; clean up all airways, enlarge breakthroughs and remove every obstruction to the free passage of the air.

Says Herrin Acquittals Were Really Verdicts of Guilty Against Union

In a brief detailing the facts of the Herrin massacre and the two trials which failed to convict anyone for the twenty murders, counsel for the Bituminous Operators' Special Committee charged before the U. S. Coal Commission on May 17 "that the verdicts of acquittal for the individual defendants were in reality verdicts of guilty against the United Mine Workers of America."

The document charges, throughout, that the United Mine Workers, as an organization, planned and executed the crimes and by terrorism and the use of a special check-off tax approximating $900,000, together with community intimidation, prevented the guilty from being brought to justice. The entire affair, according to the brief, was in pursuance of "an avowed purpose of preventing any person not a member of the United Mine Workers of America from mining a ton of coal" during strike by the union and was designed to help starve the public into tolerating submission to the union's strike demands.

"What took place in Herrin was the logical and inevitable result of the establishment of this Mine Workers super-government in an American state. Such a result will inevitably follow its establishment in any other state just as soon as the aims and purposes of the super-government run afoul of the laws of that state."

Illinois Operators Oppose Severance Tax On Coal as Inequitable

The old, old battle is on in Illinois. Somebody is always trying to get the Legislature to levy a tax on coal at the mines to provide money for something. This year it is the state teachers' association asking that coal be taxed 8c. a ton. At a hearing in Chicago last week before the legislative committee the operators declared the tax would cut Illinois producers out of a good deal of business and would be unjust unless it applied uniformly over the whole country. The teachers' bill also would tax fluorspar $1 a ton and oil 5c. a barrel, and would be calculated to raise about $7,000,000 a year, which the teachers hope would be used to raise teachers' salaries and add to the income of state educational institutions.

A. J. Moorshead, president and general manager of the Madison Coal Corporation, said a severance tax would be inequitable as between Middle Western states' coal competition. Herman C. Perry, secretary of the Fifth and Ninth District Operators' Association estimated that a tax of even as much as 5c. a ton would reduce the Illinois output by 10,000,000 tons because very often a 5c. margin is enough to make or lose a sale. Thus, he argued, the tax would further reduce miners' working time and would work hardships in various places to counterbalance whatever benefits the school funds of the state would get. "You might as well tax bread as coal," he ended.

Dr. F. C. Honnold, of the Honnold Coal Bureau, of Chicago, said Illinois producers are already under a freight-rate and other handicaps in meeting competition from coals of surrounding states, including Kentucky, and that the addition of any further burden on Illinois coal would be hard to bear. He reminded the committee that the U. S. Coal Commission has asked that state legislatures defer action on coal legislation until the commission gets through its work. He revealed that Illinois operators already have spent $1,500,000 collecting data for the commission and hopes that nothing will happen to upset conditions in Illinois while the commission is making its investigation.

Says Autocratic Clique Runs Miners' Union

Most of the evils that afflict the anthracite industry could be eliminated "if the voice of the great majority of the rank and file of the miners can make itself felt through a more democratic management of the union," says a brief filed May 15 with the U. S. Coal Commission on behalf of the anthracite operators. The recommendation is made that "it should be unlawful to engage even in a general suspension, except after a two-thirds vote taken by secret ballot at the collieries under the supervision of the Department of Labor or some other public official."

The statement continues: "The United Mine Workers of America is not functioning fairly or democratically, either in respect to the public, the operators, or its own members. Union meetings usually are attended by only a small percentage of the total union membership, and this small attendance does not ordinarily include the most stable and steady miners, thus leaving the administration of union affairs with the more militant and noisy minority. The conduct of the meetings is such that freedom of expression and freedom to vote as one pleases are frequently denied those who desire to speak or vote against the less conservative clique or ring which manages the organization. . . .

"The result of these conditions, recognized and encouraged by the union constitution, is the autocratic conduct of union affairs by a small minority of the membership with a few union bosses."

Begin Hearings on Railroad Efficiency

The Interstate Commerce Commission began hearings May 16 on Docket 14556—Efficiency and economy of management of common carriers. A. H. Smith, president of the New York Central Lines, was the first to testify. His testimony was more or less of a historical nature, containing much statistics as to operation, net return on investment and other items.

Mr. Smith pointed out in his statement that in the decade 1910-1920 there was an increase of 157 per cent in the number of bituminous coal mines, while the increase in production was only 37 per cent.

He strongly advocated consolidation with the New York Central of the Ohio Central line, stating that it would enable the New York Central to compete better in service with other lines serving the smokeless coal fields of West Virginia, and also would help to stabilize the rate of return.

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of April*

(In Net Tons)

Ports	Railroads	1923 Cargo	1923 Fuel	1923 Total	1922 Cargo	1922 Fuel	1922 Total	1921 Cargo	1921 Fuel	1921 Total
Toledo	Hocking Valley	112,013	3,622	115,635	202,729	5,824	208,553	253,024	6,610	259,634
	N. Y. C.-Ohio Central Lines	57,039	1,609	58,648	.....	.....	.....	47,754	1,408	49,162
	Baltimore & Ohio	83,308	2,334	85,642	251,346	4,567	255,913	106,530	2,537	109,067
Sandusky	Pennsylvania	84,589	2,271	86,860	176,364	4,883	181,247	32,552	1,109	33,661
Huron	Wheeling & Lake Erie	54,546	2,190	56,736	7,612	334	7,946	133,374	3,634	137,008
Lorain	Baltimore & Ohio	126,999	10,901	137,900	17,820	2,835	20,655	175,517	9,242	184,759
Cleveland	Pennsylvania	96,309	3,824	100,133	43,358	5,624	48,982	159,472	8,040	167,512
	Erie	74,251	4,602	78,853	.....	.....	.....	24,983	1,564	26,547
Fairport	Baltimore & Ohio	22,392	858	23,250	.....	.....	.....	.....	.....	.....
Ashtabula	New York Central	208,511	7,192	215,703	31,083	2,792	33,875	108,633	4,755	113,388
	Pennsylvania	29,444	902	30,346	28,342	1,688	30,030	97,831	4,017	101,848
Conneaut	Bessemer & Lake Erie	137,381	3,730	141,111	22,152	.....	22,152	40,393	292	40,685
Erie	Pennsylvania	18,292	3,440	21,732	21,835	3,65	25,200	62,709	3,180	65,889
Totals		1,105,074	47,475	1,152,549	802,641	31,912	834,553	1,242,772	46,388	1,289,160

*Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, manager.

C. E. Maurer Assails Assigned-Car Practice Before Railway Fuel Convention

The fifteenth annual meeting of the International Railway Fuel Association in Cleveland this week had several addresses and papers of particular interest to coal men. George Cushing presented a paper on the "Classification of Coals" in which he argued, if he did not demonstrate, that coals cannot be classified. C. E. Maurer, president of the Glens Run Coal Co., told the railroaders comprising the audience what havoc assigned cars play with the soft-coal industry. The delegates were scheduled to a welcome from T. K. Maher, the veteran Cleveland coal operator, and R. F. Grant, of M. A. Hanna, extended the welcome of the city.

The following is an abstract of Mr. Maurer's address:

"It does not require a salesman to make a fuel contract with a railroad at the present time. It requires the service of a shrewd purchaser. The coal salesman does not approach the purchasing agent of a railway company to sell the product of his mines. He comes to buy railway equipment with which to operate his properties. His aim is not so much to sell his commodity at a profit but to barter his coal for open-top cars.

"I used the term barter. The system could be designated by a more vicious and better descriptive term were it not for the fact that this system has been quasi legalized by the Interstate Commerce Commission, one of the many super-government bodies created, that assume the authority not only to execute, make, suspend and construe federal and state statutes but the highest law of the land, the Constitution itself.

"Railroads were given certain rights not enjoyed by individuals. They can, when necessary, confiscate not only private real estate but private personal property. They can dissect the old home farm or destroy the city mansion, because private interests must be submerged to the public good. In return, however, they are supposed at least to be operated for the public benefit. They are legally forbidden to discriminate between shippers and passengers: to make no distinction between the strong and the weak: to give the same consideration to the corporations with thousands as those with millions: and finally to provide—not trade—equipment for all who might desire service.

"Today the railroads in the great coal-producing states, in so far as the coal itself is concerned are operated (1) for the benefit of those who are willing to barter their fuel for equipment; (2) for those who are sufficiently fortunate as to own their own private railway cars, and lastly, the public gets what is left of motive power and open-top equipment.

"This condition exists because the Interstate Commerce Commission has so ordered. The railroads are only carrying out its orders. If I should dare to criticize them, it would only be for the part they have taken in helping to bring about this situation. While rightly decrying government interference and charging many of their ills to their inability to conduct their own affairs, they have not hesitated to solicit that same interference, when some temporary advantage might be gained thereby.

"The great transportation systems, combined with an abundance of cheap fuel, are the foundations upon which our national wealth and progress are built. We owe our enviable position among the earth's great powers to these more than all else combined. Yet each has been made the vehicle upon which designing politicians have attempted to ride into popular esteem.

"The interests of both are mutual. The coal mines with their thousands of acres of unmined coal are the railroads' greatest asset. While time and conditions may vary, neither the location of the coal nor the mines can be changed and years hence in a constant stream will furnish an almost fixed annual revenue, not only to the railroads of the coal fields proper but to all their connections.

"At the same time the railroads are necessary to the coal. To a great extent the values of coal properties are measured by the transportation system to which they are tributary. Bankrupt railroads mean valueless coal mines. It would seem, under the circumstances, that instead of antagonizing each other, these great industries, upon which the public is so absolutely dependent, could find some common ground upon which they could unite that in the end the public might well be served. If they cannot reconcile their differences they only invite others much less qualified and ever willing to assume the task.

"The burden is primarily ours. We may for a time rely upon some temporary advantage either may have gained by doubtful legal decisions of commissions or otherwise. In the end, however, if the public suffers thereby, drastic means will be found to correct these evils.

"The present car-distribution rules for coal mines, if not revised by the Interstate Commerce Commission by and with the consent of the railroads, will be corrected by federal enactment, in no uncertain terms. The attempt was made in the Esch-Cummins Law, one paragraph of which, referring exclusively to distribution of cars at coal mines, provided that all cars placed at coal mines should be counted and charged against the mines receiving them.

"This part of the law, however, has been made a parody of by the Interstate Commerce Commission. A statute intended to prevent has been construed to license discrimination. I presume that the railroads are still counting and charging against certain coal mines the cars furnished to keep them in continuous operation since the enactment of the law. This duty at least was imposed upon them.

Counter Charges of Operators and Roads

"The coal operators of the country during the last year have correctly charged their inability to furnish coal to the public to lack of railroad equipment. The railroads in reply have submitted reports showing that the coal mines were supplied with from 50 to 70 per cent of their capacity requirements. I have no cause to doubt the correctness of these reports. At the same time I do know that they were not only misleading but absolutely incorrect in so far as the great coal-consuming public were concerned. Had anything like even a 50-per cent car supply been equally distributed to all the mines there would have been an abundance of coal for all.

"The distribution was not equal, however. The mines enjoying railroad fuel contracts were first supplied with equipment. Mines having contracts with or owned by individuals or corporations able to control their own cars were next supplied. And lastly the mines supplying the general public were given the balance, if any existed, of motive power and equipment with which they might operate.

"In so far as I know, this small balance was not only equally distributed but the cars were carefully counted and charged against the mines receiving them. As a result the public has paid the bill, and will continue to pay as long as the practice is continued.

"You can easily understand what this system means to the coal mines that can only operate from one to two days per week, while adjoining properties are operated continuously. Men cannot be held; their entire organization is destroyed; their output when able to operate is cut down and their costs doubled.

"The system works untold hardships on the employees of the mines on whom we are dependent for our fuel. Homes cannot exist nor can children be clothed when the heads of the families find employment but from one to two days per week. Do you wonder that they clamor for more wages? I have no hesitancy in saying that the miners fortunate enough to be employed at the mines enjoying these special privileges where work is constant are overpaid. I am just as certain, however, that no reduction in wages will come until the railroads find a way, through car distribution, to give them equal employment.

"The men upon whom the public is dependent for its heat

and power and every comfort are entitled to at least a fair livelihood. Any method of distribution of the equipment of the public-service corporations upon which they must rely that prevents their equally sharing therein will be paid for in full by those who must use the product of their toil.

"For the time being the railroads may operate their motive power to haul private equipment while their own lies idle on sidings. They may furnish cars to run certain mines six days per week and others less than two. They may provide the means whereby a few miners may have continuous employment while thousands are deprived of an opportunity to earn an honest livelihood. They may make one corporation's coal mines valuable and its neighbor's valueless. They may make cheap fuel for the favored few and expensive fuel for the countless balance, but the situation existing during the last year and at the present time cannot continue for long.

"It must be apparent to every man connected with the coal roads that not only the coal operators and the miners but the general public are being deprived of their legal and equitable share of transportation; that were there no legal obligation on their part to serve all equally, their sense of equity and justice for which they appeal for themselves and their interests, would lead them to give the same consideration to others dependent on them without waiting for a higher authority to intervene.

"A short time ago an able address was made by one of the leading Railroad Presidents before one of our Civic Bodies. He laid particular stress upon the fact that transportation companies should not be required to own sufficient rolling stock and equipment to carry the peak loads that only came periodically and be charged with this surplus when conditions were normal. No one can challenge his position. Had he only added 'but when the peak load is on, this equipment must be equally distributed without fear or favor or among classified necessary industries.' No more could have been desired.

"You are the men in a position to determine whether this present method is necessary to your department; to judge if it tends to improve the relationship between the great coal-producing interests and the coal-carrying railroads.

"There is a more equitable and a better way. The cost of the production of coal is known. All the mines on your lines of railroad are your natural assets. Nothing would better tend to increase the friendly relation between their owners and yourselves than to meet these men, not part but by all, either directly or through their representatives. Meet them with your executives and the heads of your managing departments. Discuss with them the value and cost of the fuel which they produce. Fix a price for your fuel that will render to them at least a reasonable return for the product of their mines, and then give every man an equal opportunity, providing he is so situated as not to inconvenience you, to furnish you his proportion of your fuel requirements based upon what his mines are able to produce.

"Give them to understand that in consideration of their furnishing you fuel at a reasonable price, all cars upon your lines will be distributed equally among all the mines, and you will have done more to establish a feeling of good will between these men and your railroads than anything that I can suggest. Not only among them, but you will have given all the employees at the mines along your lines of railroad an equal opportunity of earning a livelihood, and will have placed the public and all dependent upon you for coal in an equal position with yourselves."

SPEAKERS' BUREAU OF SPECIAL COMMITTEE ANNOUNCES COAL TALKS.—Addresses on the coal problem from the operators' standpoint have been booked by the speakers' bureau of the Bituminous Operators' Special Committee as follows: Kansas Bankers' Association, Hutchinson, May 24; Engineers' Club, Philadelphia, June 12; Michigan Bankers' Association, Detroit, June 18; National Association of Building Owners and Managers, Atlantic City, June 18. Invitations for speakers to represent the bituminous industry have been received from the following: Rotary Club of Cleveland; Mercator Club of Columbus; Kiwanis Club of Chicago; Exchange Club of Toledo; and the Jersey City Lodge, Foresters of America.

Forty-nine Companies Submit Bids on Coal for Government Fuel Yards

Forty-nine companies submitted bids to the U. S. Bureau of Mines for furnishing 200,000 tons, more or less, of bituminous coal to the Government Fuel Yards for the use of government departments during the period from June 1, 1923, to March 31, 1924. Offers were opened May 15 and details made public May 16. Of the total amount, 170,500 tons was on New River run-of-mine; 25,000 tons of Maryland, Pennsylvania or Northern West Virginia run-of-mine; 4,750 tons of New River nut and slack and 1,600 tons of gas coal. All quotations are on a gross ton basis, f.o.b. mines.

The following bids were submitted on Maryland, Pennsylvania and Northern West Virginia coal, run-of-mine: Rhodes Fuel Co., Uniontown, Pa., 5 cars daily, $2.75 per ton; Mostoller Coal Agency, Somerset, Pa., 20,000 tons at $2.25 per ton; Patton Coal Co., Fairmont, W. Va., 21,000 tons at $2.91 per ton; D. E. Williams & Co., Philadelphia, Pa., 40,000 tons at $3 per ton; Lynah & Read, Baltimore, 45,000 tons at $3.06 to Oct. 1, 1923, and $3.79, Oct. 1, 1923 to March 31, 1924; Madeira, Hill & Co., Philadelphia, Pa., 25,000 tons, $3.24 per ton to Oct. 1, 1923, and $3.64 per ton, Oct. 1, 1923, to March 31, 1924; D. E. Williams & Co., Philadelphia, 30,000 tons, $3.25 per ton; Lynah & Reed, Baltimore, 10,000 tons, $3.25 per ton; Lynah & Reed, Baltimore, 12,000 tons, $3.28 per ton to Oct. 1 1923 and $3.51, Oct. 1, 1923 to March 31, 1924; Matlack Coal & Iron Co., New York, N. Y., 50,000 tons, $3.34 per ton; Fidelity Coal Mining Co., Philadelphia, 21,000 tons, $3.34 per ton; Equitable Fuel Co., Baltimore, 5,000 tons, $3.35 per ton; Dexter & Carpenter, Inc., New York, 21,000 tons, $3.36 per ton, W. A. Merrill Sons & Co., Philadelphia, 21,000 tons, $3.36 per ton; Piedmont & Georges Creek Coal Co., Frostburg, Md., 75,000 tons, $3.36 per ton; Quemahoning Coal Co., Somerset, Pa., 60,000 tons, $3.36 per ton; Equitable Fuel Co., Baltimore, 50,000 tons, $3.42 per ton; Emmons Coal Mining Co., New York, 25,000 tons, $3.44 per ton; Maryland Coal & Coke Co., Philadelphia, 30,000 tons, $3.53 per ton; Davis Coal & Coke Co., Baltimore, 53.662 tons at $3.53 to Oct. 1, 1923, and 96,588 tons at $3.89 per ton, Oct. 1, 1923, to March 31, 1924; Ridge Hill Products Co., Philadelphia, 21,000 tons at $3.58 per ton; Equitable Fuel Co., Baltimore, Md., 5,000 tons, $3.63 per ton; Commercial Coal Mining Co., Philadelphia, 25,000 to 30,000 tons, $3.64 per ton; Brothers Valley Coal Co., New York, 50,000 tons, $3.64 per ton; D. E. Williams & Co., Philadelphia, 30,000 tons, $3.64 per ton; W. A. Marshall & Co., New York, 70,000 tons, $3.64 per ton; A. H. Powell & Co., Baltimore, 21,000 tons, $3.70 per ton; Price-Ryan Coal Co., Baltimore, 25,000 tons, $3.80 per ton; Quemahoning Coal Co., Somerset, Pa., 25,000 tons, $3.81 per ton; Pennsylvania Coal & Coke Corp., New York, 50,000 tons, $3.92 per ton; Dexter & Carpenter, Inc., New York, 21,000 tons, $4.06 per ton; Piedmont & Georges Creek Coal Co., Frostburg, Md., 60,000 tons, $4.20 per ton; Coleman & Company, Philadelphia, 10,000 tons, $4.20 per ton; W. H. Bradfort & Co., Inc., Philadelphia, 10,000 tons, $4.20 per ton; Eastern Fuel Co., Pittsburgh, Pa., 21,000 tons, $4.76 per ton; Equitable Fuel Co., Baltimore, 10,000 tons, $4.93 per ton; Consolidation Coal Co., Baltimore, Md., 4.000 tons, $7.30 along side dock.

The following bids were submitted on New River Coal, run-of-mine: Chesapeake & Potomac Fuel Co., Washington, D. C., 15,000 tons, $4.30 per ton; Equitable Fuel Co., Baltimore, 50,000 tons, $4.31 per ton; Fayette Smokeless Fuel Co., Mt. Hope, W. Va., 50,000 tons, $4.48 per ton; White Oak Coal Co., McDonald W. Va., 60,000 tons, $4.48 per ton; C. G. Blake Co., Cincinnati, Ohio, 5,000 tons monthly, price to be determined each month.

Nut and slack: White Oak Coal Co., McDonald, W. Va., 4,750 tons, $4.368 per ton; Maryland Coal & Coke Co., Philadelphia, 20,000 tons, $4.48 per ton.

Gas coal: Equitable Fuel Co., Baltimore, 1,600 tons, $2.74 per ton; Price-Ryan Coal Co., Baltimore, 1,600 tons, $2.97 per ton; Consolidation Coal Co., Baltimore, 1,600 tons, $3.08 per ton; Patton Coal Co., Fairmont, W. Va., 1,600 tons, $3.14 per ton; Matlack Coal & Iron Co., New York, 1,600 tons, $3.90 per ton.

National Chamber of Commerce Urges Consumers to Buy and Store Coal

Consumers are urged to purchase and store coal "as a matter of insurance, as a help in the transportation difficulty, and in order to assist in stabilizing the working time of the miners" by the Natural Resources Production Department of the Chamber of Commerce of the United States, of which W. DuB. Brookings, is manager, and C. T. Starr, chief of the Coal Bureau.

The bulletin issued by the development discusses the coal situation as of May 1 and declares that it is difficult to understand the apathy of the consumer in holding back his purchases in the light of past experience and in view of the present demand on transportation, including the car shortage, which shortage is expected to be accentuated by the usual heavy movement next autumn.

FRENCH AIMS IN THE RUHR would seem on the whole to be pretty good, if we are to judge from the way they have hit the mark.—*Manila Bulletin.*

A CANDIDATE NOWADAYS is a man who stands for what he thinks the people will fall for.—*Princeton Tiger.*

Louisville & Nashville Lease of C. C. & O. Insures Outlet to Sea for Eastern Kentucky Coal

The Louisville & Nashville R.R. has obtained a lease for 999 years of the Carolina, Clinchfield & Ohio R.R., according to an announcement on May 16 by W. L. Mapother, president of the L. & N. As the C. C. & O. forms a belt through the coal fields of West Virginia, Tennessee and North Carolina, and links up with direct connections with tidewater at Charleston, the lease is expected to play an important part in the development of coal fields in eastern Kentucky. The Atlantic Coast Line, it is understood, will be a joint lessee with the L. & N. and will assist in the financing.

It is the intention of the L. & N. at once to spend many millions of dollars in connecting trackage in eastern Kentucky. This will link up all the lines of the L. & N. with those of the C. C. & O. It will give eastern Kentucky coal an outlet to the sea and will at once develop thousands of acres of coal land which, it had been thought, might be idle and unproductive for a quarter of a century.

Not only will the main system of the L. & N. be extended to line up with the new property but scores of small lines will be built, radiating out through the undeveloped coal lands of southeastern Kentucky and Tennessee.

A meeting of the directors of the L. & N. has been called for New York for May 23. After the contract is approved the consent of the L. & N. stockholders will be obtained and then the Interstate Commerce Commission must act. As the Carolina, Clinchfield & Ohio is not a competing system no objection is expected from that quarter.

"The acquisition of the C., C. & O. by the L. & N. is one of the greatest things that has ever happened in the development of eastern Kentucky," is the comment of R. C. Tway, of the Tway Coal Co., which has large properties on the L. & N. near Harlan, Ky. "It means that the hundreds of coal operators along the lines of the L. & N., for the first time, have an outlet to tidewater.

"At present we are shut out of all Atlantic seaboard business because of the impossibility of getting rates that will enable us to sell coal in competition with operators from other districts. When we have an outlet over the line of the C., C. & O. to Charleston, we can sell coal on the coastwise trade at all ports from New England and Florida. We all will share in the gigantic coal business of New York City, Philadelphia and all the other great cities of the East.

"One of our greatest handicaps for some years has been traffic congestion. Our coal has to leave Kentucky through the gateways of Cincinnati and Louisville. These outlets have been so choked with coal traffic that it has greatly handicapped production. Not only that, but the coal from the Harlan fields has had to go through a single track neck of the L. & N., leading northward to Corbin. That has been the cause of much loss of business though the inability to operate when cars could not move."

George Otis Smith Outlines Matters That Coal Commission Is Asked to Consider

At a meeting of the New York section of the Mining and Metallurgical Society held at the Harvard Club in New York City, May 16, George Otis Smith, now of the U. S. Coal Commission, was the principal speaker, W. Y. Westervelt presiding.

In the course of his remarks Mr. Smith stated that the commission had, at least, the merit of being a sort of rough cross-section of the American people. One of the propositions presented to the commission was to advocate that a curb be placed on the excessive development of coal areas which could be operated profitably only by the granting of excessively low freight rates considered on a per-ton mile basis. He said that the Pittsburgh coal operators complained that their shipments to the Great Lakes in normal years had declined from over 50 per cent of the total coal shipments to about half that, this loss being to eastern Kentucky and southern West Virginia, where a freight rate was given which was only 25c. per ton more than that from the Pittsburgh district, but where the distance to be traversed was 300 miles further. Putting the tonnage thus transferred to the area mentioned at 5,000,000 tons, or 100,000 railroad cars annually, the Pittsburgh operators have reason to contend that thus 1,500,000,000 ton-miles of freight every year were moved needlessly. This movement required perhaps 6,000 cars.

The diversion of coal for the Twin Cities from the Lake route to all-rail would involve a loss of a billion ton-miles per annum and is thought by some even more undesirable because it would put an end to that highly valuable storage of about 10,000,000 tons at Duluth-Superior alone, which has given the mines summer operation. Less shortage of cars would be experienced if distances of transportation were reduced, but in the past every effort seems to have been made to lengthen the haul and to favor the opening of new and unneeded mines.

Despite the excess of mines and of men and the shortage of railroad equipment, action is even now being taken toward building new coal branches where such development is least needed. The "dilution of coal-car service" by spreading them over too many mines and too many miles of railroad was a difficulty which had made the railroads unable to meet the real needs of the coal industry.

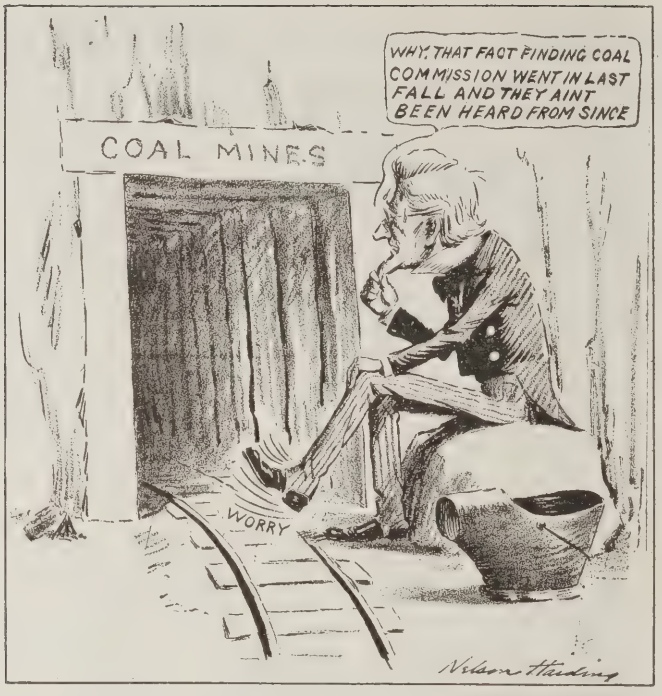
Another remedy proposed was to give mines an allotment of cars in proportion to the contracted coal. Mines having large contracts have found that, when business was briskest, the opening of new mines, which had preference because they were under development, reduced the number of cars available to mines having contracts. Thus one company which normally shipped 80 per cent of the coal going over a certain road received only 60 per cent of the cars when the market boomed, a host of small operations springing up to take advantage of the spot market. The companies that had made contracts with the coal companies were by failure to receive coal compelled to bargain for high-price spot fuel with those very operations which had made it impossible for them to get their contracts filled.

These references to transportation limitations were given as examples of the man-made handicaps under which the coal industry suffers and from which relief is sought.

Draft Program of Wholesalers' Convention

The tentative program for the convention of the American Wholesale Coal Association at Cincinnati calls for a meeting of the executive board of the association at the Hotel Gibson on the afternoon of June 11 to complete the preliminary plans. Wednesday morning, June 12, the official welcome will be extended by Julius Ratterman, chairman of the local committee, with a response from President Morton. Following this the reports of the secretary-treasurer, president and the traffic manager will be read. In the afternoon it is hoped to have Judge Alschuler, of Chicago, as the speaker, to be followed by a general discussion.

The annual dinner of the association will take place on the evening of June 12 with Charles L. Dearing, of Chicago, who is spoken of as the probable successor to the presidency, as the toastmaster. Edwin P. Morrow, Governor of Kentucky. will be the main figure on the program. Charles R. Moriarity, former president of the Cincinnati Coal Exchange, also will be on the program. On Thursday morning the election and installation of officers will take place Ladies who attend the convention will be taken on a motor sightseeing tour of the city on Wednesday afternoon; in the evening they will be welcomed at the annual dinner of the association and on Thursday morning they will be the guests of the official hostess of the Cincinnati Chamber of Commerce.



From the Brooklyn Eagle

Entombed?

Engineers Announce Personnel and Plans of Committee to Probe Coal Storage

Personnel and plans of the committee which is to direct a national investigation of the storage of coal in co-operation with the U. S. Coal Commission, the Department of Commerce and the Bureau of Mines have been announced by the Federated American Engineering Societies. The committee members are H. Foster Bain, Director of the U. S. Bureau of Mines, Washington; David Moffat Myers, former Fuel Administrator, New York; Perley F. Walker, dean of engineering, University of Kansas; W. H. Hoyt, chief engineer of the Duluth, Missabe & Northern Ry., Duluth, Minn.; S. W. Parr, professor of applied chemistry, University of Illinois; Edgar S. Nethercut, secretary of the Western Society of Engineers, Chicago; Roy V. Wright, editor, New York. The chairman is W. L. Abbott, chief operating engineer of the Commonwealth Edison Co. of Chicago.

The investigation, the first of its kind to be undertaken in this country, will deal with the whole range of problems affecting the storage of coal. Factors involved, according to the Federation's statement, comprise cost, embracing the question of financing and providing means whereby coal in storage may be used as collateral; amounts of coal consumed at different periods, particularly by industries; provision by industrial organizations to aid the workers of the nation in securing coal supplies during the summer at a low cost; methods of handling and storing; effects of storage on the heating value of coal; transportation facilities; allaying labor unrest, and reducing the number of mines and miners.

"There are factors about which there is a lack of definite information," the Federation statement says. "They relate largely to the economics of coal storage, involving such problems as cost and the quantity that should be stored before winter begins. There also is the question of financing the storage of coal and providing means whereby coal in storage may be used as collateral for financing.

"No one has specific knowledge of the amount of coal consumed per month, per year. All that is known is the quantity produced by months, and roughly the amount consumed, but this does not give sufficient information whereby one may specifically determine the amount consumed per month. It, therefore, follows that it is not known whether more coal is consumed for industrial purposes during the summer than during the winter months. It is known, of course, that the domestic consumption is larger.

"The Federated American Engineering Societies have undertaken to make a definite study of the important factors in the whole question of the storage of coal, particularly to secure an adequate supply when and where needed. . . .

"In making this study, the Federated American Engineering Societies hope to bring to the attention of all concerned the fundamentals involved, the economic and social advantages to accrue to the public through a larger practice in the storage of coal."

Searles Tries to Shift to Operators Blame For Excess of Bituminous Miners

Ellis Searles attacks the statement of the bituminous coal operators with respect to who is responsible for the excess number of mines in the soft coal industry, in a "press release" dated May 15, 1923. He states in part that:

"Through the medium of amateurish statements issued to the press, the Bituminous Operators' Special Committee, a thoroughly non-union aggregation, has repeatedly made the charge that the United Mine Workers of America is responsible for the fact that there are 200,000 surplus miners in the coal industry. In their hectic demoralization these non-union operators seek to induce the public to believe that the miners' union reaches out and drags in men from anywhere and everywhere in order to increase its membership. Their statements on that subject are wholly untrue and should not be accepted or believed by the public. And in order that the commission may not be misled by any such mis-statements, purposely made, we desire respectively to call your attention to the real situation. We want the commission to have facts, not misrepresentations.

"The fact is that the coal operators themselves determine just how many members the United Mine Workers of America shall have; they determine just who shall become members of this union; they determine just who shall not become members of the union; they are responsible for the size and character of the membership.

"The union does not reach out and drag men into the industry and into its membership. The union does not have, nor does it attempt to exercise, the right to hire or discharge any man in or around any coal mine. That right belongs exclusively to the operator, and the union recognizes that right to the fullest degree.

"These coal operators continue to carry these 200,000 surplus men on their payrolls and refuse to turn them loose. There is not enough work to furnish steady employment for this vast number. The bituminous mines of the country are operating only approximately 40 to 50 per cent of full time. That's the reason there is so much idleness among coal miners. Yet each operator insists upon maintaining a 100 per cent working force of men at all times in order to be ready for capacity operation when the opportunity arises.

"Never was there a greater opportunity for a set of employers to perform a real service to the American public than that which now presents itself to the coal operators. If they will close down 4,000 of the unnecessary coal mines that are now open and operating spasmodically they will reduce the number of surplus miners proportionately and, thus *reduce the production cost of coal.* This, in turn, would mean *cheaper coal* to the consumer. That's what the consumer is interested in. The United Mine Workers of America cannot close down these mines, because it has no such right, power or authority. Nor can it, for the same reason, put 200,000 miners out of the industry. But the operators can do it if they will. We challenge them to make the start.

"The United Mine Workers of America has a membership of more than 500,000 men who are employed only a part of the time. The union, the operators, the industry, the public and the nation would be better off if there were 4,000 fewer coal mines and if there were 200,000 fewer miners with steady employment for all of them. But so long as the coal operators continue to hire more men; so long as they refuse to reduce their working force to a proper basis; so long as they insist upon keeping open these 4,000 useless mines; so long as they persist in their attempts to operate every possible mine, even at 40 per cent of full time, just so long must they assume responsibility for the demoralization that exists in the coal business."

Commerce Commission Hears Arguments for Cut in Rates on Coal from Kansas Field to Missouri River

The attention of the whole Middle West and Southwest coal industry centered largely on the rate hearing in Kansas City, Mo., which began May 17. There the battle of the Kansas and Oklahoma producers to get lower freight rates on Southwestern coal into their main market region, the Missouri Valley, or higher rates from Illinois into the same region, was fought with much verbosity. Southwestern producers contend that unreasonable rates are strangling them to death. Their opponents, the Illinois producers and the carriers with long hauls from Illinois to the valley markets, declare it is oil, not Illinois rates, that is doing the strangling, that present rates are fair, and that a revision downward would upset the rate fabric in various parts of the country. The Southwestern operators proposed a schedule of reductions on rates out of their own fields to valley points.

Submission of evidence to back up the complaint—I.C.C. docket No. 14,661 filed by the Southwestern Interstate Coal Operators' Association and the Oklahoma Coal Operators' Association—was made before J. P. McGrath, examiner for the Interstate Commerce Commission. The whole burden of the Southwest case, as put in mainly by C. E. Warner, traffic manager of the Southwestern association, and A. P. Budowsky, traffic manager of the Oklahoma association, was that present rates between all fields and the Missouri Valley are discriminatory in favor of Illinois.

Mr. Warner, the first witness, proposed a new scale of rates from the mines to the destination cities, designed, he explained, to bring about a more stable ratio between freight charges and distances hauled. As a basis for his schedule he suggested a charge of $2.49 a ton on lump from the Oklahoma-Arkansas mines to Kansas City, and $2.07 on slack. From the Pittsburg group he suggested a charge of $1 a ton less on each of the two grades, or $1.49 for lump and $1.07 for slack. For the sake of simplicity, dealing only with the two larger origin groups and the larger destination cities, Mr. Warner's suggested changes may be tabulated as follows:

TO KANSAS CITY

From Oklahoma-Arkansas: Rates	Lump	Slack
Present	$3.28	$2.21
Proposed	2.49	2.07
Reduction	.79	.24
From Pittsburg:		
Present	$1.70	$1.34
Proposed	1.49	1.07
Reduction	.21	.27

TO ATCHISON, ST. JOSEPH AND LEAVENWORTH

From Oklahoma-Arkansas: Rates	Lump	Slack
Present	$3.52	$3.04
Proposed	2.74	2.32
Reduction	.78	.72
From Pittsburg:		
Present	$1.82	$1.70
Proposed	1.54	1.32
Reduction	.28	.38

TO OMAHA AND COUNCIL BLUFFS

From Oklahoma-Arkansas: Rates	Lump	Slack
Present	$3.89	$3.52
Proposed	3.49	3.07
Reduction	.40	.45
From Pittsburg:		
Present	$2.67	$2.31
Proposed	2.49	2.07
Reduction	.18	.24

TO SIOUX CITY

From Oklahoma-Arkansas: Rates	Lump	Slack
Present	$5.22	$4.50
Proposed	3.99	3.57
Reduction	1.23	.93
From Pittsburg:		
Present	$3.77	$3.04
Proposed	2.99	2.57
Reduction	.78	.47

From the table it may be seen that Mr. Warner's idea is to make the charge on both grades from all origin groups to Leavenworth, Atchison and St. Joseph 25c. higher than to Kansas City; Omaha and Council Bluffs, $1 higher than to Kansas City; and to Sioux City, $1.50 higher than to Kansas City. Such a schedule, he maintained, would equalize haulage charges in relation to distances hauled and do away with present apparently discriminatory charges from origin groups to destination groups. Also, he testified, it would give the mines of the Southwest a more even break with the mines of Illinois in competition for the northern Missouri River market. No charge of discrimination in the market for Kansas City and adjacent territory, as between Illinois and Southwestern mines, was pressed.

The present rates between southern Illinois mines and Omaha are $3.71 for lump and $3.34 for slack, Mr. Warner said, while from the Belleville and Springfield districts they are $3.28 for lump and $2.92 for slack. Rates from Springfield to Kansas City on the Chicago & Alton and on the Wabash, both of which have direct lines between the two points, are $2.49 for lump, $2.37 for commercial lump and $2.07 for slack, Mr. Warner said.

Mr. Warner was followed by Mr. Rudowsky, whose testimony was an elaboration of that which had preceded. Mr. Rudowsky described conditions in the coal fields of the Southwest, where mines are operating only one or two days a week as a result of no market. Lower freight rates, he declared, would strengthen the market and give the mines more operating time.

A. M. Corp, Topeka, statistician for the Kansas Public Utilities Commission, testified that traffic density on railroads of the territory through which coal from the Southwestern mines must pass to the Missouri River markets differed little from that through which Illinois coal must pass to the same market. Cross examination of Mr. Corp attempted to show that he used different standards of comparison in his figures, using gross tonnage measurements in some cases where net tonnage should apply.

H. L. Bennett, Oklahoma City, rate expert for the Oklahoma corporation commission, made similar comparisons of traffic density between the Oklahoma and Illinois mines and the Missouri River. Both the states of Kansas and Oklahoma are interveners for the complaints.

John L. Brown, representing the coal dealers of Sioux City, Iowa, declared many industries in Sioux City have been forced to burn oil instead of coal because of prevailing high railroad rates. C. H. Markham, of the Midland Coal Co., of Kansas City, had testified to the same effect concerning the competition between oil and coal in Kansas City.

Clyde M. Reed, chairman of the Kansas Public Utilities Commission representing not only the state but also mining communities and the miners' organization, was the final witness for the complaint. His testimony was based principally on his official observations while a member of the Kansas Industrial Court, and later as a member of the Utilities Commission. He said between 8,000 and 10,000 men in mining regions are now out of work.

R. T. Willette, transportation commissioner for the Atchison Chamber of Commerce; C. E. Childe, transportation commissioner for the Omaha Chamber of Commerce, and W. H. Fitzpatrick, traffic commissioner of the St. Joseph Chamber of Commerce, testified concerning the effect of present rates on their cities, and all requested rates even lower than those suggested by Mr. Warner.

H. S. Mitchell, manager of the Coal Credit and Correct Weight Bureau of the Kansas City Chamber of Commerce; William Bartrim, of the Alpine Ice & Fuel Co., Kansas City, and Charles L. Dooley, traffic manager of Peet Bros. Mfg. Co., Kansas City, were other witnesses for the complaint.

The defendants and railroad interveners in opposition to the complaint were of three distinct groups—the Southwestern origin lines. whose principal coal traffic is from the mines of the Southwest; the lines whose principal coal business in the Missouri Valley is from Illinois mines to valley markets, and those which serve both the Southwest and Illinois. Of the first group, the Missouri Pacific, the Frisco, the Kansas City Southern and the Missouri, Kansas & Texas were selected by the Southwestern Freight Bureau to conduct the defense. These four roads have attempted

to reduce rates in the past, but their reductions have been overruled by the Interstate Commerce Commission.

C. C. P. Rausch, of the Missouri Pacific; Bruce A. Rodgers of the Kansas City Southern, and H. E. Morris, of the Frisco, testified that coal shipments over their lines have been dwindling in recent years. They denied that their present rates are too high, but insisted that rates from Illinois to the Missouri River are too low.

The Wabash offered the first spirited testimony for the defense. The Wabash has a direct line from Illinois to Missouri River territory, but it also carries transfer coal from the Southwest to northern Missouri Valley cities. T. R. Farrell, of St. Louis, assistant general freight agent of the Wabash, defended present rates from Illinois, and declared unequivocally his road's intention to combat reductions from the Southwest.

The Southern Ry., through its general freight agent, F. S. Reigel, of Cincinnati, and its assistant freight traffic manager, K. B. Hannigan, of St. Louis, intervened in opposition to rate reductions from Kansas specifically, and in defense of present rates from Illinois.

R. H. May, vice-president and general sales manager of the Southern Coal, Coke & Mining Co., of St. Louis; E. M. Stanton, general sales agent of the Lumaghi Coal & Mining Co., of St. Louis, and C. P. Hoy, traffic commissioner of the coal traffic bureau of the 5th and 9th districts of Illinois, intervened in opposition to the complaint. All testified to the fairness of present rates both out of Illinois and the Southwest.

Objection to testimony concerning Illinois rates, which Mr. Phillips, for the Southwestern operators, insisted did not enter into the case, was sustained, but later the witnesses were permitted to continue. Mr. Phillips insisted that Omaha was the only city of the Missouri Valley affected to any extent by Illinois competition.

The substance of testimony concerning Illinois-Southwest competition was concisely given by W. A. Holley, traffic manager for the Central Illinois Coal Traffic Bureau, in an interview with a representative of *Coal Age*. "During the labor trouble in Kansas," he said, "Illinois coal was shipped to the Missouri Valley. But since the miners settled down to work and Kansas began producing coal, that business has steadily decreased until now it is negligible. Oil is the thing that is playing havoc with the markets of the Southwest."

H. J. Pollack, of Chicago, assistant to the coal traffic manager of the Burlington, testified in opposition to any reduction of rates in the Southwest, as also did R. P. DeCamp, of Chicago, assistant coal traffic manager of the Illinois Central. Both said present rates are reasonable. Mr. DeCamp denied any personal interest of his road in Southwestern rates. "We get our bridge toll for carrying the coal across the river between Omaha and Council Bluffs, regardless of what the rate from the fields may be," he said.

In the final session of the hearing, which closed Monday afternoon, S. G. Lutz, of Chicago, Chief of Traffic of the Chicago & Alton, intervening in opposition to the complaint, declared that the proposed reduction would create a monopoly for Southwestern mines in the Missouri Valley market, closing it to Illinois coal. "We do not oppose a general readjustment of rates whenever reductions can be brought about that will give the fullest benefit to the consumer as well as the producer. We do oppose any piecemeal readjustment," he said. Mr. Lutz testified that of his road's $27,000,000 coal-freight revenue last year, $1,000,000 was derived from Illinois coal billed to Kansas City.

The Central Illinois Coal Traffic Bureau, an intervener against the complaint, was represented by its president, H. C. Adams, and its traffic manager, W. A. Holley. Both criticised the proposed reduction as conducive to a monopoly in the Missouri Valley for Southwestern coal and declared the Southwest has no harder scramble for a market than Illinois has. "If rates from the Southwest are reduced, Illinois will be forced to seek reductions also," Mr. Holley testified. "Whatever the outcome of this action, we may be compelled to seek a return to the 1916 differential of 50c. for fine coal and 70c. for lump between Southwest and Illinois rates to Kansas City."

Representatives of Illinois coal companies and of the Springfield (Ill.) Chamber of Commerce, intervening in opposition to the complaint, substantiated the testimony of Messrs. Adams and Holley.

Hammond Favors Cheaper Production Cost And Larger Output of Anthracite

Substitutes for anthracite coal were used with sufficient success last winter to give great impetus to their continued use, John Hays Hammond stated in the course of a talk before the National Conference of Business Paper Editors in Washington, May 21. He admitted that the anthracite operators are worried by the prospect of competition from cheaper fuels. He said that the company mines had done much to stabilize anthracite prices. During the entire period from 1903 to 1917, he pointed out, the Reading company advanced its rate only 25c. per ton.

If legal and other obstacles could be removed, he said, the anthracite field could absorb many thousands of the surplus of coal miners in the bituminous districts. If means can be found for reducing the costs of anthracite production and distribution, he believes its use can be extended to the point where as many as 50,000 additional miners could be employed. Mr. Hammond stated that John L. Lewis had told him that he would rather have a union with 400,000 members who had steady employment than one with 700,000 members employed only a portion of the time.

From his remarks it could be judged that Mr. Hammond favors making public periodic statements showing the margin of profit enjoyed by each producer of or dealer in coal. While he admits that this would reveal that which is regarded as a legitimate trade secret, he is inclined to think it would be better for all concerned. He let it be known also that the coal commission probably will attempt to draw up a code in which will be set forth the rights of the employer and the rights of the employee. He also stated that the help of several associations had been solicited to make a study of furnace design, flue design and other problems incident to the use of a wider range of fuels for domestic purposes.

Government Must Pay Market Price for Coal Requisitioned, Supreme Court Rules

The Navy Department did not pay a just price for coal it requisitioned from the New River Colleries Co. at Hampton Roads, between Sept. 17, 1919, and Feb. 1, 1921, according to a decision rendered by the U. S. Supreme Court, May 21, which sustained decisions of lower courts awarding additional compensation to the company. The decision was read by Associate Justice Butler.

Acting under Section 10 of the Lever Act, the Navy Department requisitioned some 60,000 tons of coal which belonged to the New River Colleries Co., between the dates mentioned, offering the price fixed by the President. The company accepted 75 per cent of the amount offered and entered suit in the U. S. District Court of New Jersey for a greater amount, contending that the market price was higher than that offered by the government. A jury in the District Court awarded a judgment for an amount in excess of that offered by the government, and this judgment was affirmed by the Circuit Court of Appeals.

In sustaining this judgment, the Supreme Court declared: "The United States had the right to take the coal on payment of the market prices prevailing when and where the coal was taken; the owner was not entitled to more and could not be required to take less." The opinion affirms the finding of fact by the lower courts that the market prices at Hampton Roads for spot export coal were higher than the price offered by the government in settlement, and that the spot price, with an active market, should have controlled rather than the domestic future price which the government had attempted to introduce. Efforts of the government to introduce evidence of "real value" in contradistinction to "market value" were properly ignored by the lower courts, the opinion stated.

Hammond Warns Not to Expect Too Much in Anthracite Report; Pepper to Advise on Royalty Regulation

By Paul Wooton
Washington Correspondent of *Coal Age*

Anthracite coal, in the opinion of John Hays Hammond, chairman of the President's coal commission, is paying a disproportionate freight rate. In making that statement, Mr. Hammond was careful to point out that the railroads must be allowed to earn reasonable profits, but he does believe they are collecting charges on anthracite coal which are out of proportion to the charges levied on other commodities. The fact that anthracite traffic originates in a comparatively small area and does not require the construction of additional sidetracks and can be concentrated easily in full trainloads should be reflected in the freight rate, Mr. Hammond believes. He also called attention to the fact that there are great differences in favor of anthracite in the cost of handling bituminous and anthracite coals. He admitted that the commission is considering a recommendation that the cost of service be made the basis for computing freight rates on anthracite.

Publication in the daily press of Mr. Hammond's statement in regard to anthracite rates gave rise to inquiries as to how soon a reduction might be expected. This led to a request that publication be made of the fact that no one should delay purchase of coal in the hope that a lower freight rate will be available in the near future. In that connection, attention was called to the fact that even should the commission vigorously recommend such a rate reduction, this does not mean that the Interstate Commerce Commission will act on the recommendation, and even should it be disposed to embark upon a new study of anthracite coal rates, many months probably would be required for the hearings and other formalities in connection with such an investigation. The coal commission is anxious that the public understand that there is no prospect of any rate reduction for a year at least and no promise of a reduction at any time.

In sounding this note of caution, the commission has in mind the heavy losses which came to some consumers who delayed purchases of coal awaiting the much heralded reduction in the rates on bituminous coal last year.

Drafting of Anthracite Report Not Under Way

The commission has conferred at length with the independent anthracite operators but no important new facts were brought out, Mr. Hammond stated. Much the same ground was covered as was the case when the company operators met with the commission. One of the interesting phases of the discussion, Mr. Hammond stated, pertained to methods of selling. He gave no details. There also was discussion of the possibility of improving methods of conciliating labor disputes. The operators have a variety of ideas but all admit that there is no easy solution for any of the problems that the anthracite producers are facing. The commission has been advised that the report of the anthracite committee will be forthcoming in the near future and will be confined largely to constructive suggestions.

No portion of the anthracite report has been drafted as yet, Mr. Hammond asserted. The commission are reaching no conclusions since they have at their disposal returns covering only 30 per cent of the anthracite production. The rate at which replies to the questionnaires are being received will accelerate rapidly from this time on, he predicted. It leaked out at the conference that Senator Pepper is the "distinguished Pennsylvania lawyer" who will report to the commission in detail as to the possibility of exercising regulation over the matter of royalty. His report will simply review the Pennsylvania statutes that would have a bearing on that practice.

Mr. Hammond cautioned against expecting too much in the anthracite report. The problems of anthracite are overlapping and it will be difficult to reach conclusions before all of the questionnaires have been tabulated. For that reason, he believes, the real results of the commission's work will be embodied in its final report, although he expects the anthracite report to contain much more "substance" than the preliminary report issued Jan. 15.

The commission is making headway in its study of relationships between the producers and the anthracite carriers and the bearing these relationships have on the price paid by the ultimate consumer. The reports on this work are being made by Professor Hollander and his assistants. Mr. Hammond emphasizes the importance of determining questions of valuation and capitalization before intelligent estimates as to reasonable profits can be made. The advisory committee on valuation plans to report June 15. It is Mr. Hammond's opinion that no additional questionnaire will be required in connection with arriving at fair valuations, as practically all of the information required is covered on the questionnaire already sent out.

That the Interstate Commerce Commission has been urged by the Coal Commission to expedite its consideration of the coal rates in the Northwest, was admitted by Mr. Hammond. He expressed the earnest hope that the existing uncertainty could be removed. From his remarks could be deduced that Mr. Hammond is of the personal opinion that the people of the Northwest should enjoy the benefits incident to water transportation and that the economies represented in the lake movement of coal should be encouraged.

In this connection it may be said that there is some opposition among coal specialists in Washington to any attempt on the part of the Coal Commission to advise the Interstate Commerce Commission. The coal rate structures are delicate pieces of mechanism with which the Interstate Commerce Commission is quite familiar after long experience in efforts to keep them adjusted. Since Congress is prone to act on transportation matters without full knowledge of the intricate questions involved. some fear that a recommendation from the Coal Commission as to an adjustment of anthracite rates would have far-reaching consequences. There also is a feeling that the Interstate Commerce Commission rather resents some of the suggestions which have been made to it in regard to its handling of matters concerning coal. There is doubt whether any constructive service can be performed in suggestions to that body on matters pertaining to coal rates.

New Haven Road Lifts Embargo Limiting Anthracite Shipments to New England

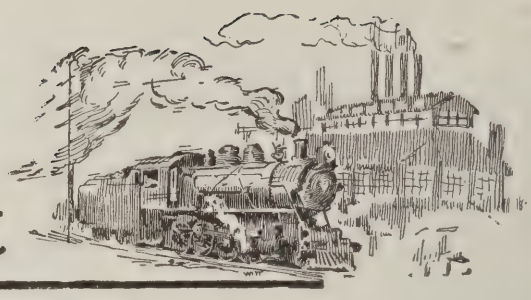
The New York, New Haven & Hartford R.R. announced May 18 that it had lifted all embargoes on east-bound freight, including the limitation of anthracite shipments to New England, which had prevailed since the fuel shortage of last winter. The order removes the regulation of anthracite through the Campbell Hall Gateway, near Poughkeepsie, which limited to 100 cars a day the amount to be accepted from connecting roads. Removal of the congestion which afflicted all Eastern roads last winter, improvement of equipment and the more equable distribution of freight along the lines made it possible to lift the embargo, said New Haven officials. The summer demand for anthracite in New England has already set in, they reported.

Anthracite Miners Call Wage Convention

The anthracite mine workers, through their district boards, according to a news despatch from Wilkes-Barre, are to hold a convention at Scranton on June 26 to formulate new demands to take the place of the present wage agreement, which expires Aug. 31. Details of the demands to be formulated were not forthcoming.



Production and the Market



Weekly Review

A feeling of confidence pervades the coal trade. Spot prices are comparatively easy but there is a decided firmness in the contract market. Current output is easily absorbed, the demand for domestic sizes of anthracite and for high-grade steam bituminous coal being avid. Contracting is going on quietly at good prices. So long as smokeless commands around $4 in Western markets the tidewater supply will be short, especially with the limited car supply offered by the N. & W. and C. & O.

Production of soft coal continues above 10,000,000 net tons weekly with car supply somewhat easier. Output of anthracite for the first four months of 1923 was 33,931,000 net tons, the largest recorded production for a like period and 21 per cent above the average for the same period of the last nine years. April production was 8,063,000 net tons, exceeded by the corresponding month in 1914, 1915 and 1918, but 14 per cent above the April average for the last eight years.

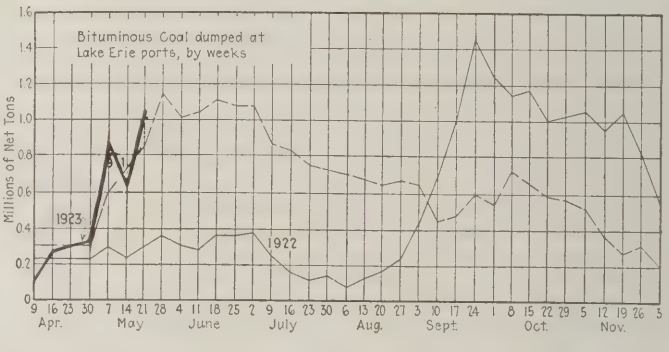
Spot prices for soft coal declined last week, *Coal Age* Index dropping 5 points to 221 on May 21. The average price was $2.68. Pocahontas, Pittsburgh, Mount Olive and Springfield recorded advances and Clearfield, Somerset, Cambria, Kanawha and Standard showed decreases in prices.

Demand Improves in Middle West

There was a slight improvement in demand for domestic sizes in the Middle West. Dealers were slow in stocking but were buying some because an increase of 25c. per ton is scheduled to go into effect on June 1. In the East there has been no material change. Although the New Haven lifted its embargoes on anthracite there remain numerous local embargoes in New England that interfere with deliveries.

The export market remains quiet. During the first twenty days of May 19 ships carrying 182,973 tons of cargo coal left Baltimore, as compared with 170,000 tons during the corresponding period of April. Thirteen of the foreign trade vessels loaded 13,602 tons of bunker coal, making total dumpings at Baltimore to April 20 196,575 tons. Of this amount, 19,432 tons went to South America. During the week ended May 14 two cargoes of coke aggregating 8,518 tons went to France.

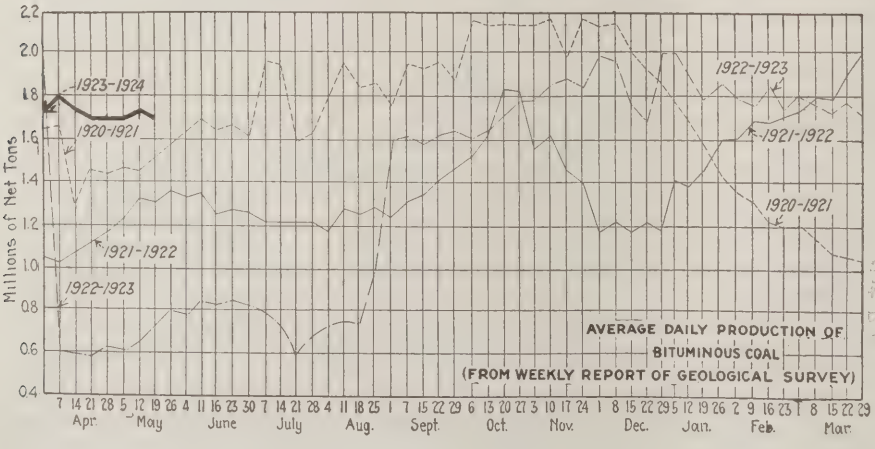
Lake navigation is now in full swing. Anthracite and bituminous coal is moving to the Head-of-the-Lakes in good volume; receipts at Duluth-Superior during the first five days of the season were approximately as large



as was unloaded during the first 17 days of the season last year.

"The recent gradual decline in soft-coal production was checked in the second week of May," says the Geological Survey, "when, according to preliminary estimates, the output increased to 10,211,000 net tons, a gain of 150,000 tons over the revised estimate of the week preceding. Preliminary reports of cars loaded during the first half of the week May 14-19 indicate a continued production at the rate established the week preceding and a probable total of 10,200,000 tons."

Dumpings at Hampton Roads for all accounts during the week ended May 17 were 333,977 net tons, a decrease of 35,025 net tons from the previous week.



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
April 28	4,175,000	10,103,000
May 5 (*b*)	4,164,000	10,061,000
May 12 (*a*)	4,433,000	10,211,000
Daily average	739,000	1,702,000
Calendar year	153,126,000	199,768,000
Daily av. cal. year	1,361,000	1,772,000
ANTHRACITE		
April 28	5,000	2,116,000
May 5	6,000	2,021,000
May 12	7,000	1,903,000
Calendar year	21,816,000	37,518,000
COKE		
May 5 (*b*)	95,000	407,000
May 12 (*a*)	97,000	403,000
Calendar year	2,493,000	7,227,000

(*a*) Subject to revision. (*b*) Revised from last report.

Domestic sizes of anthracite keep moving, but the steam coals are accumulating. Considerable of the larger coals are going into Canada and the Northwest. Prices for independent coal remain around $11 with concessions to those buyers who take steam sizes as part of their order.

Midwest Gets a Little Trade

A slight movement of domestic sizes has begun throughout the Middle Western coal fields. Dealers all over this section of the country are hesitant about stocking, but they are nibbling a little because of the 25c. increase scheduled to go into effect June 1. After that date another two weeks of low market is expected before real summer buying sets in. By July 1 coal-wise men think business will have picked up considerably. Midwest steam trade continues slow, as might be expected with the market in its present condition. Central Illinois, where production came almost to a full stop a week ago, had so few screenings available that some sold up to $2, while in southern Illinois where are many storage piles, they sank below $1.75. Now, however, there is little Southern to be had at less than $1.75, because most producers decided to hold on rather than continue giving coal away. Most mines still have loads of all sizes unbilled on tracks.

Duquoin, Jackson County, Mt. Olive and Standard fields are all acutely inactive except in cases of mines with mine-run contracts. Standard 2-in. lump is quoted $2@$2.15, and smaller sizes at just what they will bring. Screenings at $1.50 are about the only coal moving.

St. Louis Stirs Slightly

Household trade in St. Louis was stirred up a little during the past week by newspaper accounts of the probable coal difficulties of next season. Domestic demand from the country was unaffected, however, and the steam trade is dull. Anthracite, smokeless, and a little Arkansas semi-anthracite get most of the buyers though there is little Arkansas in the city. Apartment-house storage of Standard 2-in. lump is starting at prices from $4.50 up. Cut-throat competition is troubling the trade.

Kentucky Has Its Troubles

The State of Kentucky and surrounding regions are pretty well filled with distress coal just now. This is mainly the result of the reopening of western Kentucky mines that were on strike until two weeks ago. Such a rush for business

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

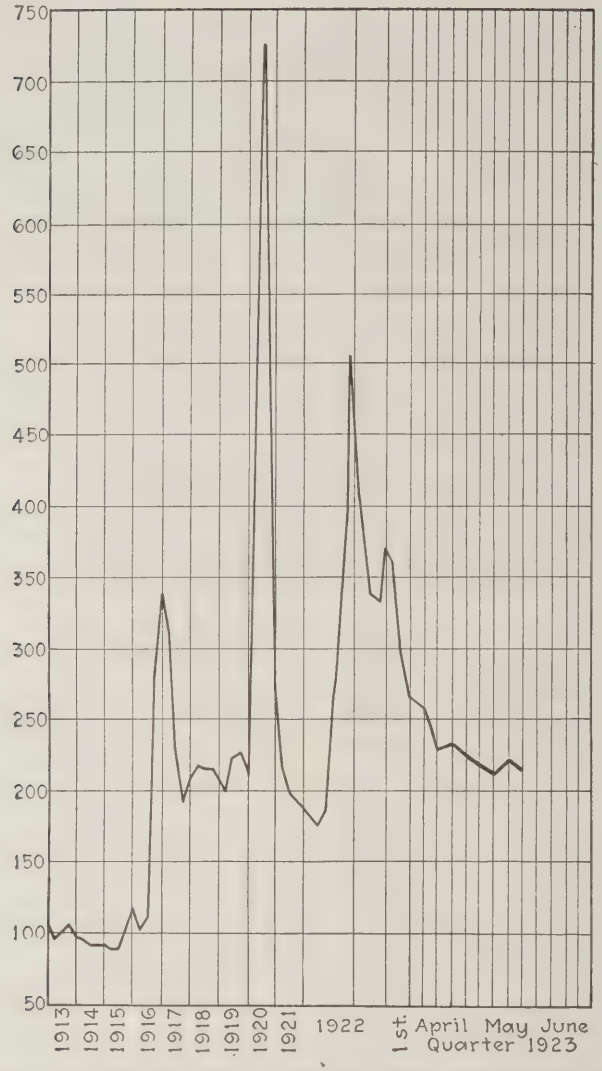
	Market Quoted	May 22 1922	May 7 1923	May 14 1923	May 21 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.65	$6.15	$6.25	6.00@ 6.50
Smokeless mine run	Columbus	3.30	4.00	4.10	*3.85@ 4.30*
Smokeless screenings	Columbus	3.25	3.75	3.75	*3.40@ 4.00*
Smokeless lump	Chicago	2.75	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	2.75	3.85	3.85	**4.00@ 4.25**
Smokeless lump	Cincinnati	3.50	6.00	6.00	**6.00@ 6.50**
Smokeless mine run	Cincinnati	3.25	3.85	4.25	4.00@ 4.50
Smokeless screenings	Cincinnati	3.15	3.85	4.10	**4.00@ 4.50**
*Smokeless mine run	Boston	7.35	6.35	6.85	6.75@ 7.00
Clearfield mine run	Boston	3.75	2.50	2.75	*2.25@ 3.00*
Cambria mine run	Boston	4.25	3.10	3.60	*3.00@ 3.50*
Somerset mine run	Boston	3.65	2.75	3.10	*2.75@ 3.25*
Pool 1 (Navy Standard)	New York	.....	3.75	3.75	3.50@ 4.00
Pool 1 (Navy Standard)	Philadelphia	4.75	4.05	4.00	*3.60@ 4.00*
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	.....	2.80	2.90	2.60@ 3.25
Pool 9 (Super. Low Vol.)	Philadelphia	4.65	3.05	3.00	*2.55@ 3.20*
Pool 9 (Super. Low Vol.)	Baltimore	4.75	2.80	2.75	**2.70@ 2.85**
Pool 10 (H.Gr.Low Vol.)	New York	4.90	2.50	2.50	2.25@ 2.75
Pool 10 (H.Gr.Low Vol.)	Philadelphia	4.75	2.45	2.40	*2.15@ 2.60*
Pool 10 (H.Gr.Low Vol.)	Baltimore	4.75	2.25	2.25	**2.30**
Pool 11 (Low Vol.)	New York	4.65	2.20	2.20	*1.85@ 2.30*
Pool 11 (Low Vol.)	Philadelphia	.....	2.00	2.00	**1.85@ 2.30**
Pool 11 (Low Vol.)	Baltimore	4.75	2.00	2.00	2.00
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	.....	1.80	1.85	1.75@ 2.00
Pool 54-64 (Gas and St.)	Philadelphia	3.40	1.85	1.85	**1.95@ 2.15**
Pool 54-64 (Gas and St.)	Baltimore	4.00	1.80	1.80	1.80
Pittsburgh sc'd gas	Pittsburgh	.....	2.85	2.85	2.75@ 3.00
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	2.00
Pittsburgh slack (Gas)	Pittsburgh	.....	1.75	1.75	**1.75@ 2.00**
Kanawha lump	Columbus	3.60	3.50	3.25	3.00@ 3.50
Kanawha mine run	Columbus	3.25	2.25	2.20	2.00@ 2.40
Kanawha screenings	Columbus	3.35	2.05	1.75	1.60@ 1.90
W. Va. lump	Cincinnati	3.40	3.50	3.75	*2.75@ 4.50*
W. Va. Gas mine run	Cincinnati	3.65	2.35	2.20	*1.65@ 2.00*
W. Va. Steam mine run	Cincinnati	3.40	2.35	2.20	*1.65@ 2.00*
W. Va. screenings	Cincinnati	3.25	2.10	2.00	*1.60@ 1.75*
Hocking lump	Columbus	3.90	2.85	2.80	*2.50@ 3.00*
Hocking mine run	Columbus	3.65	1.95	1.95	1.85@ 2.10
Hocking screenings	Columbus	3.50	1.60	1.60	*1.35@ 1.60*
Pitts. No. 8 lump	Cleveland	3.90	2.90	2.90	**2.40@ 3.50**
Pitts. No. 8 mine run	Cleveland	$3.25	$2.15	$2.15	$2.10@$2.25
Pitts. No. 8 screenings	Cleveland	3.90	1.80	1.60	**1.50@ 1.85**
Midwest					
Franklin, Ill. lump	Chicago	.....	3.80	3.80	3.50@ 4.10
Franklin, Ill. mine run	Chicago	.....	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	.....	1.85	1.75	**1.75@ 1.90**
Central, Ill. lump	Chicago	.....	2.30	2.30	**2.50@ 2.75**
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.55	1.85	1.75@ 2.00
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	.....	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.55	1.65	*1.50@ 1.65*
Standard lump	St. Louis	.....	2.50	2.60	*2.00@ 2.50*
Standard mine run	St. Louis	.....	1.85	1.80	1.75@ 1.90
Standard screenings	St. Louis	.....	1.50	1.50	1.50
West Ky. lump	Louisville	3.25	2.60	2.60	2.50@ 2.75
West Ky. mine run	Louisville	3.25	1.90	1.90	1.85@ 2.00
West Ky. screenings	Louisville	3.25	1.75	1.60	1.50@ 1.75
West Ky. lump	Chicago	3.60	2.60	2.60	2.50@ 2.75
West Ky. mine run	Chicago	3.60	1.80	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.00	2.70	2.70	2.70
Big Seam mine run	Birmingham	1.70	2.05	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	3.65	3.75	3.75	3.50@ 4.00
S. E. Ky. mine run	Chicago	3.50	2.85	2.85	*2.25@ 2.50*
S. E. Ky. lump	Louisville	3.90	4.10	4.00	*3.50@ 4.00*
S. E. Ky. mine run	Louisville	3.40	2.45	2.50	2.25@ 2.75
S. E. Ky. screenings	Louisville	3.40	1.90	1.90	1.80@ 2.00
S. E. Ky. lump	Cincinnati	3.50	3.35	3.35	2.50@ 4.25
S. E. Ky. mine run	Cincinnati	3.50	2.25	2.00	*1.60@ 2.00*
S. E. Ky. screenings	Cincinnati	3.25	2.00	1.80	*1.50@ 1.75*
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.15	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.65	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	May 14, 1923 Independent	May 14, 1923 Company	May 21, 1923† Independent	May 21, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@ $8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.00	8.00@ 8.35	$8 50@11 00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.25	6.00@ 6.30	6.30@ 7.25	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.25@ 3.50	3.50@ 4.15	2.25@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.00@ 3.50	3.50	3.00@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.50@ 2.50	2.50	1.50@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 221, Week of May 21, 1923. Average spot price for same period $2.68. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

followed the resumption of work that most coals in the state have been selling off. There is much bemoaning the fact that Lake trade does not seem to be drawing heavily enough from Kentucky.

Some state and local contracts for the season show eastern Kentucky screenings at $2.25 and mine-run at $2.40 while western Kentucky screenings have been signed up at $1.50@$1.85 f.o.b. mines. Already western Kentucky distress screenings have sold as low as $1.25@$1.35. Car supply is the best it has been for months.

Northwest Exerts Itself

A concerted and intense selling campaign is going on throughout the Northwest. The docks at the Head-of-the-Lakes have reduced soft-coal lump and mine-run prices to a point where they can undersell Illinois coal an average of about 28c. at Minneapolis and St. Paul and are striving mightily to regain lost business. They have lost little if any on the dock stocks carried over because most of the coal was screenings, price of which has held above cost and is not softening noticeably. Anthracite, at last year's prices, is moving well into the upper Lakes inland region.

Around Milwaukee the first spurt of business marking the opening of the Lake season has not subsided and coal concerns are scratching hard for business. The big May rush prophesied by many did not appear. Retailers feel no demand from consumers and big consumers are hesitant about contracting just now.

West Feels Better

Two things seem to portend better days for the Southwestern field. Early orders for threshing coal are beginning to trickle in, and already there is a noticeable increase in the sale of storage coal. Still, mines are working only one or two days a week, and the Southwest has a long way to go before it will be out of the desert.

The retail price of domestic sizes, cut several weeks ago to encourage storing, has not yet been raised, although the prediction then was that it would advance 50c. in May and 50c. a month until September.

Railroad business in Utah is a little better and steam coals generally are improving so that Utah screenings sell now above $1.75. Domestic trade is dormant, however. The 50c. reduction to encourage storage by householders has had little effect. Northern Pacific Coast trade has livened a shade but Utah mines still average only about two days a week running time.

In Colorado a light snowstorm and accompanying cool weather have combined to sell some coal. Steam trade has shown more effect of this than has domestic. Quotations on the slow sizes have lowered a little.

Ohio Consumers Play Waiting Game

The situation in Ohio is quiet. At Columbus buying continues at a low level, as large consumers apparently are playing a waiting game. Purchasing agents for the larger users are not anxious to close contracts, believing that low prices will prevail for the greater part of the summer. Public utilities and railroads are the largest buyers, although some contracts are being made by iron and steel concerns.

Cincinnati dealers believe that buyers in Michigan, northern Ohio and Indiana are waiting for an indication that the bottom has been reached before entering good sized orders. Railways are believed to be getting ready to make purchases, it being reported that one carrier within the next few days will place an order that will result in the withdrawal of between 50,000 and 60 000 tons from that market. The majority of steam coal users in the Cleveland market are still looking to the open market for their coal and have not yet made contracts for their requirements.

There is a somewhat more hopeful feeling among operators in the Pittsburgh district as to the future of the market, based upon the expectation of car shortages. Demand for coal is not expected to improve to any great extent soon, though the Lake demand has room for much betterment. The present dullness in central Pennsylvania is attributed, in a measure, to the high production of the first four months of this year.

Conditions in the Buffalo market are quiet. Demand is light, although general business is good.

New England Consumers See Auguries

While in New England there is no material change in the current market there are indications of a different attitude on the part of buyers. A succession of embargoes affecting traffic through all the gateways is bringing home to the consumer the possibilities later on. It is realized that sometime during the fall and winter the railroads will reach the peak of ton miles and that probably long before that time there will be a shortage of equipment and corresponding congestion on the through lines.

All-rail from central Pennsylvania quotations are unmodified. A few producers of high-grade coal have about concluded they have all the spot business required to keep mines in operation the balance of May and are again turning their attention to contracts over periods of six to ten months. Transportation conditions have made it difficult to figure available tonnages, but more than a few operators feel they will have less trouble placing output the next three months than has been the case since February.

Hampton Roads prices rule reasonably firm at a $7 level for Navy standard coal, with an occasional sale of No. 2 grade at $6.75 or less. The smokeless districts continue on

less than 50 per cent output, but it is of some interest to note that the shortage is now attributed to lack of railroad facilities rather than to a restricted market. Occasional export inquiry helps out the spot market, but due to the flood of Pennsylvania coal offered at New England points there is only very light inquiry for Pocahontas and New River for distribution inland. On cars Boston, Providence, and Portland quotations are still $8@$8.25. A few market cargoes furnish surplus enough to keep prices easy on about that range.

Movement via the Philadelphia piers continues in good volume. A few steamers ordinarily plying to Norfolk and Newport News have been noticed loading at Port Richmond, and to an extent this is a development of some interest. Some of the coal moved is of course anthracite, due to the great pressure to get domestic sizes forward, but much the heavier proportion is steam coal, both high and low volatile, for use at plants in New England adjacent to tidewater. Congestion all-rail has been sufficient to make the water route a matter of decided interest among certain buyers.

New York Market Notes Slight Improvement

A slight improvement in buying was noticeable in the New York market. Inquiries increased and there was an apparent tendency on the part of consumers to "cover" themselves. There are many loaded boats in the New York harbor and some sales of distressed coals at low prices were made. The market at Philadelphia continues quiet with no evidence of a sustained demand. Demand centers around the high grades. At the coal docks there is little activity and clearances show a decrease. There has been little change in the Baltimore market with regard to steam and gas coals. Industries are buying in the open market. The gas-coal market is sustained in part by the export demand.

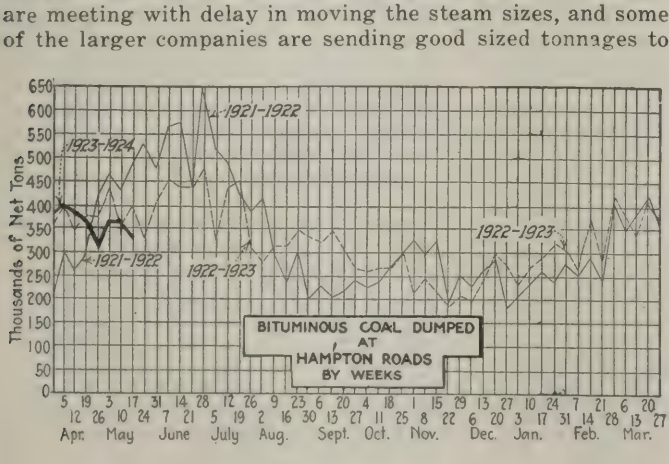
Inquiry from industrial sources at Birmingham is light and there is an accumulation of all grades of coal. The coke market has shown some weakness. Domestic coals are still in active demand.

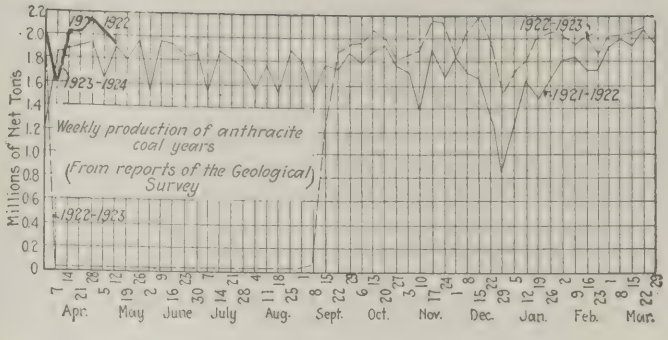
Lake Movement Gains Headway

Of the 90 cargoes of coal shifted to the docks at the Head-of-the-Lakes before May 14 8 were anthracite. United States Steel Corporation vessels, which usually make the first trip of season empty, carried coal this year to the D., M. & N. Railway. Receipts at Milwaukee during the first half of May aggregated 97,929 tons of anthracite and 319,281 tons of bituminous. During the week ended May 21 Lake dumpings amounted to 988,794 net tons of cargo coal and 46,072 net tons of fuel coal, making the dumpings for the season 3,365,063 net tons of cargo coal and 140,349 net tons of fuel coal.

Demand for Domestic Anthracite Holds Up

There has been no letup in the demand for the anthracite domestic sizes. Egg and stove coals are the shortest in the New York market but there is no surplus of either chestnut or pea sizes. Dealers in Philadelphia are being delayed in filling orders because of the continued cool weather. There is a fairly heavy movement of barges from Port Richmond to various New England ports. Producers are meeting with delay in moving the steam sizes, and some of the larger companies are sending good sized tonnages to





storage. Demand at Toronto is heavy, due to weather conditions. Orders are being received as fast as retail dealers can fill them, although receipts are slightly larger than they were several weeks ago.

"The production of anthracite in the week ended May 12 decreased 6 per cent in comparison with the production in the week preceding," according to the report of the Geological Survey. "The nine principal carriers of anthracite reported loading 36,387 cars, from which it is estimated that the total output, including mine fuel, local sales and the product of dredges and washeries, was 1,903,000 net tons. The decrease appears as the result of holiday observance on Ascension Day, when mine production was cut to about 43 per cent of the average for the other days of the week. Preliminary reports of loading during the week May 14-19 indicate a somewhat lower daily rate of production."

Beehive Coke Output Declines Further

Production of beehive coke, which declined somewhat during the first week in May, showed a further small decrease in the week ended May 12, says the Geological Survey. On the basis of the number of cars loaded by the principal coke carriers the total output is estimated at 403,000 net tons, a decrease of 4,000 net tons when compared with the previous week's production. The decline was all in the Pennsylvania district with small gains in the Middle and Southern Appalachian states.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to May 5, 1923 Inclusive	Week Ended May 5, 1923
U. S. Total	55.7	....	....	....
Somerset County	74.9	36.3	33.0	(a)
Panhandle, W. Va.	51.3	57.3	56.0	60.7
Westmoreland	58.8	65.8	56.3	56.3
Virginia	59.9	55.7	56.6	61.1
Harlan	54.8	22.1	24.8	41.0
Hazard	58.4	16.4	24.0	30.5
Pocahontas	60.0	36.6	38.2	38.9
Tug River	63.7	28.8	36.0	36.8
Logan	61.1	26.2	31.3	29.7
Cumberland-Piedmont	50.6	31.7	49.3	51.2
Winding Gulf	64.3	30.4	35.6	41.3
Kenova-Thacker	54.3	42.4	36.3	45.0
N. E. Kentucky	47.7	28.4	28.9	33.0
New River	37.9	31.6	36.9	40.3
Oklahoma	59.6	59.1	44.6	54.2
Iowa	78.4	75.9	73.8	57.4
Ohio, Eastern	46.6	40.8	36.4	43.2
Missouri	66.8	76.3	71.3	57.2
Illinois	54.5	49.9	44.8	30.4
Kansas	54.9	55.9	45.3	25.1
Indiana	53.8	37.7	49.3	31.4
Pittsburgh†	39.8	41.2	37.4	57.7
Central Pennsylvania	50.2	53.4	48.8	54.7
Fairmont	44.0	35.5	37.6	56.7
Western Kentucky	37.7	32.4	32.2	29.0
Pittsburgh*	31.9	56.1	61.5	79.5
Kanawha	13.0	15.6	23.7	26.5
Ohio, Southern	24.3	38.1	31.1	24.0

* Rail and river mines combined.
†Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended May 5, 1923	961,029	175,866
Previous week	963,694	180,127
Same week in 1922	747,200	75,125

	Surplus Cars All Cars	Surplus Cars All Cars	Car Shortage	Car Shortage
May 7	13,556	3,195	28,316	16,672
Same date in 1922	353,239	226,276	....	....
April 30, 1923	13,556	2,849	35,282	17,643

Foreign Market And Export News

British Production Declines Slightly; Some Collieries Sold Ahead

Production of coal in Great Britain's mines took another drop during the week ended May 5, when the output was 5,325,000 tons, according to a cable to *Coal Age*, as compared with 5,721,000 tons the week previous. The decrease was due to May 1 being largely observed as a holiday.

Some collieries in South Wales are reported as being heavily booked for deliveries well into June, with little coal available for prompt or early delivery.

Orders placed include heavy bookings for the French State Railways, and 100,000 tons of Monmouthshire large coals for South American railways. The latter is on the basis of about 30s. per ton, f.o.b. The Algerian State Railways are in the market for 60,000 to 90,000 tons of patent fuel for delivery between June and November.

Statistics showing exports of coal during the week ended May 19, follow in tons:

	Tons
From the Tyne district	5,850
From the Mersey district	9,995
From the South Wales district:	
To the United States	8,921
To Canada	32,021

Hampton Roads Movement Slow

Movement at Hampton Roads last week was slow, the diversion of coal to the West by rail having cut down supplies to some extent. Vessels did not arrive up to schedule, and all lines of the trade fell off.

Export business was not up to expectations, while the coastwise trade showed a marked reduction. Bunker business was slightly below the previous week.

The tone of the market was dull, and shippers were not looking forward to any distinct revival in business during the next few weeks. They expect contracts to be asked for about the middle of June, to become effective July 1. The outlook for continued export business, to South America and France, was bright, according to shippers.

Saar Mine Strike Settled

The strike of the 50,000 coal miners in the Saar Valley has been settled according to a press cable received in this country, the men returning to work on May 16 under an agreement providing for an increase in wages ranging from 3 to 5 fr. Soon after the strike began the League of Nations Commission which administers the Saar, according to the dispatch, offered the men an increase in wages, but the offer was refused, the men insisting on their demand that the Ruhr be evacuated. It is likely that it will be at least a month before the first shipments of coal from the district will arrive in France.

French industrial coals are in better supply, although the mines in the Nord and Pas-de-Calais are heavily booked for the May output.

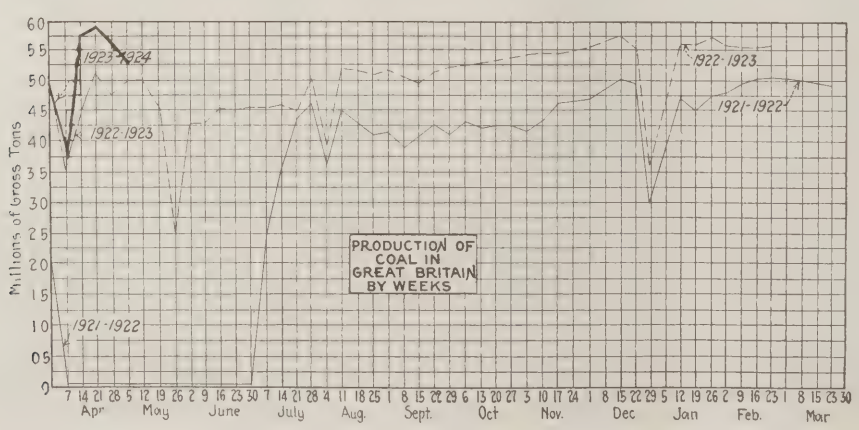
Production during March amounted to 3,012,116 metric tons of coal, 149,285 tons of coke and 262,316 tons of patent fuel.

During March and up to April 20, France received from Germany 76 000 metric tons of coal, 78,800 tons of coke and 6,700 tons of lignite briquets.

Although 109,200 metric tons of Ruhr coke consigned to the Societe des Cokes de Hauts-Fourneaux passed Ehrang station between April 1 and April 30 the French Minister of Public Works has urged French Metallurgists to stock up one-third of the coke they receive from the Ruhr until they have reserves aggregating 250,000 tons.

Production of coke from French collieries ovens is increasing. In the Nord and Pas-de-Calais coal fields it amounted to 97,800 tons in March, as compared with 47,300 tons in October of last year. Out of the March production the Crespin and Douchy collieries supplied to French Metallurgists 28,000 tons and they received from the other collieries about 35,000 tons, the balance going to foundries and other industries. It is expected that by the end of the year the collieries, not including Crespin and Douchy, will be delivering monthly to French blastfurnaces 60,000 tons of coke and by the end of 1924, 110,000 tons.

Two batteries of ovens amounting to 110 ovens are about to be started, while four other batteries are in course of construction, one to be ready in July, one in September and the remaining two toward the end of the year or the beginning of next.



Export Clearances, Week Ended May 12, 1923

FROM HAMPTON ROADS

	Net Tons
For Argentine:	
Du. SS. Vechtdijk, for Puerto la Plata	5,108
For Brazil:	
Br. SS. Clearpool, for Rio de Janeiro	5,577
For Canada:	
Br. SS. Twickenham, for Montreal	7,625
For Cuba:	
Nor. SS. Albatross, for Havana	4,834
Nos. SS. Steinstad, for Sagua de Tanamo	317
For Italy:	
Jap SS. Egypt Maru, for Porto Ferrajo	8,560
Ital. SS. Bampton, for Porto Ferrajo	6,518
For Mexico:	
Nor. SS. Crissy, for Vera Cruz	3,349
For Uraguay:	
Br. SS. Shelley, for Montevideo	6,481

FROM PHILADELPHIA

For Cuba:	
Am. Schr. James W. Coburn, for Cay Francis	...
For France:	
Du. SS. Zosma, for Dunkirk (coke)	...

UNITED STATES JANUARY COAL IMPORTS

(In Gross Tons)

	Jan., 1922		Jan., 1923
Anthracite	116		11,331
Bituminous	111,037	free	158,048
		dutiable	179,601
Imported from:			
United Kingdom	17,025		142,349
Canada	82,263		179,639
Japan	2,075		.....
Australia	9,674		11,525
Other countries	.....		4,136
Coke	6,051		8,307

Hampton Roads Pier Situation

	May 10	May 17
N. & W. piers, Lamberts Pt.:		
Cars on hand	828	1,135
Tons on hand	51,724	71,137
Tons dumped for week	113,678	90,159
Tonnage waiting	16,000	1,700
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,509	1,487
Tons on hand	87,130	84,470
Tons dumped for week	132,741	129,109
Tonnage waiting	38,100	14,346
C. & O. piers, Newport News:		
Cars on hand	2,096	1,543
Tons on hand	108,525	90,660
Tons dumped for week	74,119	78,926
Tonnage waiting	5,250	11,695

Pier and Bunker Prices, Gross Tons

PIERS

	May 12	May 19†
Pool 9, New York	$5.75@$6.00	*$5.50@$5.75*
Pool 10, New York	4.90@ 5.50	*4.50@ 5.25*
Pool 11, New York	4.00@ 4.75	*4.00@ 4.50*
Pool 9, Philadelphia	6.15@ 6.60	*5.90@ 6.35*
Pool 10, Philadelphia	5.20@ 5.60	*5.00@ 5.55*
Pool 11, Philadelphia	4.20@ 4.60	*4.10@ 4.55*
Pool 1, Hamp. Roads	7.00	7.00
Pools 5-6-7, Hamp. Rds.	5.50	*5.25*
Pool 2, Hamp. Roads	6.75	6.75

BUNKERS

Pool 9, New York	6.05@ 6.30	*5.80@ 6.05*
Pool 10, New York	5.20@ 5.80	*4.80@ 5.55*
Pool 11, New York	4.30@ 5.05	*4.30@ 4.80*
Pool 9, Philadelphia	6.50@ 6.70	*6.15@ 6.35*
Pool 10, Philadelhia	5.40@ 6.00	*5.15@ 5.95*
Pool 11, Philadelphia	4.50@ 5.00	*4.30@ 4.90*
Pool 1, Hamp. Roads	7.00	7.00
Pool 2, Hamp. Roads	6.75	6.75

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	May 12	May 19†
Admiralty, large	39s.@40s.	**40s.@42s.**
Steam, smalls	30s.	**32s.6d.**
Newcastle:		
Best steams	34s.@35s.	*32s.6d.*
Best gas	32s.6d.@35s	32s.6d@35s.
Best bunkers	35s.@35s.6d.	*34s.@35s*

† Advances over previous week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade

ALABAMA

The fifth annual statewide first-aid field meet will be held at Birmingham, July 21, under the auspices and direction of the Alabama Mining Institute and the U. S. Bureau of Mines. A large number of teams from the different mining companies and other industrial plants will participate in the meet, the program of events, prizes, etc. now being in course of preparation.

The first application for a coal lease on public lands in the State of Alabama has been made to the Department of the Interior, affecting 1,840 acres of land located near Carbon Hill, Fayette County. The tract is estimated to contain seven million tons of high-grade bituminous coal, lying in what is known as the "Jagger bed." It is a non-coking coal, but is especially adapted to domestic use, analyses made by the Bureau of Mines showing an average heating value of 12,577 B.t.u. Application for the lease has been made by a coal company of Memphis, Tenn. Should this company be the successful bidder it agrees to pay to the federal government a royalty of 10c. per ton mine-run of coal produced, guaranteeing a production of 20,000 tons per annum beginning with the fourth year and obligating itself to invest $25,000 per year during each of the first three years in coal-production plant and equipment. The coal-leasing privilege on this land will be sold by the Interior Department under the above conditions some time in June to the bidder offering the highest cash bonus at public auction at the land office at Montgomery. The exact date of this auction will be announced within the near future.

ILLINOIS

The Rentchler mine of the Missouri-Illinois Coal Co., at Rentcher, Ill., **has been ordered closed** by State Mine Inspector James R. Richards. The company has been ordered to equip the airshaft with a ladder. The company has also been instructed to increase the amount of air pumped into the mine.

The mine of the **Jeffrey Coal Co.** at Herrin **suffered a loss by fire** recently when the **timbering in the shaft was almost totally destroyed.** The timber was new, the mine having been shut down some time ago for the purpose of retimbering the shaft and the work had been completed to within a few feet of the surface.

Governor Len Small told the Illinois legislative investigating committee last week that neither he nor Adjutant General Black nor Colonel Sam Hunter ought to be blamed for not sending state troops to stop the Herrin massacre of June 22, 1922. He blamed the sheriff and county authorities of Williamson County and said that, judging from the reports furnished him, right up to the morning of the slaughter of 21 non-union miners by a mob there was no need for troops. The committee has found that many of the important witnesses it wanted to call from Williamson County have "disappeared" and probably will stay out of sight until adjournment of the Legislature, when the committee's authority ends.

A. C. Linberg has joined J. M. Crom in representing the **Cement-Gun Co.** in the Chicago district. Mr. Linberg, formerly with Fred T. Ley Co., Inc., and with the Thompson-Starrett Co., has had wide experience in sewer and dam construction. The Cement-Gun Contracting Co. is now taking contracts not only for Gunite work, but also for the building of reservoirs, dams, levees and the like.

Too many mines and too much labor trouble are the most serious afflictions of the soft-coal industry, according to Conrad B. Spens, vice-president of the Chicago, Burlington & Quincy R.R. and formerly Federal Fuel Distributor, writing in the *Illinois Journal of Commerce*, the publication of the Illinois Chamber of Commerce. Soft-coal production increased 37 per cent between 1910 and 1920, Mr. Spens says. While in that period the railroads increased their coal-car tonnage 42.5 per cent they were obliged to divide their cars among 6,800 more mines in 1920 than in 1910. With fewer mines there would be better transportation and with fewer labor troubles there would be continuous production, Mr. Spens said.

INDIANA

The Bankers Trust Co., of Indianapolis, receivers for the Steele-Kattman Coal Co., has announced that all creditors of the defunct company are required to file their claims with the receiver on or before June 1.

The Joan Collieries Co., an Ohio corporation, has qualified to do business in Indiana with a capital stock in this state of $50,000 as represented by the stockholders. David E. Rowland, a well-known coal man of Terre Haute, has been named state agent.

The Wabash Coal & Oil Co. of Terre Haute, has filed a final certificate of dissolution. **The Glendale Coal Co.,** also of Terre Haute, has filed a similar document with the Secretary of State.

Contracts for providing the 1923-24 coal supply to Indiana state institutions, 140,775 tons in all, **have been awarded** by the State Purchasing Committee to the **Tope Coal Co.** and **Ogle Coal Co.,** both of Indianapolis; **Walter Bledsoe Coal Co.,** of Terre Haute, and **Ayrshire Coal Co.,** of Oakland City, according to Fred B. Robinson, secretary of the committee. One or two small contracts yet may be made, but the great bulk of the supply is covered by the deals just completed. The contracts call for $2.40 a ton for mine-run Indiana No. 4 shaft coal; $2.05 for No. 4 screenings; $2.65 for egg size; $1.25 for 4-in. screen; $1.90, pea and slack, No. 5 coal, and $2.20 washed pea and slack, Mr. Robinson said. The prices are to prevail until April 1, 1924, when miners are to negotiate with operators for a new wage scale.

A drop in coal prices for the summer months has been announced by most of the dealers in Evansville. It is expected similar decreases for summer delivery will be made now in most of the cities of that section of the state. **Prices quoted at Evansville are:** Lump coal, 20c. a bushel; nut coal, 20c.; mine-run, 18c. During the winter months the prevailing price for lump and nut coal was 23c.

Two practical coal miners and two experienced coal operators were appointed members of the **Indiana State Mining Board by Governor McCray** in organizing the new State Department of Mines and Mining which was created by the last session of the General Assembly. The mine inspection work of the state was formerly a division of the state industrial board. John Hessler, of Terre Haute, president of district No. 11, United Mine Workers of America, and William Mitch, of Terre Haute, a miners' official, were appointed as the coal miners on the new state board. William Johnson, of Vincennes, and John A. Templeton, of Terre Haute, are named as the coal operators. Mr. Hessler and Mr. Johnson were appointed for two years, while Mr. Mitch and Mr. Templeton will serve for four years. Cairy Littlejohn has been appointed chief mine inspector by the Governor. Mr. Littlejohn has been state mine inspector under the industrial board.

Articles of incorporation for the Indiana Coal Merchants' Service Bureau, Inc., of Indianapolis, which is composed of the membership of the Indiana Retail Coal Merchants' Association and which will give statistical and other service to its subscriber members have been filed with the Secretary of State. The bureau was capitalized at 100 shares of no par value. Directors are: R. R. Yeagley, secretary of the coal dealers' association; Martha A. Yeagley and Frank D. Roberts. The establishment of the service bureau was decided on at the final session of the spring convention of the association in April in Indianapolis. Annual meetings of the subscribers to the service bureau will replace the conventions of the association.

KENTUCKY

Announcement was made at Hazard May 4 of a contract let for the **construction of a Whitesburg to Harlan roadway, connecting the Hazard and Harlan coal fields by road.**

J. E. Johnson has succeeded the late Richard V. Hord as secretary of the Hazard Coal Operators' Association.

MASSACHUSETTS

The special Massachusetts Legislative Commission appointed to investigate the coal situation **held its first session** on May 10 at the State House in Boston. Congressman Treadway, the first witness, declared that New England is the subject of discrimination as in favor of longer hauls. He suggested an investigation of the question of royalties, noting particularly the Girard estate, and also raised the question of profits accruing to independent companies. The questions of standards of quality and of substitutes were suggested as subjects which might yield valuable results upon close investigation. As to government ownership, he declared himself decidedly opposed to any such plan. The coal dealers declared that the new pure coal law is responsible for some shippers refusing to send coal here. B. Preston Clark, of the Associated Industries, declared that the situation here is chaotic and that there is now a great shortage of coal, which ought to be relieved as speedily as possible.

MISSOURI

A controlling financial interest in the **Devoy & Kuhn Coal & Coke Co., of St. Louis, has been acquired by Chas. A. Wall and associates.** Mr. Wall is chairman of the board and his son, W. P. Wall, president of the firm. S. W. Innes and J. Weinberg, appointed as vice-presidents, will have charge of sales and purchases.

NEW YORK

The Webster Mfg. Co. of Chicago announces the appointment of **Robert T. Pierce as manager of the company's New York sales office** at 90 West Street. He succeeds the late Glen N. Porter, whose death occurred March 31, 1923.

Emil Greenberg, chairman of the Bath Beach Community Council, Brooklyn, has sent a letter to President Harding, asking that **action be taken "which will insure for the future an uninterrupted supply of coal** to the public at reasonable prices." The letter declares that the coal operators "deliberately created a shortage," that "rubbish from the culm piles" was sold by "the coal barons and profiteers," and that much suffering resulted.

Sealed proposals will be opened by the Superintendent of Lighthouses, Staten Island, 2 p.m., May 28, 1923, for approximately 3,100 tons of bituminous steam coal during July, August and September, 1,800 tons trimmed in vessels' bunkers as required under coal chute New York Harbor; 300 tons for vessels at New London, Conn., and 1,000 tons delivered in 500-ton lots by barge alongside Lighthouse Depot, Staten Island. Information on application.

PENNSYLVANIA

Thirty-two ovens at the Farrell byproduct coke plant of the Carnegie Steel Co. **have been fired up** after a two-year shutdown. The remaining 182 will be charged as soon as possible.

Two hundred applicants took the examination for second-grade mine foremen at Cresson during the second week in May before an examining board of which Joseph Williams, mine inspector of Altoona, was the chairman.

Fifteen tracts of coal land, in addition to those purchased recently, have been acquired by the Pennsylvania Coal & Coke Corporation in northern Cambria County. The entire deal is said to involve the expenditure of a million dollars.

The washery and tipple of the Keystone Coal & Coke Co. at Salemville **was destroyed by fire** May 5, causing damage estimated at $100,000. It was announced that coal mined at Salemville would be taken by an underground route to the Huron plant of the company and that it would be put through the washery at the latter place and then returned to Salemville to be made into coke.

Examinations were held in Johnstown during the second week in May by the state mining board, composed of Nicholas Evans, inspector; George W. Wilkes, operator, and Robert Joves, miner. A total of 128 miners took the examination for second-grade mine foremen, one of the largest classes ever examined in Johnstown. The 6th, 24th and 30th districts were represented.

George W. Wilkes, superintendent of the Eureka mines Nos. 30, 31, 39 and 40 of the Berwind-White Coal Mining Co. for the past seven years, has tendered his resignation. Mr. Wilkes is a mine superintendent of wide experience, beginning his work in England 47 years ago, and working in western and central Pennsylvania for thirty years. He will remain in Windber.

Twenty ovens at the Grace plant of the Corrado-Schenck Coke Co. at Moyer **were recently overhauled and fixed up after an idleness of more than a year.** Coal will be supplied from a new opening, a sufficient quantity being available to keep the operation running for some time. The plant, built and operated for many years by W. J. Rainey, was acquired by the Corrado interests about two years ago.

The bill compelling anthracite companies to sell coal to churches, schools and charitable institutions in the communities where the coal is mined, has passed the Senate and is now in the hands of the Governor. The bill is the outgrowth of Olyphant's experience last winter, when the Hudson Coal Co. refused to sell coal to keep the schools and churches open. The citizens answered this by confiscating several cars of coal that stood on a siding.

Future polices of union labor in Somerset County are difficult to determine since Judge John A. Berkey granted an injunction the equity suit filed by the Quemahoning Creek Coal Co. against officers and individuals of District No. 2, United Mine Workers. Two hearings were held and the injunction continued indefinitely. Union activities are prohibited in the Quemahoning field and the final decision doubtless will determine action of other non-union operating companies in the Somerset County field, of which there are many.

Representatives of organized labor appearing before the Senate Judiciary General Committee May 9 **urged passage of the amendments to the Workmen's Compensation act** sponsored by Senator Joyce, Luzerne, whose bill would increase the maximum weekly compensation from $12 to $16 and the number of weeks during which compensation would be paid for disability. Opposition to the measure failed to materialize at the meeting, but it was stated by a member of the committee that anthracite and bituminous operators would file briefs with the committee, setting forth their objections to the bill.

An accident, probably due to an air blast, at the No. 10 colliery of the Lehigh Coal & Navigation Co., near Lansford, May 4, **resulted in three men being killed and six injured,** one of them seriously. J. B. Warriner, general manager of the company, stated that the first reports that the accident was due to a gas explosion are not true as far as the preliminary investigations have disclosed. There was a rush of air in a new level at the No. 10 colliery that flung the men about, one sustaining a fractured neck, another a fractured skull, a third was badly bruised and lacerated. The other men also report that there was a terrific rush of air that lifted them from their feet and threw them down. The source of the rush has not been determined, it being impossible to penetrate to the top of the breast, where they were at work, to complete the investigation.

Five hundred men at the Buttonwood colliery of the Lehigh & Wilkesbarre Coal Co., near Wilkesbarre, **went on strike** on May 14 following a dispute over the quality of blasting powder furnished by the company. **The men returned to work on Wednesday.** Four hundred men at the Laurel Run colliery of the Hudson Coal Co. went on strike when one union man was discharged. The total loss of output in both strikes is 1,500 tons daily.

The Wilkes-Barre City Council agreed May 15 to draw up an agreement and **execute a lease for the sale of the coal under the river common to** James J. Powell, a Scranton attorney, at his bid of 52c. per ton.

Governor Pinchot on May 10 approved the bill of Representative John R. Post, Washington County, relieving life tenants of land from the payment of taxes on the underlying veins of coal which they have no right to operate. The new law, which is the first of the series of coal bills before the Legislature to be signed, provides that such coal shall be assessed to and the taxes paid by the owner of the veins of coal.

More than 1,600 miners employed by the Jeddo-Highland Coal Co. in the Hazelton district walked out May 14 **in protest against the company's refusal to advance the hour of paying off** so the men will not have to stand around in wet clothes waiting for their money. The company announced that no concessions would be made and that the matter will be taken to the Anthracite Conciliation Board. They claim that under the eight hour day the miners should not finish work until 3:30 p. m. The men announced that they will tie up all the collieries every pay day until the change is made.

Another big transaction in coal lands involving over 1,000 acres has just been put through in Cambria County. The price is said to be $1,000,000. **The holders of the Davis-Long Coal Co. in Cambria township have just been sold to J. H. Weaver,** of the Ebensburg Coal Co., which already has a large acreage now under operation at Colver. This is the territory that was the cause of considerable litigation between the Davis-Long company and Charles N. Blanchard, of Binghampton, N. Y. The new owner will open a mine and start a new town several miles west of Ebensburg.

The Davis and the Fowler mine-cave bills in the House Committee on Mines and Mining probably will follow the series of other bills before the Legislature this year which have as their object the return of part of state taxes to the municipalities in which they are collected. With the collapse of the taxation program in the House there is little chance, if there ever was any, for a return of moneys collected for state purposes to their source. The mine-cave bills provide for a return of a portion of the anthracite tonnage tax to coal producing municipalities for general purposes for the repair of damages caused by mine caves. Representative Fowler and Representative Whiteman, chairman of the House Committee on Mines and Mining, saw Governor Pinchot about the bills on May 15 and the Governor told them that in view of the lack of finances he could not see how he could sign the bills if they reached him.

Shipments of anthracite during April, 1923, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,173,774 gross tons as compared with 7,183,518 gross tons during the preceding month of March, a decrease of 1,009,744 gross tons or 14.06 per cent. This decrease is partly due to fewer actual working days during the month of April and to operations being almost entirely suspended on the Eight-hour Day, April 2. Continued button strikes also contributed to the decreased production. Comparison with the month of April last year cannot be made on account of entire suspension of operations pending new wage agreement, which was signed Sept. 11, 1922. Shipments by originating carriers were as follows:

	April 1923	March 1923
Philadelphia & Reading	1,170,925	1,370,476
Lehigh Valley	1,088,783	1,279,599
Jersey Central	508,683	622,710
Dela., Lackawanna & Western	906,203	1,146,217
Delaware & Hudson	851,960	907,099
Pennsylvania	527,139	542,167
Erie	647,707	818,817
N. Y., Ontario & Western	146,985	192,247
Lehigh & New England	325,389	304,186
Totals	6,173,774	7,183,518

One of the largest hearings of the present legislative session was held May 9 on the Smith and McNichol bills aimed at stopping further stream pollution. The Senate Health and Sanitation Committee held the hearing and speakers of the bill included representatives of water companies, conservationists, sportsmen and state officials of the Health Fisheries and Labor and Industry Departments. F. D. Patterson, representing the Manufacturers' Association; Charles O'Neil, secretary of the Pennsylvania Coal Operators' Association; James Campbell, chemist for the Frick Coal & Coke Co.; Clayton Snyder, Pittsburgh steel interests, and J. N. Chester, Pittsburgh, opposed the bills. They contended they are unnecessary, for chemists of the coal and steel companies are working on filtration plans to stop pollution. The Smith bill prohibits pollution of all streams not now contaminated, while the McNichol measure prohibits pollution of water supplies at their source.

UTAH

The U. S. Land Office at Salt Lake City has been directed by the Secretary of the Interior **to offer for lease two tracts of public coal land** in Utah, one containing 400 and the other 440 acres. The land is in Sevier County about 40 miles northeast of Richfield and is accessible to the branch of the Denver & Rio Grande R.R. running from Salt Lake City to Marysvale. Lease for each tract will be at a government royalty of 10c. per ton for coal mined, a minimum investment in mining operations of $35,000 during the first three years of the lease, and a minimum production of 12,000 tons of coal a year beginning with the fourth year of the lease. The sale of the leases will be made by public auction at the Salt Lake City land office on a day to be fixed later. Privilege will be given to bidders to obtain one lease covering both tracts.

It has been announced that the **Utah Fuel Co.'s coal camps in Carbon County will all make connections with the Utah Power & Light Co.'s high-tension lines for power service.** This is taken to indicate that the much discussed plan to build a central power plant near Price to generate electric power with local screenings for fuel has been abandoned.

VIRGINIA

Trial of suits aggregating nearly half a million dollars filed by the Norfolk & Western Ry. against coal companies which have agencies at Norfolk, for alleged demurrage charges over a varied period running back nearly to the war, **will begin in the City Circuit Court at Norfolk, May 25.** The railroad claim for demurrage is denied by the companies, which charge that the railroad assessed demurrage on improper schedules. The companies which are defendants in the suits, and the amounts in each case, are: Panhandle Coal Co., $3,286 28; Nottingham & Wrenn Coal Co., $15,000; C. H. Sprague & Co., $58,129.28; Smokeless Fuel Co., $21,870.28; Raleigh Smokeless Fuel Co., $17,636.50; Dexter & Carpenter, $1,990; West Virginia Coal Co., $2,183.06; Jewett, Bigelow & Brooke, $46,320; Algonquin Coal Co., $124,012.62; Eastern Coal & Export Corp., $29,409.66; George E. Warren Corp., $2,072.20; Matlack Coal & Iron Corp., $8,640.26; William-Cory-Mann-George Corp., $8,826.02; Kentenia Coal Co., $242.14, and Fort Dearborn Coal & Export Co., $5,219.82.

WEST VIRGINIA

The Horse Branch Coal Co. and the **Black Diamond By Product Coal Co.** have been dissolved as corporations.

The following West Virginia coal concerns have increased their capital stock in the amounts given: Raleigh-Wyoming Coal Co., from $3,500,000 to $4,100,000; **Elm Grove Mining Co.,** from $2,000,000 to $2,400,000; **Hite-Barns Coal & Coke Co.,** from $200,000 to $300,000; **Mordue Collieries Co.,** from $750,000 to $1,250,000; **Fort Grand Coal Co.,** from $100,000 to $500,000.

The United Workmen Collieries Co., organized under the laws of Delaware, has been authorized to transact business in West Virginia.

A jury in the Federal Court of the Southern District of West Wirginia has **nullified the claims of C. L. Stickel to the lands owned by the Big Laurel Coal Co.** in Boone County. The case was an action in ejectment, Stickel claiming title to the land. The case is one of those involved in the government case now pending against a number of defendants in Omaha, Neb.

Another mine will soon be opened by the Pocahontas Fuel Co. in the Wyoming County field, not far from the Itmann mine in Wyoming County, on the line of the Virginian Ry. It will be necessary for the Virginian to extend its line in order to afford shipping facilities. There are about 2,000 acres in the tract, which the Pocahontas Fuel Co. will begin to develop. The company is making extensive improvements at Pocahontas, having begun the erection of a number of dwellings for the use of company officials and the clerical force of the company.

The Fairmont & West Virginia Coal Co., which was recently organized by Robert Y. Brown and others **will have offices in Fairmont,** New York, Pittsburgh, Cleveland and other cities. Opening of the offices in Fairmont follows the recent purchase of the Shadybrook mine of the Banner Coal Co. on the line of the Western Maryland in the Fairmont region. The company will have as its local representative, it is understood, Harry MacAlarney of Ebensburg, Pa. A. L. Black is to be the superintendent of the Shadybrook mine, the capacity of which will be increased by numerous improvements and the installation of much new equipment.

By agreement between counsel representing the state and the defense, **the trial of C. Frank Keeney,** president of the District 17 United Mine Workers; **Fred Mooney,** secretary-treasurer of the same organization, and **William Blizzard,** president of sub-district 2 of District 17, **will be begun in the Circuit Court of Greenbrier County at Lewisburg, on June 18,** that date having been fixed May 19 by Judge Summers H. Sharp. Keeney, Mooney and Blizzard were indicted for complicity in the armed march against Logan and Mingo counties in the fall of 1921 and are now charged with being accessory to the slaying of several Logan County deputies during the outbreak of 1921. Judge Sharp has continued the term of Circuit Court in Greenbrier County for the purpose of trying the defendants.

The Helmick bill creating the West Virginia School of Mines has been approved by the Governor. The new law creates a school of mines to be on the same footing with the school of arts and sciences and other schools at the West Virginia University. It provides that there shall be a department of mining engineering, mining geology, chemical engineering, mining extension, etc., and that a suitable staff of instructors as well as a dean shall be appointed. The new law also provides that a suitable building shall be erected. The location of the new school of mines has not been definitely determined upon, that being left to a commission of five members to be appointed by the Governor.

In the list of West Virginia concerns whose capital stock has recently been increased are: **Long Coal Mining Co.,** of Clarksburg, from $50,000 to $200,000; **Bear Run Coal Co.,** from $5,000 to $25,000; **Coal River Collieries Co.,** from $2,000,000 to $2,500,000; **Standard Thacker Coal Co.,** from $25,000 to $150,000; **Vulcan Coal Co.,** from $50,000 to $200,000; **Smith Pond Creek Coal Co.,** from $50,000 to $150,000.

The Middle West Coal Co. has reduced its capital stock from $200,000 to $53,750, and the **Aetna Sewell Coal Co.,** from $2,000,000 to $1,000,000.

A compromise has been reached out of court **in the suit between the Matthew Addy Steamship and Commerce Corporation and the Raleigh Smokeless Fuel Co.,** which was being tried in the federal court for the southern district of West Virginia and in which $464,000 in all was involved as a result of the suit and counter suit. The Matthew Addy Corporation had instituted suit for damages to the amount of $364,000 for alleged breach of contract and on the ground that the Raleigh company had failed to make deliveries according to contract. The Raleigh Smokeless Fuel Co. also had a suit against the Matthew Addy Corporation pending in which damages were asked in the sum of $100,000 for alleged failure to accept the delivery of coal.

Following a visit of Colonel C. W. Watson, president of the Consolidation Coal Co., to that company's properties embraced in the New River-Pocahontas division, it became known that **improvements costing about $5,500,000 are contemplated.** The properties to be improved are located in McDowell County and were acquired a few months ago. Since the Consolidation took over the smokeless properties in southern West Virginia it has been engaged in making many improvements and in maturing plans for further improvements, all with a view to increasing the capacity of mines.

The Atlas Coal & Coke Co., of Chicago, of which L. Romanski is president, has opened an office in the Masonic Temple Building, Charleston, with E. W. Tildesley in charge. The tidewater and Western business of the company will be handled through the new office.

The Elkland Coal Mining Co., which has headquarters at Columbus, Ind., will soon increase the capacity of its mine on the Charleston division of the B. & O. by the installation of a larger tipple, scales and shaker screens. It is hoped to double the output soon. D. C. Hitt, of Columbus, is president and I. D. Lyons, of Columbus, secretary and treasurer.

WASHINGTON, D. C.

I. W. W. interests will soon be operating a coal mine in this state, judging by the fact that Elmer Smith, of Centralia, an I. W. W. leader, has filed articles of incorporation for the Smith Coal Co. to operate a mine near Mendota. The company is capitalized at $18,000.

During the absence in Europe of George S. Rice, chief mining engineer of the Bureau of Mines, and until further notice, **James W. Paul will be acting chief mining engineer,** with headquarters at Washington. **C. A. Herbert is detailed to Pittsburgh to serve as acting chief coal mining engineer,** beginning June 1 for a period of five months, and will report through the superintendent of the Pittsburgh Station to Mr. Paul. He will have immediate charge of the Experimental Mine work and other coal-mining investigations, except the coal waste inquiry for the U. S. Coal Commission, which work will be handled directly by Mr. Paul. **H. I. Smith will continue as mining supervisor** and will report through the Assistant to the Chief Mining Engineer on administrative matters, consulting with the Acting Chief Mining Engineer on technical matters.

The U. S. Bureau of Indian Affairs, Department of the Interior, **invites bids on approximately 46,100 tons of bituminous coal and 2,100 tons of anthracite** for the use of the Indian Service during the fiscal year ending June 30, 1924. Bids will be opened 2 p.m., June 4. Schedules giving all necessary information will be furnished upon application to the Indian Office, Washington, D. C., or the U. S. Indian Warehouses at Chicago, St. Louis and San Francisco.

CANADA

The Princeton Coal & Land Co., which owns extensive coal areas near Princeton and much real estate in that city, **is being taken over by Yorkshire and Lancashire coal mining interests,** and in future is to be operated on a much more extensive scale. F. W. Glover, who has been superintendent of the mine for many years, has been made general manager. The company has been in operation for some years, and last year it produced close to 20,000 tons of coal. The coal is unusually high in volatile combustible matter, average analyses running 44 per cent volatile, 50 per cent fixed carbon and 5 per cent ash. The sulphur content averages about 0.5 per cent.

At a recent conference Mayor Macguire told the Toronto coal dealers that if they could not guarantee that there would be no shortage of fuel as there was last winter **the city would go into the coal business again.**

Four thousand miners in the Glace Bay coal fields voted May 18 **to call a strike if the provincial police make further raids upon the homes of the United Mine Workers** in their search for seditious literature. The arrest of any of those whose homes already have been raided also would be the signal for a strike, it was said.

Denial of an agreement between the Canadian National Railways and the Canadian Pacific Ry. **fixing an early summer rate of $9 a ton on coal** from points in Alberta to Toronto was made by E. P. Mallory, of the C. N. R., before the Mines and Minerals Standing Committee at Ottawa. A net cost of $9.90 for handling coal from Lethbridge, Alta., to Toronto was given by W. B. Lannigan, general freight traffic manager of the C. P. R., in testimony before an investigating committee.

In a report just issued by the fuel investigating committee of the Engineering Institute of Canada on the fuel situation throughout the dominion it is stated **"that the American anthracite must be regarded today as 'luxury' fuel** in that a high price is paid for acquired habits of use. Welsh anthracite and metallurgical coke, particularly, are much better fuels in that they give more heat for less money, are easy to handle, and have very little ash."

Association Activities

Monongahela Coal Association

The Monongahela Coal Association at its May meet in Morgantown, W. Va., not only made arrangements to be officially represented at the National Coal Association gathering in Atlantic City on June 19, but also discussed informally some of the problems affecting the Monongahela Valley coal region. President John H. Jones, who recently negotiated a merger of a number of coal companies in Pennsylvania and West Virginia, and Secretary C. D. Junkins are to be the official representatives of the association to the National Coal meeting.

Smokeless Coal Operators Association

At its meeting in the Waldorf-Astoria Hotel in New York on May 10, the Smokeless Coal Operators' Association gave its attention to transportation. Looming up at no distant date, it was stated, is an effort of Pittsburgh and Ohio operators to bring about changes in present freight differentials on West Virginia coal in so far as shipments to the Great Lakes are concerned. If such a move should be successful, it was the impression at the meeting, it would place a discriminatory rate against West Virginia shippers of 36c. per ton and would prevent the industry in West Virginia from moving any coal except that which could not be obtained elsewhere. Among those present were Messrs. Caperton, Collins, Crocket, Deyerle, Ellison, Farrell, Fobes, Gross, Houston, Higgins, Jones, Johnson, Koepler, Lawton, Machnicht, Lewis, Morfit, Phillips, Tams, White, Burrows, Adams, McKee and Wolfe. President Robert H. Gross acted as chairman of the meeting. George Wolfe, secretary of the Winding Gulf Association, was the secretary.

Obituary

Archibald MacDonald, widely known in Glace Bay, B. C., died at his home there May 14 after an illness that lasted nearly three years. He was 73 years old. Born at River Dennys, Mr. MacDonald at an early age went to the Glace Bay district, where he worked for the past half century as a miner in various collieries throughout the district.

Eastern Kentucky operators were very sorry to hear of the sudden death at Lexington, Ky., of **Richard V. Hord,** 45, of Lexington, who for five years or more was secretary of the Hazard Coal Operators' Association until he resigned on account of ill-health about the first of this year. Death on May 7 was due to a stroke of paralysis on the 5th. Mr. Hord was a native of Mason County, and for years had been active in eastern Kentucky coal circles. He had some holdings of his own, principally undeveloped properties.

Thomas Hudson, for thirty years a district mine inspector in Illinois, died at the St. Francis Hospital, Kewanee, May 7, at the age of 77 years, lacking fifteen days. Though always of a rugged strong constitution, Mr. Hudson's health had been failing for some time previous to his being taken to the hospital two weeks before his death. He was born in England, May 22, 1846, but came to this country more than fifty years ago, forty of which he has been a resident of Galva, which was his home at the time of his death. For the past three years he served the state as a member of the Mine Investigating Committee. Mr. Hudson was a charter member of the Mine Inspectors' Institute of America and held the office of treasurer of the Institute for three years following its organization in 1908. Taking a deep interest in politics, he served his home town as Mayor and Alderman. Mr. Hudson is survived by his wife and six children, all of whom were present at his bedside when he died. He had a large circle of mining friends.

Traffic News

The petition asking for authority to continue rates on bituminous coal from mines in the State of Ohio to certain points in Indiana, without regard to the fourth section, will be considered at an Interstate Commerce Commission hearing in Pittsburgh, May 28.

The Colorado and New Mexico Coal Operators' Association has assailed the freight rates from producing districts in Colorado and Northern New Mexico, alleging that they have been made without reference to any set plan or system, are full of inconsistencies and are being subjected to constant changes, arbitrarily made, without regard to the rights of producers in other districts. The association declares that its members have been subjected to unlawful discriminations and excessive charges and that it is necessary that the Interstate Commerce Commission establish maximum and minimum rates from the various competing districts in that territory. The association insists that each producing district be given full advantage of its geographic location so as to prevent rate wars and discriminations and give stability to the rate structure involved.

On account of embargoes via other routes and to prevent diversions, **an embargo was placed May 11 by the Boston & Maine R.R.** on all carload freight from the Rutland R.R. at all junctions for movement to or via the Boston & Maine, except carload freight originating on the Rutland, livestock, perishable and railroad supplies, including company fuel.

Members of the Alabama Utility Commission were in session in Birmingham for several days recently **hearing arguments from producers of coal,** ore and other commodities and the consumers of such raw material and the representatives of the several railroads regarding adjustments to be made in freight rates. It is understood that changes carrying in the main reductions in such rates will be arrived at. The discussions hinged for the most part on whether the zoning system of rate-making should remain in force or rates computed on a mileage basis.

The Interstate Commerce Commission has dismissed the complaint of the Little Fork Coal Co., Willard, Ky., in which claim was made for reparation on various shipments of coal on which it was claimed unreasonable rates had been charged.

Reparation has been awarded the C. Reiss Coal Co., to cover overcharges on 134 carloads of anthracite shipped from Pittston, Dunmore and Avoca, Pa., to St. Paul and Minneapolis.

Linn Chapel and Kendall Brothers, retail coal dealers in Elmira, N. Y., **have attacked the rates on anthracite in effect via the Pennsylvania R.R. from points on its line in the Shamokin district to Elmira.** The complainants also **object to the failure of the Lehigh Valley to absorb connecting-line switching charges** at Elmira on such traffic. The commission is asked to prescribe rates of $2.14 and $2.02 per gross ton on this traffic. The present rates are $2.65 and $2.50 on prepared sizes and pea and smaller, respectively.

Operating, mining and production managers from mines in southeastern Kentucky gathered at the Hotel Sinton, in Cincinnati, on May 15 to **take action in opposition to the move made by operating companies of Ohio and Michigan to remove the lake differential from the outer crescent.** Some West Virginia operating men were present at this meeting also and have signified that they will join the movement. The statement was made that the Interstate Commerce Commission some time ago went fully into the plea of the Ohio and Pennsylvania people for the removal of the differential and decided that this as it stood in favor of Kentucky and West Virginia was eminently proper. It was the consensus of the Kentuckians that the differential should be fought for to the last ditch. Among those present were: Arthur Ellison, of Harlan, F. C. Mahan, of High Splint; Gus Whitfield, of Hazard, R. C. Tway, of Louisville; C. W. Boyd, traffic manager for the Appalachia and Hazard Operators associations, E. L. Douglass and G. W. Creech, of Twila.

An increase in the car supply on the Chesapeake & Ohio was reflected during the first twelve days of May by heavier loadings than during the corresponding days of April, the increase amounting to about 3,500 cars, or approximately 175,000 tons. E. L. Bock, general superintendent of the western general division of the road, said: "There is a gradual improvement showing in all lines of business and while our problem is not more business but more empty cars, the general situation affects us more or less."

Complaint made by the **C. H. Mead Coal Co.** and other coal companies operating **in Raleigh, Wyoming, McDowell** and other counties in southern West Virginia that the rates for power charged by the **Appalachian Power Co.** were unjust, unreasonable and excessive has been dismissed by the **West Virginia Public Service Commission,** before which the case has been pending since Feb. 21, 1922. The coal companies took the ground that in view of reduced fuel and labor costs as well as reduced material costs, the rates charged by the power company were unduly high. The Public Service Commission in dismissing the complaint without prejudice held that the power company was entitled to receive 8 per cent on its investment and that investigation disclosed the fact that the company was not earning more than $25,000 a year over and above 8 per cent on its investment.

Fred M. Sackett and William S. Speed, of Louisville, controlling the Byrne & Speed Coal Co., Louisville, have just closed a deal which has been authorized by the Interstate Commerce Commission, involving the **sale of the Sackett-Speed-owned Black Mountain R.R. in southeastern Kentucky to the Louisville & Nashville R.R. for $300,000.** The road is 8.29 miles long, running from Blackmont in Bell County, on the L. & N., to Puckett's Creek, in Harlan County. The road boasts of one engine and four cars, along with three mines and daily production of 52 cars of coal. It was built during the war period by Dr. W. H. Frost and associates of Fredonia, N. Y., and has outstanding capital of $108,000 and bonds of $300,000, which were acquired by Sackett and Speed in June, 1921. About $100,000 has been spent on improvement since the Louisville interests secured control.

A total of 10,979 new freight cars were delivered and placed in service by the railroads of the United States in April, according to reports filed by the carriers with the Car Service Division of the American Railway Association. This made a total of 50,151 new freight cars that have been placed in service since Jan. 1 this year. During the month of April the roads also placed orders for 8,303 new freight cars, which brought the total number of freight cars on order on May 1 up to 115,756. Of the new freight cars on order, coal cars numbered 46,194. The railroads also placed in service during April 293 new locomotives, which brought the total number installed during the first four months this year to 1,228. Locomotives on order on May 1 numbered 1,956 compared with 1,974 on April 1.

A final effort to save the Chicago, Peoria & St. Louis railroad from abandonment and the cruel mercies of the junk man is to be made by Peoria, Ill., interests. A petition made by New York bondholders that the road be scrapped and sold for its junk value has been bitterly fought out in the Sangamon County Circuit Court in Springfield, Ill., and has been heard by the Interstate Commerce Commission. The commission's order has not as yet been filed in court, but it does not solve the problem of how to keep the road in operation. Shippers who have been served by the road, including three mines, are trying to solve the problem. The C. P. & St. L. has about 180 miles of track with valuable terminal facilities in Peoria, Springfield and Alton. It has spent the greater part of its life in the hands of receivers. Efforts have been made toward a consolidation of the C., P. & St. L. with the C. B. & Q., Sante Fe, C. I. & W., and other systems operating in the territory, but the heavy indebtedness has been too great a deterring factor.

Summer Courses in Coal Mining

Carnegie Institute of Technology, Schenley Park, Pittsburgh, Pa. June 25 to July 20.

School of Mines, College of Engineering, University of Alabama, University, Ala. June 4 to June 30. H. D. Pallister, Professor of Mining Engineering, School of Mines, University, Ala.

School of Mines, Pennsylvania State College, State College, Pa. June 25 to July 28. E. A. Holbrook, Dean of School of Mines, State College, Pa.

Department of Mining, West Virginia University, Morgantown, West Va. June 11 to July 21. A. C. Callen, Professor of Mining Engineering, Morgantown, West Va.

Coming Meetings

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

American Association of Mechanical Engineers will hold its spring meeting at Montreal, Quebec, Canada, May 28-31. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Retail Coal Dealers' Association of Texas will hold its eighteenth annual convention at Galveston, June 11 and 12. Secretary, C. R. Goldmann, Dallas.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

The Illinois Mining Institute will hold its summer meeting on board a boat on the Illinois River, cruising between St. Louis, Mo. and La Salle, Ill., June 7-9. Secretary, Martin Bolt, State House, Springfield, Ill.

West Virginia Coal Mining Institute has set June 12 and 13 for its annual meeting, to be held at Hotel Waldo, Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Ninth National Exposition of Chemical Industries at the Grand Central Palace, New York City, week of Sept. 17. Manager, Charles F. Roth, Grand Central Palace, New York City.

COAL AGE

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C. E. LESHER, *Editor*

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Selective Immigration

IF THE immigration quotas of 1890 were restored and employers permitted to recruit their own labor under that quota, well-advised opinion is to the effect that the result would be in the public interest. Under such an arrangement immigration could be drawn largely from the north of Europe. It must be admitted that the government cannot undertake a selective process in a foreign country. Private employers, however, could look up the particular type of skill that they might need and in that way affect the selection of immigrants of the more desirable type.

For instance, this year there has been a great shortage of puddlers at American steel mills. On the other hand, there has been a surplus of this type of skill in Wales. Under the present law where the employer is prohibited from making any arrangement with a prospective employee in a foreign country, it is difficult to induce the average man to come to the United States and take a chance on obtaining employment. Many have not the resources to finance such a trip, yet they would be willing to come if expenses were advanced.

It is believed that any relief from the present immigration law will have to come along some such lines. There is no probability that Congress will take off the lid. Moreover, public sentiment is strongly opposed to any large increase in immigration since it is being learned that the public must take care of the unemployed in the off-peak periods.

A type of immigration and emigration that is coming in for considerable discussion is the interstate and inter-industry flow of labor. It is pointed out repeatedly that in the aggregate the soft-coal mines can spare thousands of mine workers without impairing their capacity to produce ample fuel for industry. The anthracite mines are perennially short handed and the metal mines want more men, as do many manufacturing industries. To meet in part this requirement negro labor from the South is flowing north, but the soft-coal mine worker is not leaving his part-time job in haste.

The reason, of course, that the steel industry, for instance, is short of labor while the bituminous-coal mines have a surplus is that the steel industry does not pay as high wages as does coal mining. Laws of Congress determine or at least set the limits on the influx of labor from across the seas, but economic laws govern the movement within the nation's borders.

It is more important to discuss how excess labor in one place may be induced to take up work where it is more urgently needed than to debate endlessly the question of how and why so many mine workers happen to be attached to the industry. The operators point out that the high wage and possibility of high earnings have and continue to attract men into digging coal, which is a reason suggesting a cure. The mine workers' official spokesmen do not deny this as a reason but merely say that if there are 200,000 excess men at the soft-coal mines it is the operators' fault for giving them jobs—which line of argument gets nowhere.

The bituminous-coal industry attracts men to it because it pays well and to dig coal is to be one's own boss, that is to say, assures money and freedom. For no lesser reason do those from foreign lands crowd to these shores.

Why More Reason In Settling Freight Rates Than Wages?

NO SURER evidence of normal conditions in the soft-coal trade could be had than the many complaints now before the Interstate Commerce Commission for readjustments in freight rates. Southern Ohio has a case before that body in which an increase in the differential between southern Ohio and West Virginia is sought as a direct means of increasing the market for Ohio coal. The operators in Colorado want more leeway on freight rates in the market to the east of them, Kansas seeks more of an edge on Illinois in Missouri Valley markets, Eastern shippers want better rates as compared with Illinois and Indiana into the Northwest, to mention a few of the outstanding cases before the Commerce Commission at this time.

Costs of production and freight rates determine quite rigidly the area in which coal from a producing field can be marketed. When demand and prices fall, orders decline, and with mines working but a few days a week—sometimes but a few days a month—the operators seek to extend their outlets, to get a larger share of the going business. Rate controversies are very expensive, statistical and legal services come high, but no expense is ever spared in waging a fight for lower rates or in defense of existent rates. Operators rally without question around their local associations and meet assessments willingly in the defense of such a cause. An equitable freight rate means a great deal to the life of a coal field.

The rate structure is a complicated affair, yet it is flexible. There are both general advances (or general reductions) and local changes. Inequalities are alleged, proved to the satisfaction of the rate-governing body and changed. Discrimination is prohibited. Through many years there have been evolved methods of ascertainment of such abstract things as density of traffic, earnings per ton-mile, costs and profits on specific transportation services. A great body of statistical record and of opinion has been built up on which contending parties may rely in seeking rate changes. It may almost be said that were a bar to be erected to further efforts to change coal freight-rate differentials, hope would die in the breast of the coal operator.

Yet that is what has happened with respect to that other important factor in the price at which the coal producer may sell his product. Labor represents between 60 and 70 per cent of the cost of mining and putting coal on the railroad cars. In the union fields

the wage rates and working conditions that together determine the labor cost of production have in recent years become solidified. There is no machinery in either the anthracite or the organized bituminous coal fields by which inequalities may be corrected. In the hard-coal region it is by agreement, by the contract dating from 1902, that differentials and details of working conditions have been so crystallized that no change is possible. In the soft-coal regions the union has set its face against any change that is not upward and uniformly applied. There is no present way of bringing to satisfactory negotiation the complaint, either of miners or operators, respecting wages or working conditions if the change desired will alter the earnings of either.

It is true that quite recently certain operators in an isolated field in Washington effected a new agreement with the mine workers' local that changed previously existing differentials and lowered the scale. The change was made, however, without the consent of the International organization. It was so obvious that if the union local had not agreed to what was an apparent necessity the district would have at once been made non-union that common sense prevailed in spite of Indianapolis, and a reduction was agreed to. The instance stands alone.

Now it is not conceivable that the relationships that exist between wages in different fields are perfect; that no improvement of advantage to either party is possible. Quite the contrary, for in 1920 these matters were introduced before the Robinson commission, particularly by the mine workers. The Robinson commission made no awards in this regard but it did recommend a commission within the industry to investigate machine differentials. The advice was never followed. So long as one side—now the United Mine Workers—is so powerful in its field with no organized resistance, there can be no collective bargaining.

It is possible to array facts with respect to discriminatory freight rates and come to a conclusion and force obedience to that conclusion, because there is a tribunal that has control of freight rates. What should be a proper wage rate should be as susceptible to argument and determination by reason as what should be a proper freight rate. The essential difference, of course, lies in the fact that the one is concerned with the wage of capital and the other with the wage of labor. Capital is now subject to the discipline of society; labor is not, although the time may come when it will be. Compulsory arbitration of freight rates came after a decade of discrimination and abuse in the railroad world, none of which could compare in blighting effect with the strikes of labor in 1922.

In the exchange of paper shot between the United Mine Workers and the Special Committee of the Bituminous Coal Operators—which our Washington correspondent advises this week is going over the heads of the Coal Commission—it is boldly proclaimed on the one hand that the cure for labor trouble in the coal industry is to unionize all the mines, while it is plainly intimated on the other hand that the union as a whole should be abolished. Neither, of course, is imminent.

To have industrial peace in the coal industry there must come a will to negotiate and to bargain collectively in every field where the union is a recognized factor. There must also be machinery to conduct negotiations and to enforce the results of the negotiations. The first step is a united front by the operators in the organized fields, for nothing less will force the United Mine Workers again to bargain. The machinery may be either within the industry or outside, as is the Railroad Labor Board. The preference is for arbitration and conciliation within the industry, and if there is to be any suggestion as to how it should be organized and function that suggestion must come from the operators. The question now is whether the Special Committee of Bituminous Coal Operators with its majority of anti-union sentiment can and will frame a constructive proposal for peace in the organized fields and rally the union operators to that plan.

Commodity Exchanges and Public Welfare

THERE is within the administration a powerful influence at work in favor of the produce and commodity exchange. These agencies are regarded as being vital to the continued welfare of many trades. Dealing in commodities on paper is a necessity, it is pointed out. Future trading, where there is actual delivery of the commodity, tends to diminish the volume of speculation in the business. These exchanges provide a hedge which is nothing more than an insurance on price, a very necessary procedure in modern business. Those who put in their time betting on supply and demand do an insignificant amount of economic harm. Even that is offset to a certain extent by the fact that these operators in their keenness make helpful deductions as to probable supply and demand. The sinister influence which is exerted in future trading is the buying of a position and the setting out to make it good. To do this, resort is had to efforts to spread the impression of shortages which do not exist.

These attempts to interfere with the ebb and flow of supply and demand are confined perhaps to 3 per cent of the volume of business done on exchange. Ninety-seven per cent of its operations are in the public interest, yet the 3 per cent brings the whole into disrepute. There is every reason why exchanges should adopt regulations which would preclude such tactics. Had the Chicago Board of Trade listened to public opinion ten years sooner, it might have escaped regulation. The broker has a professional obligation to the buyer and to the seller. He cannot be faithful to those obligations if he speculates on his own account. This is widely known, yet the exchanges have not had the courage to prohibit a certain minority from engaging in the unethical practice of dealing on their own account.

ALASKA WOULD GO AHEAD if the federal government were to get out, many believe. As it is, jurisdiction over the territory of Alaska is divided among 35 different departments and bureaus of the federal government, which represent 135 separate activities. Now that a number of prominent federal officials are planning a march on Alaska, it is hoped that steps will be taken that will give the people of that territory a chance to develop it. There is a large and thriving paper and pulp industry across the imaginary line which separates Alaska from Canada. The industry is largely in the hands of Americans, who are forced out of Alaska by the curious conception of conservation which seems to have as its objective that there be no development anywhere—that water capable of developing power should continue to waste itself on the rocks of its stream bed and that trees should continue to age and fall down.

Panther Creek District Mines Thickest Coal Found In Pennsylvania Anthracite Region

Steep Pitches Make Gravity Underground Loading So Easy That Output per Miner Is High—Maintenance Is Costly — Depth Increases 88 Per Cent in Fifty Years

By Dever C. Ashmead
Kingston, Pa.

THE thickest coal in the Pennsylvania anthracite region is mined in the Panther Creek district and steeply pitching beds make gravity loading underground so general that the output per miner is far higher than that of any other district. However, in spite of thicknesses running up to 200 ft. and averaging 15.87 ft. and in spite of the high average of 641 tons loaded out per day for every miner, the general tendencies of the Panther Creek district through fifty years of mining are about the same as those of the rest of the anthracite region. Beds have been thinned an average of 22 ft., the average depth has increased 88 per cent and production per employee has dropped markedly.

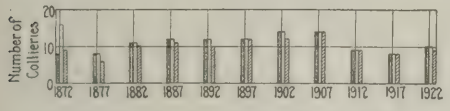


FIG. 50—NUMBER OF COLLIERIES CONSIDERED IN THE CALCULATIONS

This diagram shows the actual number of collieries used in the depth, thickness and tonnage calculations. The first column shows the collieries reporting depth and thickness and the last column in each period shows the number of collieries used in making the tonnage calculations. The center column shows the number of collieries reported by the state mine inspectors in their annual reports. These figures were determined by simply counting the collieries in each case.

The Panther Creek district, for the purposes of this article, is that group of mines in the tip of the Southern anthracite field that lies east of the Schuylkill River together with a few collieries in the same field just across the river to the west. This district includes comparatively few collieries, but data on them is practically complete, as shown in Fig. 50, except for the first period of the last half century. Therefore the figures paint a good picture of what has happened in the past and lend basis for accurate deductions.

TABLE XL—NUMBER OF PANTHER CREEK COLLIERIES IN THIS SURVEY

Years	Reported by Mine Inspectors	Having Depth and Thickness Data	Used in Tonnage Calculations
1872	16	8	9
1877	8	8	6
1882	11	11	10
1887	12	12	11
1892	12	12	10
1897	12	12	12
1902	14	14	12
1907	14	14	14
1912	9	9	9
1917	8	8	8
1922	10	10	9

The same physical characteristics that are found in the Eastern Middle district mark the Panther Creek field, but they are not so pronounced. For this reason the field is considered, geologically speaking, a part of the Eastern Middle field. The Panther Creek district has been subjected to great stresses and a very deep V-shaped basin has resulted. This makes the beds lie on planes varying from level to vertical and in places they are completely overturned. Fig. 51, which is a cross-section in the vicinity of the Lansford Tunnel, shows how steep these pitches are. The section shows the Summit Hill basin in relation to the main basin. The famous Summit Hill mine fire has been burning nearly fifty years in this section.

NOTE.—This is the fifth in a series of articles by Mr. Ashmead describing conditions in the seven sections of the Pennsylvania anthracite region. Previous articles appeared in *Coal Age* for Feb. 22, March 22, April 5 and May 10. The sixth will appear soon.

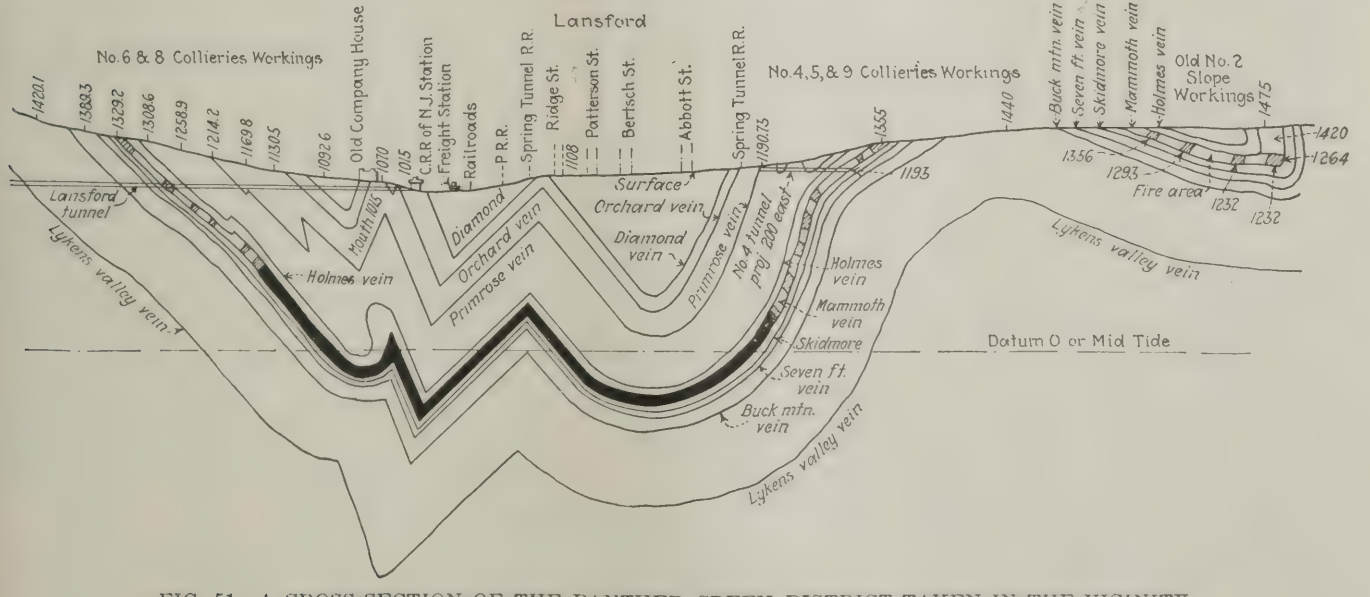


FIG. 51—A CROSS-SECTION OF THE PANTHER CREEK DISTRICT TAKEN IN THE VICINITY OF THE LANSFORD TUNNEL; SUMMIT HILL BASIN ON RIGHT

This cross-section shows the general character of the measures in the Panther Creek district. The beds of coal are generally very steeply pitching and in places they are vertical and lie back on themselves. This complicates the mining.

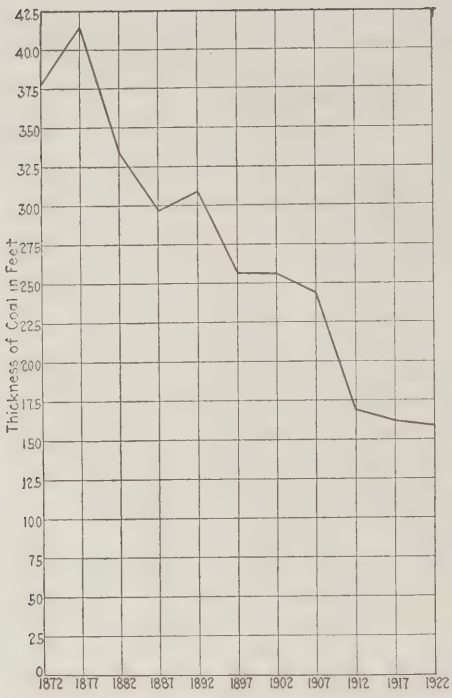


FIG. 52—AVERAGE THICKNESS OF THE BEDS OF COAL IN THE PANTHER CREEK DISTRICT

For the method of calculating this curve turn to Fig. 3 in Part I of this series of articles (*Coal Age*, Vol. 23, p. 324). Table XLI gives the points on the curve.

Some of the coal beds reach their maximum in the Panther Creek district. The Mammoth bed in places is 200 ft. thick and in one place it has been so folded that the two arms of the "V" come together and the total thickness of the bed reaches 400 ft. This coal is now being removed by stripping. Formerly it was mined by the old breast method. In this district, from the surface downward will be found beds in this order: Diamond, Orchard, Primrose, Holmes, Mammoth, Skidmore, Seven Foot, Buck Mountain and Lykens Valley and some smaller beds, which probably are splits of those mentioned. Some of these beds have not been proved to their greatest depth, hence it is impossible to state that they all exist in a workable condition.

Whether these thick beds are assets or liabilities depends entirely upon the mining methods that must be adopted to work each one. A thick bed from which the surface may be removed and the coal mined by steam shovels naturally is a very great asset, but a thick bed which has to be mined by breasts may be a liability, for the cost of the necessary protection of the hanging wall may more than offset every possible economy. The steep pitches and thick beds may mean that serious squeezes may result and areas of coal may be lost or badly damaged.

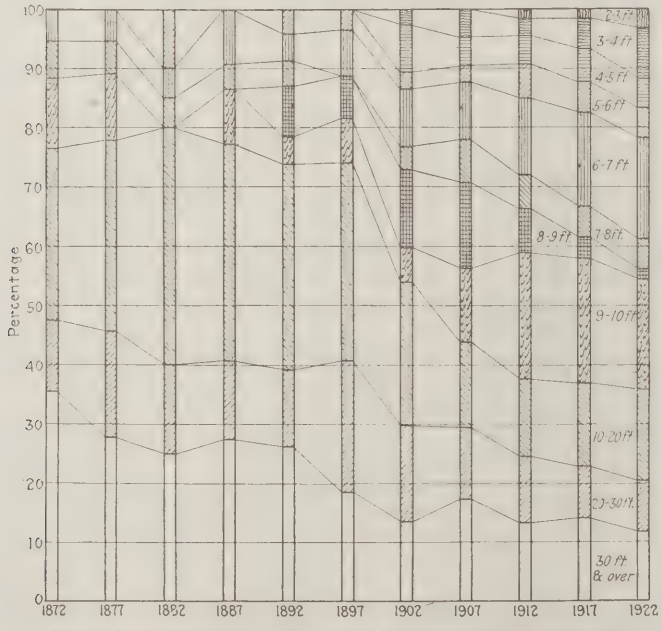


FIG. 53—PERCENTAGE DISTRIBUTION OF BEDS BY THICKNESS IN PANTHER CREEK DISTRICT

TABLE XLI—THICKNESS AND DEPTH AVERAGES FOR PANTHER CREEK DISTRICT

Years	Thickness of Beds	Depth of Workings	Years	Thickness of Beds	Depth of Workings
1872	37.86	337	1902	25.53	634
1877	41.50	445	1907	22.45	569
1882	33.35	468	1912	16.85	534
1887	29.70	475	1917	16.21	589
1892	30.90	507	1922	15.87	630
1897	25.58	616			

In the early days most of the coal was procured from water-level tunnels, and only the cream of the coal in the Mammoth and one or two other beds was taken. The remaining beds were not considered worth going after, as the easily attainable coal was considered inexhaustable. The adoption of anthracite for domestic purposes so increased the demand that the coal companies began to realize the value of the other beds. The old method of taking only the cream of the coal was abandoned; for by that method disturbances of the beds were likely to occur ruining the thinner upper beds by squeezes and causing loss of the coal remaining in the beds under operation. Fig. 52 indicates that in 1872 the average thickness of the coal beds was 37.86 ft. and that in 1887 it had increased to 41.50 ft. It was not until after that period that the thinner beds began to be worked. From 1877 the curve declined rapidly. By 1922 the average thickness had decreased to 15.87 ft. Today, Panther Creek operators work nine beds instead of only the Orchard, Primrose and Mammoth beds, as in 1872.

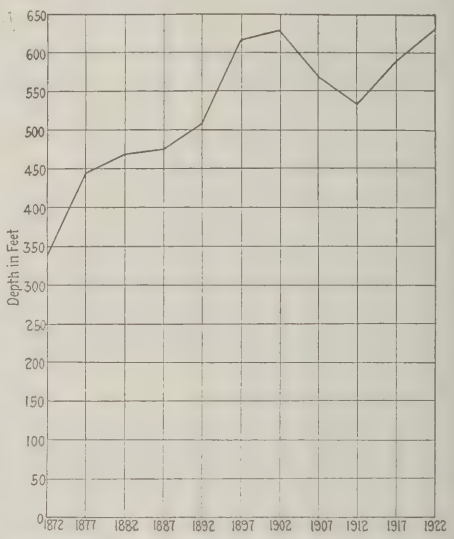


FIG. 54—AVERAGE DEPTH OF WORKINGS IN PANTHER CREEK DISTRICT

By five-year periods commencing with 1872 the weighted average depth of workings in the district is shown. The method of obtaining this weighted average depth is shown in the footnote to Fig. 5 in the first of this series of articles (*Coal Age*, Vol. 23, p. 325). In Table XLI will be found the figures from which this curve was plotted.

In Fig. 53 is shown the proportionate increase of thin beds mined. In 1872 not a single bed less than 6 ft. thick was worked. Those that might be called thinner beds—between 6 and 8 ft. thick—are really splits of much thicker beds according to reports from coal companies and therefore might properly be assigned greater

TABLE XLII—TONNAGE PRODUCED PER BOILER HORSEPOWER AND PER ENGINE HORSEPOWER IN THE PANTHER CREEK DISTRICT

	Boiler Horsepower Installed	Engine Horsepower Installed	Tons of Coal Produced per Boiler Horsepower	Tons of Coal Produced per Engine Horsepower
1877	2,340	3,030	0.88	0.68
1882	3,780	7,611	.48	.24
1887	6,480	.....	.63	....
1892	8,850	.....	.66	....
1897	13,640	.....	0.60	....
1902	17,337	.....	0.48	....
1907	25,389	28,930	0.54	0.47
1912	29,162	38,571	0.48	0.36
1917	17,372	29,209	0.80	0.47
1921	16,123	.....	0.99	....

thicknesses than those given in this paper. In 1872 exactly 76.5 per cent of the beds being worked were more than 10 ft. thick, and this proportion was maintained until 1897. At this point there was a considerable drop, due to the opening of a new colliery working thin beds by modern methods, taking practically all of the coal instead of only working the best beds.

From 1897 the percentage of the thick beds continued to drop steadily and by 1922 this percentage was down to 35.5. Not until 1902 were beds thinner than 5 ft. worked. But by 1912 beds even as thin as 2 ft. were opened. Naturally the character of mining in this district changed materially.

As was to have been expected, the average depth of Panther Creek has increased—88 per cent in fifty years. Workings show a steady increase, according to Fig. 54, until 1902. This increase is from 335 ft. in 1872 to 634 ft. in 1902, or 299 ft. In the period 1902 to 1909 workings averaged shallower for two reasons. New beds were opened at higher levels and new operations at the edge of the district were begun. This same condition applies to the next period. The data indicated that during the labor disturbances in 1902 some of the deeper workings were flooded and therefore work in them was temporarily discontinued. From 1912 to

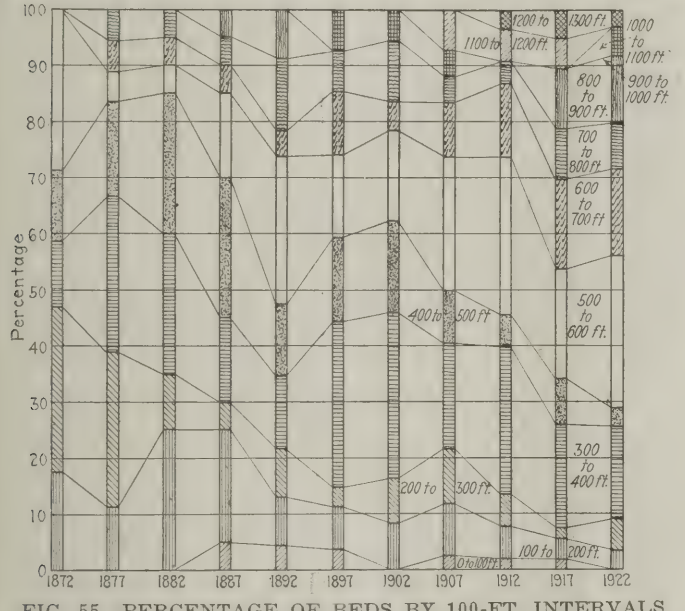


FIG. 55—PERCENTAGE OF BEDS BY 100-FT. INTERVALS

The method of calculating this curve is described in the footnote to Fig. 6 in the first of this series of articles.

1922 the depth of the workings again increased and by 1922 they had reached a mean depth of 630 ft., this being a few feet less than the average depth of 1902.

In Fig. 55 the percentage of producing beds by 100-ft. depth intervals is shown. In 1872 there were no workings below the 500- to 600-ft. interval, but in 1922 only 56 per cent of the beds being mined were as shallow as 600 ft., and the deepest in the 1902 to 1922 period were 1,200 ft. and 1,300 ft. None below 1,000 ft. was worked until in 1907.

What happened in each 100-ft. interval is evident in Fig. 56. Probably the most interesting interval is that of the top 100 ft. Here there has been a considerable increase in the average thickness of the workings due to the opening up of the strippings. The figure shows no workings of this depth for 1922 because active strippings have penetrated as deep as 200 ft. in places though operations at various levels clear up to the surface are in progress.

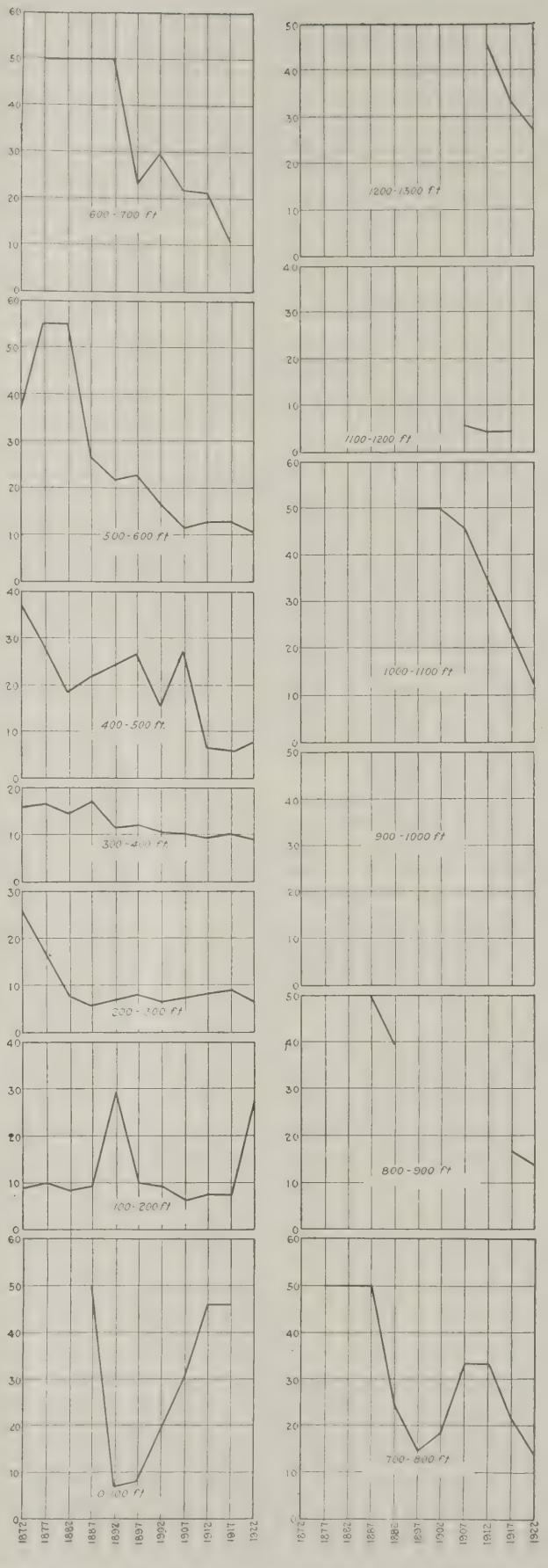


FIG. 56—AVERAGE THICKNESS OF BEDS AT EACH 100-FT. INTERVAL DEPTH BY FIVE-YEAR PERIODS IN THE PANTHER CREEK DISTRICT

The description of the method used to calculate these curves will be found in the description accompanying Fig. 7 in the first of this series of articles. New strippings have made the record for shallow coal show a big increase in coal thickness.

In the Panther Creek district there is a considerable change in the power curve covering fifty years. From 1877 to 1912 the curve shows a slight general decrease in coal produced per boiler horsepower, as might be expected, but in the 1912-1917 period there is a very sharp increase. An increase is also shown in the next period. This does not mean that any less boiler horsepower is required to produce the coal, for the conditions have not improved, and, as has been shown by both the thickness and depth curves, the thickness and depth are both following along normal lines. That is, the thickness of measures is decreasing and the depth is increasing. The explanation is simple. Previous to 1917 the largest company in this district constructed a large central power station and from this station furnished a large amount of the electricity used in the mining of coal. The steam boiler plants at the mines were used to furnish power to such units as were not electrified. The coal company sold the central station to the Pennsylvania Electric & Power Co. and therefore the amount of boiler horsepower installed decreased in the reports to the Pennsylvania state mine inspectors.

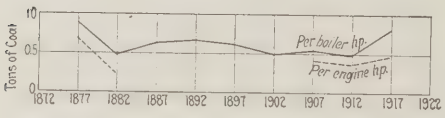


FIG. 57 — CURVE SHOWING TONS OF COAL PRODUCED PER BOILER HORSEPOWER AND ENGINE HORSEPOWER INSTALLED, BY FIVE-YEAR INTERVALS, 1877 TO 1921, IN THE PANTHER CREEK DISTRICT

The full method as to how these curves was calculated will be found in the footnote to Fig. 8 in the article in this series relating to the Lackawanna County district.

A study of the haulage curves in Fig. 58 brings to light some interesting facts. The curve showing the tons of coal hauled per mule per day indicates that in the early period the tonnage hauled per mule is comparatively low. This figure was only 12.5 tons in 1877, 11.1 in 1882 and 9.6 in 1887. In the Lackawanna county district for the same period the figures were 18.0 in 1877, 12.7 in 1882 and 14.9 in 1887. In the Wilkes-Barre district the figures were 20.32 in 1877, 16.30 in 1882, and 15.93 in 1887. In the Nanticoke district in 1877 the mules hauled 19.54 tons a day. In 1882 they hauled 16.27 tons and in 1887, 15.81 tons. In the Eastern Middle field the tonnage figures for the corresponding years are 20.77, 15.10 and 12.56. This shows that in the Panther Creek district the daily tonnage per mule is very low, in many cases amounting to only one-half that of the other districts. This may possibly be explained by the fact that in the earlier years there were a large number of small openings and the coal had had to be hauled by mules from these scattered openings to the breakers. This ran the production per mule per day down.

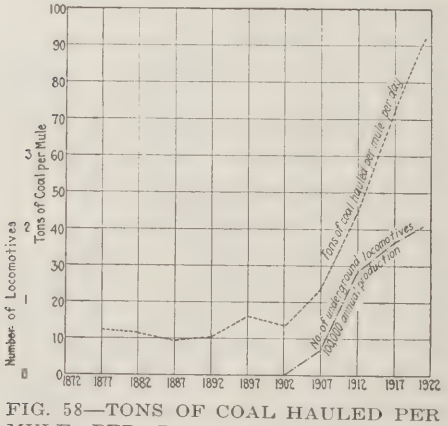


FIG. 58—TONS OF COAL HAULED PER MULE PER DAY AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS OF COAL PRODUCED PER YEAR IN THE PANTHER CREEK DISTRICT BY FIVE-YEAR PERIODS FROM 1877

Tables XLIV and XLV give the data and the final points shown in this curve. The method of making these calculations is described in the footnote to Fig. 9 in Part I of this series of articles.

TABLE XLIII—MULE AND LOCOMOTIVE HAULAGE IN PANTHER CREEK DISTRICT

Year	Tons of Coal Hauled Per Mule Per Day	Number of Underground Locomotives Per 100,000 Tons of Coal Produced Per Year	Year	Tons of Coal Hauled Per Mule Per Day	Number of Underground Locomotives Per 100,000 Tons of Coal Produced Per Year
1877	12.5	....	1902	13.8	....
1882	11.1	....	1907	23.7	0.37
1887	9.6	....	1912	44.7	1.42
1892	10.8	....	1917	73.7	1.83
1897	16.1	....	1921	90.7	2.03

The figures are extremely deceptive, however, for in this district it is estimated that for every ton of coal hauled one ton of rock has to be hauled. Therefore it is possible that the figures should be increased 100 per cent, which would bring them more nearly in line with those of the other districts. In this district it is possible to calculate the effect of the electric locomotive on the haulage of coal. From the mule-haulage curve in Fig. 58 it is reasonable to assume that if the underground electric locomotive had not been introduced in the earlier years the output per mule by the periods would have been as follows: In 1887, 10 tons; 1892, 11 tons; 1897, 13 tons; 1902, 16 tons; 1907, 19.5 tons; 1912, 23 tons; 1917, 26 tons; and in 1921, 29 tons. If this curve is true, then the tons of coal hauled per underground locomotive in 1907 was 160.6 tons, in 1912 61.6 tons, in 1917, 90.2 tons, and in

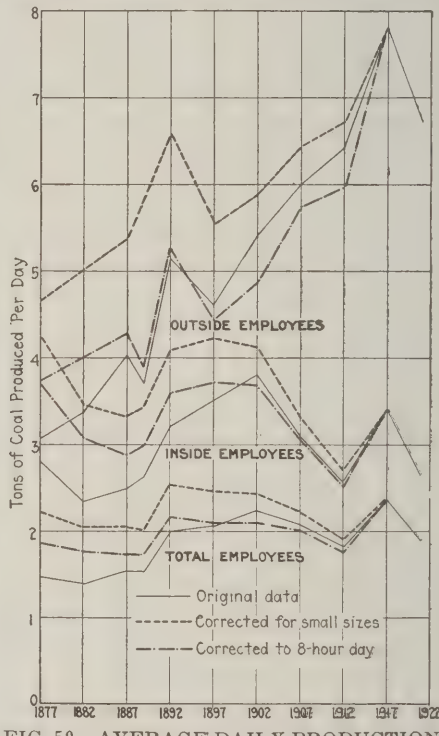


FIG. 59—AVERAGE DAILY PRODUCTION PER EMPLOYEE IN THE PANTHER CREEK DISTRICT, 1872-1921

The solid line represents the actual figures, the dash line gives the correction for small sizes and the dot and dash line gives the final corrected line for the time factor. This bases the output on the eight-hour day in order to make a proper comparison. The methods used in the calculation of these curves is given in the footnote to Fig. 10 in the article in this series that appeared in *Coal Age*, Feb. 22, page 327. The figures obtained for 1897 and 1912 were so far from the average of the curves that it was necessary to check them to see if they were correct. Points were then calculated for the years 1896 and 1898, and for 1911 and 1913 and averaged to obtain the figures for 1897 and 1912 respectively. These figures were then used instead of the actual figures for these years. It was not possible to obtain figures for miners and miners' laborers for the year 1887 for this district, so the year 1888 was used in place of it. This accounts for the extra point appearing in this set of curves.

TABLE XLIV—NUMBER OF MULES AND LOCOMOTIVES IN PANTHER CREEK DISTRICT

Year	Number of Mules	Number of Underground Locomotives	Year	Number of Mules	Number of Underground Locomotives
1877	164	..	1902	601	..
1882	164	..	1907	574	15
1887	424	..	1912	310	59
1892	543	..	1917	189	76
1897	590	..	1921	175	94

TABLE XLV—TONNAGE PRODUCED AND WEIGHTED AVERAGE DAYS WORKED IN PANTHER CREEK DISTRICT

Year	Tons of Coal Produced	Weighted Average Days Worked	Year	Tons of Coal Produced	Weighted Average Days Worked
1877	352,424	180	1902	1,181,170	123
1882	763,883	226	1907	3,563,655	252
1887	1,093,733	203	1912	3,649,717	234
1892	1,358,562	224	1917	4,934,249	290
1897	1,795,404	164	1921	4,125,863	260

1921, 113.8 tons. The amount of rock handled is not included in these figures.

The great effect of the introduction of the locomotive is shown in the number of mules used at the mines. In 1902 there were 602 mules at collieries and by 1921 this number had decreased to 175, though a number of new collieries had been opened, which normally would tend to increase the number of mules used in haulage.

In the lowest set of curves in Fig. 59 there is shown the daily output of coal per employee. The solid line, which represents the actual figures as calculated from the mine inspectors' reports indicates a condition entirely different from any described in previous articles in this series. Here from 1887 to 1902 there is a steady increase in the output per man, then a drop from 1902 to 1921. In this case the figures for 1897 are corrected as explained in the caption to Fig. 59.

This does not tell the whole story, however, for when the curve is corrected for small sizes, which were not shipped in the earliest years, there is a considerable decrease in the output from 1877 to 1889. Then there appears an increase to 1902, and from that date to 1921 a steady decrease, with the exception of the war year, 1917, when the output took a jump. When corrected for the time element, from 1892 to 1921 there is only a slight decrease in the output per man from 2.16 tons in 1892 to 1.89 tons in 1921. There seems to be a step in the curve in 1889, which probably was caused by a change in mining conditions.

Comparing the figures in Table XLVI with those of the previously described districts, it is found that in Lackawanna County district the decrease was from 2.53 tons in 1877 to 1.74 tons in 1921. In the Wilkes-Barre district the decrease was from 2.12 tons in 1877 to 1.48 tons in 1921. In the Nanticoke district the decrease was from 2.56 tons in 1877 to 2.02 tons in 1921 and in the Eastern Middle coal field the decrease was from 2.81 tons in 1877 to 1.95 tons in 1921.

If the figures for the Panther Creek district are accepted for 1877, then there was a production in that year of 1.86 tons per employee as against a production of 1.89 in 1921, thus indicating a slight increase as against a reduction in all of the other districts. This increase probably was due to the consolidation of properties and breakers and the introduction of modern haulage systems which reduce the force necessary to produce the coal.

TABLE XLVI—AVERAGE DAILY PRODUCTION OF ANTHRACITE PER EMPLOYEE, PANTHER CREEK DISTRICT

(In Gross Tons)

Year	Per Total Employee			Per Inside Employee			Per Outside Employee		
	Reported	Corrected for Small Sizes	Corrected to 8-Hr. Day	Reported	Corrected for Small Sizes	Corrected for Small Sizes	Reported	Corrected for Small Sizes	Corrected to 8-Hr. Day
1877	1.47	2.22	1.86	2.81	4.25	3.71	3.07	4.65	3.72
1882	1.38	2.05	1.75	2.34	3.47	3.09	3.37	5.00	4.00
1887	1.54	2.05	1.73	2.48	3.32	2.88	4.00	5.36	4.29
1889	1.53	2.02	1.73	2.61	3.44	2.99	3.69	4.87	3.89
1892	1.99	2.54	2.18	3.21	4.09	3.59	5.16	6.58	5.26
1896	1.91	2.33	1.97	3.29	4.02	3.54	4.26	5.20	4.16
1897	2.44	2.94	2.48	...	...	...	...	...	...
1898	2.15	2.56	2.16	3.74	4.45	3.91	4.95	5.89	4.71
1902	2.24	2.43	2.10	3.81	4.13	3.69	5.42	5.88	4.87
1907	2.08	2.23	2.04	3.09	3.32	3.07	6.00	6.44	5.73
1911	1.90	2.00	1.83	2.71	2.86	2.65	6.22	6.56	5.84
1912	1.69	1.77	1.64	...	...	...	...	...	...
1913	1.76	1.83	1.69	2.43	2.53	2.38	6.59	6.86	6.10
1917	2.37	2.37	2.37	3.41	3.41	3.41	7.82	7.82	7.82
1921	1.89	1.89	1.89	2.62	2.62	2.62	6.72	6.72	6.72

The middle set of curves shows the daily output per inside employee. It decreased from 1877 to 1882, increased from 1882 to 1902 and then decreased again to 1921. Correcting for small sizes and the time element does not materially change the shape of the curve. The curve itself looks like the symbol expressing the cycle in electricity.

In the seventies and the eighties most of the coal was produced from the water level tunnels. In the late eighties more of it came from the deeper workings. The work was more concentrated and fewer men were required and therefore production increased. In 1902 there was a complete overturn in the production. It decreased as far as the curve goes. Later in this series of articles this decrease in production possibly can be accounted for when the general conditions in the regions are discussed. The uppermost set of curves in Fig. 59 shows what has happened to the output per outside employee. Here, with the exception of the year 1892, there has been a steady increase in the production per employee. This was to have been expected, as there has been a number of consolidations of collieries and therefore of breakers, and in some places new breakers have been built. In this district are found some of the most modern breakers in the whole anthracite region. Consolidation of collieries not only reduces the number of breaker employees but also decreases the other outside employees. Greater economies are possible, so there is an increase in the amount of coal produced per outside employee.

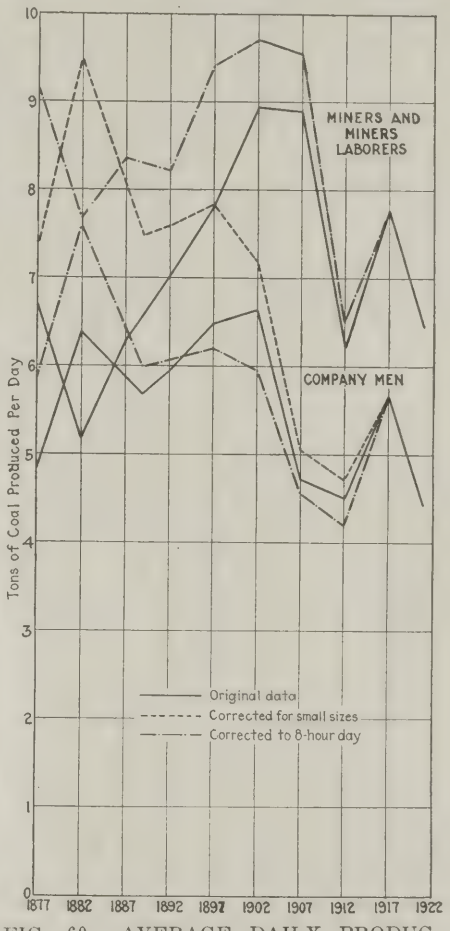


FIG. 60—AVERAGE DAILY PRODUCTION PER INSIDE EMPLOYEE FOR THE PANTHER CREEK DISTRICT, 1877-1921

The methods used in the calculation of this curve will be found in the footnote to Fig. 11, in the first article of this series, which appeared in *Coal Age*, vol. 23, p. 328. The correction for the years 1897 and 1912 will be found in the description to Fig. 59 in this article, as also will be found the reason for the use of the year 1889.

From Fig. 60 it will be observed that the output per miner and miner's laborer decreases to 1882, increases to 1902 and then drops steadily until 1921, with the exception of the year 1917. The increase in production from 1882 to 1902 was in the face of a decrease in the

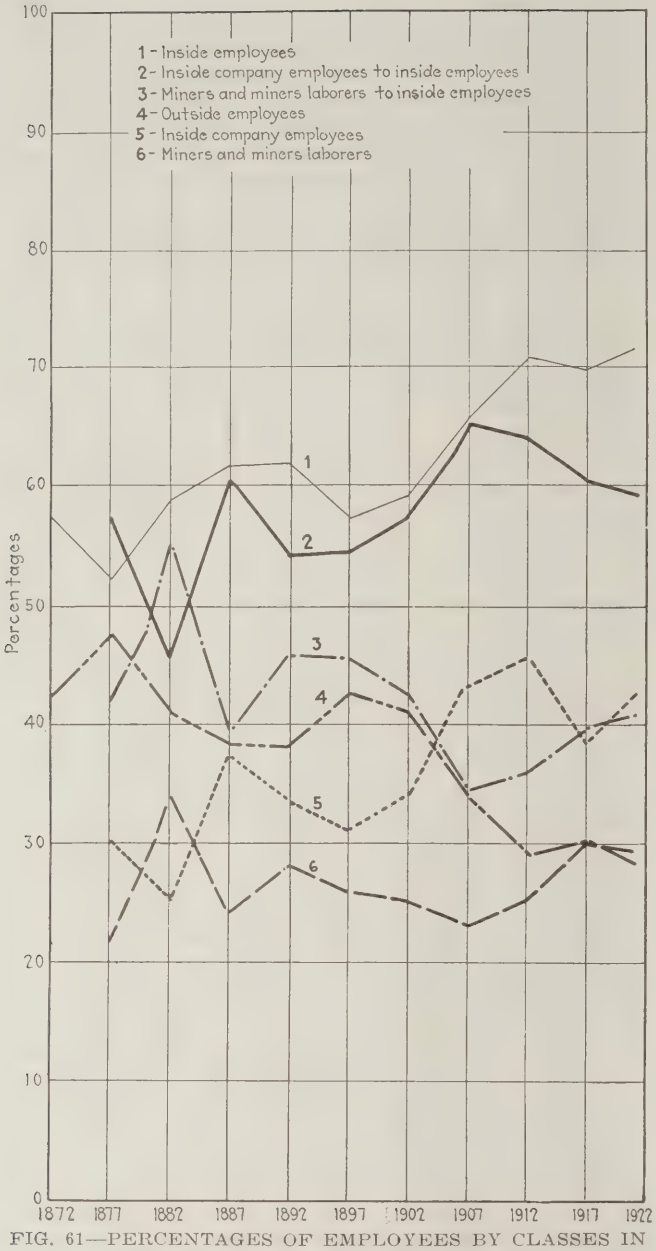


FIG. 61—PERCENTAGES OF EMPLOYEES BY CLASSES IN THE PANTHER CREEK DISTRICT

The data from which these curves was calculated will be found in Table XLVIII.

thickness of the workings, as is shown in Fig. 52. It is generally believed in this district that, owing to maintenance costs, the thicker beds are the more difficult to work. Perhaps, however, the miner and miner's laborer partly compensate for this by greater output.

The general reduction in the thickness of the beds continued after 1902. This might logically have continued to increase the output per miner and miner's laborer, but actually the output dropped. If production varies with bed thickness, then what is the most economical thickness of bed to be worked? Is it 25.5 ft., as is shown in the thickness curve, or is it some other figure, or does the thickness have no material effect on the production? No positive answer can be made, but it is probable that production variations in the Panther Creek district were not due to changes in bed thickness but to other causes which are not local but general and will be discussed later.

Other interesting data are disclosed by comparing this curve with similar curves for districts previously discussed. The district figures for daily production per miner and miner's laborer were: Lackawanna, in 1877,

TABLE XLVII—AVERAGE DAILY PRODUCTION OF INSIDE MEN
(In Gross Tons)

	Miners and Miners' Laborers		Inside Company Men		
Year	Reported	Corrected for Small Sizes	Reported	Corrected for Small Sizes	Corrected for the 8-Hr. Day
1877	6.70	9.17	4.85	7.33	5.86
1882	5.17	7.67	6.39	9.49	7.59
1887	6.27	8.35	4.11	5.48	4.38
1889	5.28	5.98	5.68	7.48	5.98
1892	7.00	8.22	5.94	7.58	6.06
1896	7.34	8.98	5.94	7.25	5.80
1898	8.24	9.81	7.03	8.37	6.59
1902	8.94	9.70	6.63	7.19	5.95
1907	8.88	9.54	4.72	5.07	4.57
1911	5.62	5.93	5.20	5.48	4.88
1913	6.78	7.06	3.78	3.94	3.51
1917	7.76	7.76	5.67	5.67	5.67
1921	6.41	6.41	4.43	4.43	4.43

6.21 tons and in 1921, 3.51 tons, a decrease of 43.7 per cent; Wilkes-Barre in 1877, 6.58 tons and in 1921 3.76 tons, a reduction of 42.9 per cent; Nanticoke in 1877, 8.83 tons and in 1921, only 4.04 tons, a decrease of 54.2 per cent; Eastern Middle coal field in 1877, 7.03 tons and in 1921, 4.39 tons, a reduction of only 37.9 per cent. However in the Panther Creek district in 1877 the production amounted to 9.17 tons and in 1921 this had decreased 27.9 per cent to 6.41 tons. This is the least reduction among all the districts.

At the same time the production per man was considerably higher than in any of the other districts. This shows that more coal can be produced per miner and miner's laborer in the steeply pitching districts than in the flatter beds, because the miner does less hand loading. Were it not for other factors entering into the cost of production, it would seem that the Panther Creek district's costs should be lower.

The other set of curves in Fig. 60 shows the daily production per inside company employee. Here, generally speaking, there is a steady decrease in the output per man. This is caused by the increasing amount of underground maintenance and the greater supervision given the work.

Fig. 61 and Tables XLVIII and XLIX show the number of each class of employees and also the percentage relationship of these employees to the total number of employees. Comparing these curves with similar ones for the other districts it will be noted that the number of inside company employees has greatly increased, a factor counterbalancing the large output per miner and miner's laborer and increasing the mining cost.

TABLE XLVIII—MEN EMPLOYED IN PRODUCTION OF ANTHRACITE IN THE PANTHER CREEK DISTRICT

Year	Total Employees	Inside	Outside	Miners and Miners' Laborers	Inside Company Men
1872	1,710	981	729	.....	.....
1877	1,335	696	639	.....	.....
1882	2,446	1,444	1,002	.....	.....
1887	3,506	2,170	1,336	858	1,312
1892	3,061	1,895	1,179	870	1,025
1897	4,491	2,571	1,920	1,170	1,401
1902	4,294	2,523	1,771	1,074	1,449
1907	6,942	4,588	2,354	1,593	2,995
1912	9,244	6,551	2,693	2,360	4,191
1917	7,174	4,993	2,171	1,989	3,004
1921	8,423	6,058	2,364	2,474	5,584

TABLE XLIX—PERCENTAGE OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

Year	Inside	Outside	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers (a)	Inside Company Men (a)
1872	57.3	42.7	....	....	....	....
1877	52.2	47.8	21.9	30.3	42.0	58.0
1882	59.2	49.8	34.2	25.0	55.3	44.7
1887	61.8	38.2	24.4	37.4	39.5	60.5
1892	61.9	38.1	28.4	35.5	45.9	54.1
1897	57.2	42.8	26.0	31.2	45.5	54.5
1902	59.0	41.0	25.0	34.0	42.5	57.5
1907	66.1	33.9	23.0	43.1	34.7	65.3
1912	70.8	29.2	25.5	45.3	36.0	64.0
1917	69.6	30.4	30.3	38.6	39.8	60.2
1921	71.9	28.1	29.3	42.6	40.8	59.2

(a) Percentage to inside employees.

Why Fans Often Cease to Give Satisfaction and Frequently Take Excessive Power to Drive*

Equivalent Orifice of Fan and Mine Should Be Equal—If Fan Delivers More Air Than Pressure Will Circulate Through Mine, Air Will Back Out of Fan—Changing Fans as Mine Develops

By J. R. Robinson
Consulting Engineer, Pittsburgh, Pa.

FOR a number of years I was engaged in the designing, manufacture and installation of mine fans of the Guibal type. At that time it was customary for mining companies to order a fan of a certain wheel diameter—10 ft., 16 ft., 20 ft. or perhaps 25 ft.—accompanying the order by a specification as to the quantity of air the fan was supposed to deliver. The water gage, or pressure, rarely was considered. The diameter of wheel seemed to be the determining factor in the purchase and installation of the fan. The bigger the wheel the more air was the usual thought in the mind of the purchaser.

These fan installations sometimes proved satisfactory, but in most cases they did not. Sometimes the installation met all expectations when first made, but in a few years it became entirely unsatisfactory. The purchaser would sometimes praise the fan highly when it was first installed and a few short years later would "cuss out" the fan and the maker because the ventilation afforded by the fan was unsatisfactory. Little seemed to be known as to the reasons why a fan should be effective when first installed and then become wasteful and inefficient after a few years' use.

Everyone seemed to be puzzled by these phenomena. The best makes of fans were being alternately praised and blamed, one mining man swearing by a certain maker and another swearing at him.

At the time to which I refer, the Guibal fan was generally made of wood, except the shaft, boxes and spiders, and owing to its light construction it was incapable of creating high pressures. About the same time the Capell fan was coming rapidly into use. It was a steel fan and capable of creating a much higher pressure than the wooden Guibal fan. This Capell fan frequently failed to do what was expected of it. The installation was made with the understanding that it would deliver a certain quantity of air, but when the trial was made the fan failed to produce that quantity. Then arguments begun, neither the maker nor the purchaser having a clear idea of why the quantity of air was deficient. In my conversation with the American representative I was unable ever to learn why his fan had failed to perform as expected. If he knew, he wouldn't tell.

I have spent much time studying his work as well as my own and others, and I believe he never alighted on the real reason why his fan failed to deliver as much air to the mine as was expected. His want of knowledge probably accounted for his hostility to those who showed dissatisfaction with his work. As he was considered the best man to go to for help in mine-ventilation problems and in the application of fans to mines, when I found he was working with empirical formulas and did not really understand the fundamental principles of the work of the fan in the mine, I determined to find out for myself what these fundamental principles were.

During my investigations I found that an ordinary centrifugal fan of any or all designs and makes, when applied to a new mine, invariably passed its air through itself without backing any of the air from the intake orifice, and that often after a few years of mine development the fan began to back out some of the air; as the mine kept on developing this condition got worse and worse, and finally the fan wheel went to pieces and a new fan was required.

I also observed that when first installed a fan would pass through the mine, let us say, 50,000 cu.ft. per minute at a ½-in. water gage and that after a few years when speeded up it would pass through the mine, let us say, 70,000 cu.ft. per minute at a 2-in. water gage. now, the speed of the fan necessary to produce 2 in. of water gage is exactly twice that required to produce ½ in. Why did the fan produce only 40 per cent more air when running twice as fast as it did when originally put in the mine?

The pressure increased as might have been expected from the increased speed of the fan, but the quantity of air should have been 100,000 cu.ft. instead of only 70,000 cu.ft. Why was this? With the first condition of the mine, had the fan been speeded up to twice its original running speed, the quantity at that time would have been 100,000 cu.ft. per minute and the water gage would have been 2 in. I had abundant data to confirm this. After the lapse of a few years, however, it was a fact that the fan at twice its original speed was passing through the mine only 70,000 cu.ft.

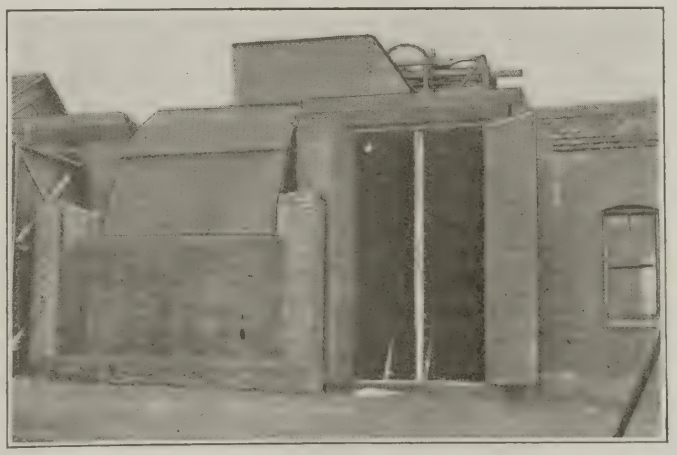


FIG. 1—FIRST FAN AT GRANT TOWN, W. VA.

This fan was 16 ft. in diameter and much too large for the mine. Its equivalent orifice was 120 sq.ft. As it required a 2.3-in. water gage to pass 132,000 cu.ft. of air per minute, the equivalent orifice of the mine was 35 sq.ft. The fan made more air than the mine would take, and the air had to work its way back through the fan, and in doing this tended to tear the fan to pieces.

*Paper read before Engineers' Society of Western Pennsylvania.



FIG. 2—SECOND FAN AT GRANT TOWN

Passing 300,000 cu.ft. of air per minute at a 9-in. water gage, this 8-ft. fan had an equivalent orifice of 40 sq.ft., which was about the same as that of the mine. Then an airshaft was sunk at the back of the workings. The company is installing another fan to take advantage of the fact that the equivalent orifice of the mine is now 58 sq.ft. instead of 40. Two-thirds of the power should be saved by using the larger fan.

But this air current required 2 in. of water gage to pass it, whereas when the fan was first installed this same 2 in. of pressure would pass 100,000 cu.ft. per minute. As a further evidence of something being wrong, much that could not be measured was backing out of the intake orifice of the fan. In my investigation I found that if I could in the second instance pass 100,000 cu.ft. per minute instead of 70,000 cu.ft. I would require for that 4 in. of water gage instead of 2 in., which showed a much worse condition of the mine than had been anticipated.

After investigating many such conditions I began to compare the orifice of passage of the mine with the orifice of passage of the fan. Most of you will recall in your study of mine ventilation that a mining engineer named Murgue had developed a formula for finding this orifice of passage and had expressed it by the equation Equivalent Orifice $= 0.0004 \times \frac{Q}{\sqrt{\text{water gage.}}}$

Q = the quantity of air passing in cubic feet per minute, the water gage being taken when the air is measured. The water gage is measured in inches and in fractions of an inch.

With this formula we can observe a mine as it develops and determine its orifice of passage, and with such information we can readily determine why our ventilation is easy or difficult and why we get the quantity we set out to get, or why we do not get any such quantity.

Now, let us take the case just cited. We set out to get 50,000 cu.ft. at a water gage of 0.5 in. and later tried to pass 100,000 cu.ft. at 2-in. water gage. Using Murgue's formula, the equivalent orifice $= 0.0004 \times \frac{50{,}000}{\sqrt{0.5}} = 28.1$ sq.ft. or again equivalent orifice $= 0.0004 \times \frac{100{,}000}{\sqrt{2}}$ or 28.1 sq.ft. So, we must have the same equivalent orifice to pass 100,000 cu.ft. per minute at a 2-in. water gage as to pass 50,000 cu.ft. per minute at a ½-in. water gage. But you will note that we found 70,000 cu.ft. per minute at a 2-in. water gage instead of 100,000 cu.ft. at that water gage, as we had anticipated. Let us apply Murgue's formula and see if we find the difficulty. The equivalent orifice $= 0.0004 \times \frac{70{,}000}{\sqrt{2}} = 19.8$ sq.ft. instead of the 28 sq.ft. which we assumed that we had for our equivalent orifice. Having found that an equivalent orifice of 28 sq.ft. is required we can readily see that we cannot put 100,000 cu.ft. per minute through an equivalent orifice of 19 sq.ft.

You will note that this equivalent orifice is the result of all the factors that impede the flow of air through the mine, whether it be rubbing surfaces, falls of roof, regulators or any other form of obstruction.

In the case above cited, when 70,000 cu.ft. is passing, the fan, if properly designed to meet the original condition, will back a portion of its air out of its intake orifice and will work at low efficiency, no matter who made it.

Now, we sometimes meet the opposite condition, which is where the equivalent orifice of the mine is increased above what was anticipated, in which case if the fan is properly designed for the work intended, it will not back a portion of the air from the intake orifice, but it will wiredraw the air through the fan—that is, the fan will be required to make more pressure to get the air through itself than is required to pass the air through the mine. So you see it is extremely important to the designing of the fan that the equivalent orifice of the mine be known, but after the fan is put into actual operation if the equivalent orifice of the mine

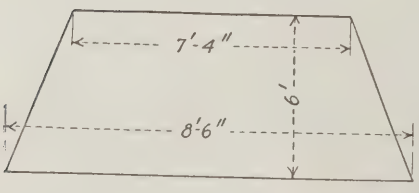


FIG. 3—SECTION OF AIRWAY AS NORMALLY DRIVEN

Area was 48.15 and equivalent orifice 20 sq.ft. as can be calculated when it is known that 116,000 cu.ft. of air per minute was passed at a 5.4 in. water gage.

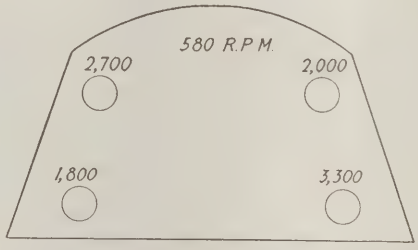


FIG. 4—VELOCITIES OF AIR WITH 580 R.P.M. OF FAN

Average velocity, 2,450 ft. per minute. Total current, 116,000 cu.ft. per minute. Water gage, 5.4 in. Power in the air, 98.4 hp.

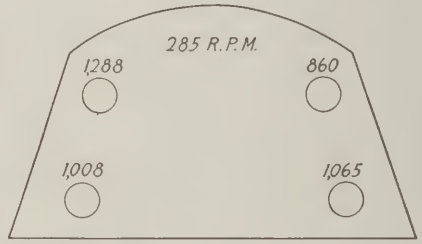


FIG. 5—VELOCITIES OF AIR WITH 285 R.P.M. OF FAN

Average velocity, 1,055 ft. per minute. Total current, 51,787 cu.ft. per minute. Water gage, 1.5 in. Power in the air, 12.54 hp.

RESULTS OF TESTS AT CHERRY TREE COAL CO.'S MINE, EMEIGH, PA.

The recording wattmeter showed in test, recorded in Fig. 4, 95 kw. or 127,345 hp. The over-all efficiency was 77.18 per cent. With 2,000 volts and 54 amperes of current and an assumed power factor of 80 per cent the horsepower used would be 160 and the over-all efficiency 61.5 per cent. In the case of the test recorded in Fig. 5, the voltage was 2,290 and the amperage 11. Again assuming an 80-per cent power factor the horsepower was 26.89 and the over-all efficiency 46.5 per cent.



FIG. 6

Turbine Fan, Cherry Tree Coal Co. Mine

The fan is only 57 in. in diameter, but as its equivalent orifice is the same as that of the mine a high efficiency is attained. The matching of mine with fan is one of the most essential requirements in mine ventilation.

be changed to any great extent, the fan will not work with a high degree of efficiency no matter how it may be designed.

We frequently hear the mine manager say he must have a certain make of fan; that he has no time for any other make. Now, that opinion is based, I have found, on the manager having had a fan of his favorite make at a mine, the equivalent orifice of which is about the same as that of the mine, whereas the other make is at a mine where the equivalent orifices of the fan and the mine do not thus match.

Ten or twelve years ago I was called upon to investigate a mine at Grant Town, W. Va. This mine is in a gaseous district and requires a large quantity of air. A 16-ft. Capell fan was in operation. It was passing 132,000 cu.ft. of air per minute at 2.3-in. water gage and was at the limit of its capacity and rapidly going to pieces. You will note that the equivalent orifice of this mine was small. The equivalent orifice $= 0.0004 \times \frac{132{,}000}{\sqrt{2.3}} = 35$ sq.ft. The equivalent orifice of the fan was about 120 sq.ft. The fan was much too large for the mine.

The management decided they wanted 300,000 cu.ft. of air, and that they would keep the water gage down to 9 in., which meant an equivalent orifice equal to $0.0004 \times \frac{300{,}000}{\sqrt{9}} = 40$ sq.ft. A fan was placed at this mine with that equivalent orifice of 40 sq.ft., and for a few years the orifice of the mine and the orifice of the fan remained about the same. During this period the fan worked with the greatest efficiency. About two years ago an airshaft was sunk at the back of the mine in order to short-circuit the air. By the use of this shaft the mine is now passing 250,000 cu.ft. of air per minute at a 3-in. water gage. Now let us examine this mine with Murgue's formula:

$$\text{Equivalent orifice} = 0.0004 \times \frac{250{,}000}{\sqrt{3}} = 58 \text{ sq.ft.}$$

The mine has now 58 sq.ft. of equivalent orifice, and the fan in use has but 40 sq.ft. To pass 250,000 cu.ft. of air through itself the fan must create a much higher pressure than is required to pass the air through the mine. Consequently it is now a wasteful machine, although it was economical and efficient before the shaft was sunk, and the equivalent orifice of the mine enlarged beyond the equivalent orifice of the fan.

A new fan is being placed at the mine to have an equivalent orifice the same as that of the mine, and as long as such conditions are obtained this fan will have the greatest efficiency. Let us see now what difference there would be in the power applied to operate each fan. It will be remembered that to pass air through two different sized openings requires power inversely as the cube of the size of the openings. The former fan had a 40-sq.ft. orifice of passage and the new fan has a 58-sq.ft. orifice of passage. The cube of 40 is 64,000. The cube of 58 is 195,112. It would require three times as much power to pass the 250,000 cu.ft. per minute through the fan with the 40-cu.ft. equivalent orifice as to pass the same quantity through the fan with that orifice increased to 58 sq.ft. when the mine resistance is equal to 3 in. of water gage.

The Cherry Tree Coal Co. has a mine at Emeigh, Pa., through which the fan at present installed is passing 116,000 cu.ft. of air per minute at a 5.4-in. water gage. The equivalent orifice of this mine is $0.0004 \times \frac{116{,}000}{\sqrt{5.4}} = 19.97$ sq.ft.—nearly 20 sq.ft. This is not a big orifice to pass over 100,000 cu.ft. of air, but you will note the test taken by the engineers of the Cherry Tree Coal Co. in Fig. 3 and that the over-all mechanical efficiency is 77 per cent.

This efficiency is high because the fan is designed for a mine such as this with a small equivalent orifice and because the equivalent orifices of the mine and the fan are practically the same. An airshaft has since been sunk near the back of the mine, and the coal company is now installing at this new airshaft a new fan which has an equivalent orifice which will suit the new equivalent orifice of the mine. The continued use of the present highly efficient fan on this mine, with its enlarged equivalent orifice, would be extremely wasteful of power.

I will now call your attention to a mine whose fluctuating equivalent orifice requires the changing of its fan from a large to a small fan and back again to the large



FIG. 7—SIX-FOOT FAN OF LOWBER GAS COAL CO.

Too big a fan caused a continuous waste of electric current. By replacing a fan with an equivalent orifice of 45 sq.ft. with one of about 32 sq.ft. enough power was saved to pay for the fan in eight months. It should be added that the first fan matched the mine satisfactorily when it was first installed.

fan. The Lowber Gas Coal Co. has a mine near Fayette City, Pa., which has these conditions. The mine was developed in such a manner as to pass 100,000 cu.ft. per minute at 2-in. water gage. The equivalent orifice is therefore $0.0004 \times \frac{150{,}000}{\sqrt{2}} = 42$ sq.ft.

An 8-ft. modern steel fan was placed at this mine. Its equivalent orifice was about 45 sq.ft. It was close to the requirements of the mine when first installed, but as the mine developed the quantity of air given off by this fan was gradually decreased until when I first observed it it was passing through the mine 87,000 cu.ft. per minute at 1.2-in. water gage. Now let us observe this new condition with the use of Murgue's formula. The equivalent orifice $= 0.0004 \times \frac{87{,}000}{\sqrt{1.2}} = 31.63$ sq.ft. instead of the original 42 sq.ft. the equivalent orifice has dropped 10 sq.ft. to less than 32 sq.ft.

Now the power required to pass the air with the 8-ft. fan originally at the mine was 78 hp. measured on the brushes of the direct-current motor by which the fan is driven. A load such as this should demand about 30 hp. with a suitable fan. Such a fan was installed with an equivalent orifice of about 30 sq.ft. and the saving in power was nearly 50 hp. The cost of making the new installation—fan, motor and belt—was approximately $4,000 and this sum is the reduction in the power bill saved in about eight months.

The 8-ft. fan originally installed, though left idle, was not dismantled but left still connected to the mine, so that it could be used should a new airshaft be sunk at the back of the mine. This it is expected would enlarge the equivalent orifice of the mine to about 45 sq.ft. The new shaft probably will be connected to the mine within four years from the time when the temporary fan was installed. You will note that in this brief period the temporary installation will have paid for itself at least six times out of the power saved.

The equivalent orifice of the mine, therefore, is the basis on which the calculations for a mine fan should be made. Having the equivalent orifice and the quantity and pressure known, we can determine accurately the characteristics of the fan. Knowing the pressure or water gage, we know the speed at which the air must travel and accordingly the equivalent air pressure. With the speed of the air known, we know what must be the velocity of the rim of the fan wheel in order to create the given air pressure, and knowing the speed of the fan and its volumetric capacity, we can determine the width the wheel should be to give off the quantity of air required at the given pressure.

This may seem like a complicated cycle of calculations, but it is all logical and each step follows in succession from the base of all the calculations, which is the orifice of passage of the mine.

Vegetable Origin of Anthracite Beds At Last Definitely Proved

AT THE meeting of the Society of Economic Geologists held in New York May 18 and 19, a paper was presented by H. G. Turner, of Lehigh University, on the "Microstructure of Anthracite Coal," which was illustrated by lantern slides made from microphotographs of great beauty, showing plainly and clearly many different types of vegetable structure.

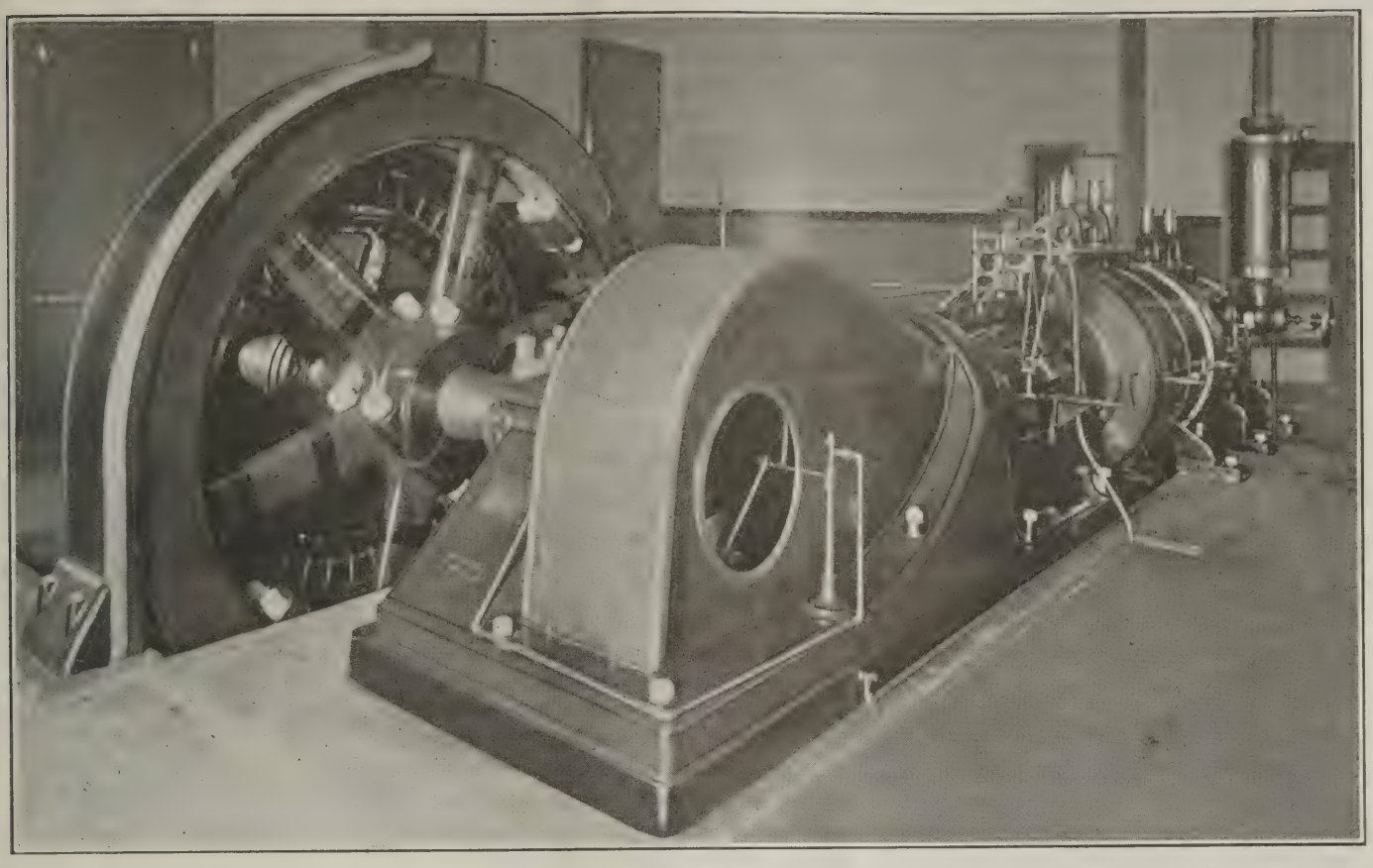
This adds final and conclusive proof to the heretofore generally accepted belief that anthracite is, like bituminous coal, of vegetable origin. Prior to this work no microscopic slides had ever been produced actually showing the presence of such material, it having been found impossible to produce sections thin enough to be transparent, and efforts to learn the structure by examination of polished surfaces had entirely failed.

Most of the work described has been done within the last year. Many have tried unsuccessfully to prove or disprove the presence of such structures in anthracite and it is rather remarkable that at last this has been accomplished. The slides are far better than those which have been produced showing the presence of similar vegetable structure in bituminous coal.

The method used by Messrs. Turner and Randall in producing these slides is remarkably simple and easy of application, only about twenty minutes' work being required to prepare a specimen for the microscope or for making photomicroscopic slides.

The method as described by Mr. Turner is as follows: From a good specimen of anthracite a cube with about 1 in. sides is sawed. One side of this cube is ground and polished on a rubbing bed or table, using progressively finer and softer polishing powders, as is the practice in preparing highly polished specimens. This produces a fine mirrorlike surface. The specimen is then put in a furnace and heated to a temperature of about 250 to 300 deg. C. It then is taken from the furnace with a tongs, and the polished face of the cube is held in the flame of a bunsen burner until the surface (but not the body of the cube) is heated to a red heat. The flame is then removed, and the specimen when cooled is ready for microscopic examination by reflected light. The heating to a red heat causes a differential etching of the surface by oxidation, so that the structure is thrown into bold relief.

Messrs. Turner and Randall have in this way worked up a large number of specimens of coal from different coal seams in the southern and middle western Pennsylvania anthracite districts, this work indicating that certain types of vegetable structure apparently predominate in some of the coal beds, thus indicating the possible use of this method for correlating coal seams in different districts.



The Isolated Power Plant in the Coal Industry

Continuity of Service Essential to Economy and Safety—Isolated Power Plant Can Utilize Small Sizes of Fuel at Mines—Transmission of Electrical Energy Cheaper Than Freight Rates on Fuel

By S. J. H. White
Erie City Iron Works

MODERN methods and requirements in coal mining frequently demand the installation of isolated power-generating units. Power supplied from outside sources should never be depended upon as the sole source of supply where continuity of service is imperative. Outside sources of supply are subject to probable interruptions due to line troubles resulting from wind, sleet, thunder storms, fires, breakage of lines, failure of insulators, etc., as well as possible accidents to central-station apparatus, transformers, switching and control equipment.

The safety and often the life of the coal miner is dependent to a large degree upon continuous operation of the power plant; therefore the danger of interruption of power should be reduced to an absolute minimum. The cost of mining coal has increased to such an extent that even coal mines have found it advisable to install power-generating equipment with a view to obtaining an outlet for their small sizes of fuel and effecting increased economies in operation.

The greatest care should be exercised in selecting power-generating units, auxiliaries and all minor equipment entering into any part of the power plant. The peculiar conditions and requirements of this class of service call for dependability of every detail and especially is this true of the prime movers.

As the prime mover in the power plant is one of the most important pieces of equipment it should be of a design and type to eliminate as far as possible any probability of failure. It should be of ample capacity to carry the high-peak and emergency demands which frequently occur. It should have unusually close speed regulation, and the speed should not be materially affected by wide variations in steam pressure or load; finally, it should be direct-connected to the generator, thus eliminating belts, ropes, gears, etc.

Control Equipment Should Be of Simple Design

In the event that ample water supply is available the prime mover may be operated condensing, but in such cases provision should be made to enable the engine to continue operating without the slightest danger of an accident in the event that the vacuum fail from any cause. Auxiliaries should be steam-driven to insure greatest dependability. Switchboards and all control equipment should be designed as simply as possible consistent with necessary flexibility, safety and up-to-date practice.

In the event that central-station power service is within available distance it is advisable that the in-

Note—Headpiece shows a typical isolated power plant at a coal mine.

dependent plant be tied in with it or that emergency-service connection be provided. Either plan insures a duplicate source of supply readily available for extra heavy peak loads or emergency requirements.

Where direct current is required in the mine, as is usually the case where haulage locomotives are used, and alternating current is supplied by the central station, a motor generator or synchronous converter will be required to connect the two systems.

To meet such conditions of load and dependability requires an engine that is extremely simple and designed for reliability, economy and durability. Its speed regulation should be easily adjustable to operate successfully under any steam or exhaust conditions and run either non-condensing or condensing without troublesome adjustment. Ample allowances should be made for handling severe overloads.

The valves should be of a type that will remain steam-tight indefinitely. The oiling system preferably should be automatic, thus insuring perfect lubrication and eliminating all probability of interrupted service due to hot boxes. Steam economy also is an important prerequisite together with ability to operate continuously at high efficiencies for long periods.

Pulverized Coal Fed to Furnace Automatically

There is always a large amount of slack and unsalable coal produced in the screening process at the mines which in the past has been thrown away as waste. Such discarded products usually contain the original number of B.t.u. per pound, but until recently this fuel could not be successfully utilized in producing steam. To meet these conditions the Erie City Iron Works has placed on the market a successful combination bituminous-coal pulverizer and feeder, which thoroughly pulverizes the coal and at the same time automatically feeds it to the boiler furnace with just the correct volume of air to obtain highest efficiency. These machines permit the utilization of the waste fuel mentioned above, and the method of automatic firing employed effects extremely high furnace efficiencies, usually much higher than is obtained with high-grade coals and the best mechanical stokers.

The coal-pulverizing apparatus referred to has been perfected and thoroughly tested out in several power plants during the past three or four years. This method of firing what were formerly considered waste coal products has reduced fuel cost in power plants many per cent, not only because of reduced cost of the lower grades of fuel consumed but also because of the much higher furnace efficiencies obtained. Full automatic control of coal and air supply, as well as damper control, in conjunction with the coal-pulverizing apparatus makes the boiler plant equipped with such devices the most efficient ever developed.

It is entirely practicable for the coal mines to install large power plants equipped to burn the waste coal as outlined and sell the surplus energy generated to the numerous large central stations and systems, who will gladly purchase same at rates attractive enough to prove profitable to the mine owners, and at the same time result in benefit to the systems.

The high freight rates on coal are causing central stations to boost their rates; therefore if the plan suggested is carried out it will prove of great benefit to the coal-mine owners, the central stations and the general public.

A much safer and more profitable plan is for the various coal mines to install power-generating plants as suggested, operate them on waste coal products, and operate their plants in parallel with each other and the large central-station transmission lines, thereby forming an immense "super-power plant" consisting of many small units. The failure of several of these units, even at the same hour, would inconvenience no one seriously, not even the workers at the mines where the local power plant may be in trouble.

Obtaining such power from the coal mines would be less costly to central stations than to produce it with a super-power plant, provided the latter has duplicate equipment, as it should have. The fixed charges on proposed super-power plants would be enormous, and as an inevitable consequence the cost of operation would be high.

Mine Plants Could Get Power Without Cost

The plan herein suggested constitutes a dual generating plant with smallest investment, and the investment, being divided among many, is a minimum burden as such. Our coal mines are fortunately situated near industrial centers, and the cost of transmission lines would be comparatively small, as they would be used merely to connect the proposed power plants at the mines with the existing high-tension lines of the central stations.

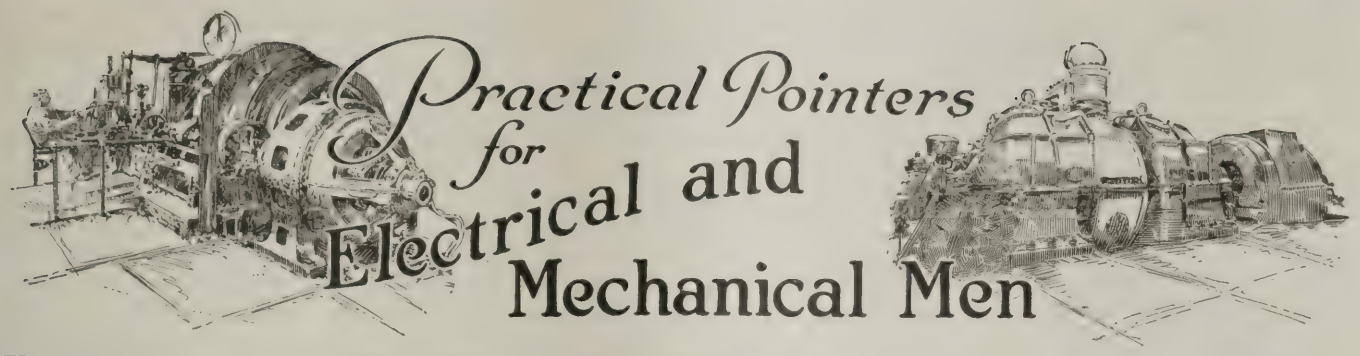
Most of the present mine power plants are more or less inefficient, but if surplus power were sold twelve months in the year to the central-station interests at slightly above cost, it would result in the coal mines getting their power for nothing, and justify much better plants being installed.

Coal-mine owners should endeavor to assist in solving our power problems by taking a deeper interest in the power-plant industry, because they actually hold the key to the situation in that they own and control the greatest source of power supply. Coal is the inactive latent state of energy which is merely put through the power house to be converted into electrical energy. Then, again, it is far cheaper freight to ship electrical energy than latent coal-energy which at its point of destination is converted into some form of useful energy like electricity.

Would Educate Workers in Economics and Government and Human Relations

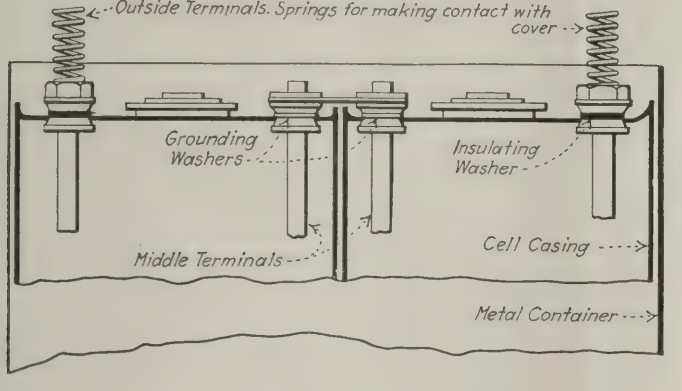
THE committee on industrial relations of the National Association of Manufacturers, which is headed by M. M. Davidson, recommends that the association take steps to develop a plan of constructive education for managers and workers in industry in the fundamental principles of economics, of government and of human relations. It is the opinion of the committee that much of the discontent and distrust among the workers has come through a misunderstanding of or lack of knowledge of the economic principles involved and through failure to fully recognize and emphasize the economic principles involved, rather than through any fundamental flaw in the system itself.

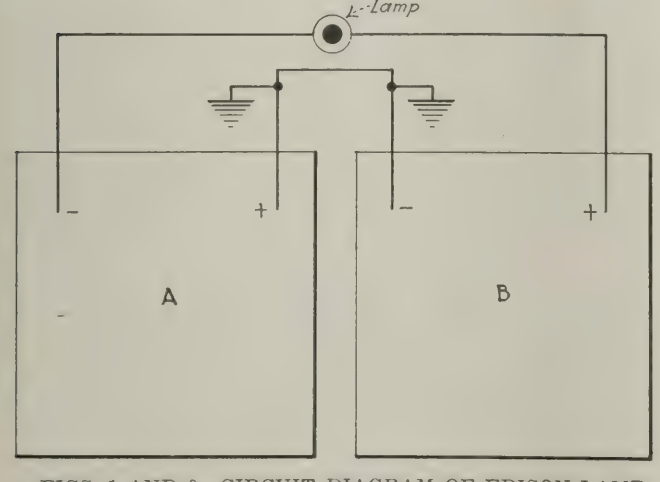
The report also emphasizes the need of some agency to place before the workers information that will enable them to think straight and act accordingly. The association and the manufacturers are warned that if they ignore the slow-working poison of vicious propaganda among the workers they may soon find it too late for either preventive medicine or surgery.



Repair to an Edison Mine Lamp Battery Which Can Be Made at the Mines

THERE is an interesting "kink" in regard to the Edison storage-battery miners' lamp which is not, I believe, generally known by a good many men who are in charge of the maintenance and care of these lamps. As everyone who has anything to do with these lamps knows, the battery for each lamp is made of two cells set edge to edge inside of a metal container. Each cell has two terminals and in the assembled battery the two outside terminals have a spring attached to them for the purpose of making the contact with the battery cover to which is attached the cord extending to the lamp and also to hold the cells firmly in the container. These same two terminals also are insulated from the metal casing of the cells as shown in Fig. 1. The two middle terminals are grounded to the metal casing of the cells and are connected to each other so that the two cells are in series. This really means that the positive terminal of one cell and the negative terminal of the other cell are grounded to their metal cell casings. (See Fig. 2.)





FIGS. 1 AND 2—CIRCUIT DIAGRAM OF EDISON LAMP

Changing the relative positions of cells *A* and *B* makes the outer terminals the inner terminals, which are normally grounded and tied together by a connecting strip. An internal ground on a middle terminal is therefore of no consequence to the operation of the battery.

If for some reason the outside terminal of either one of the cells becomes grounded inside the cell that cell becomes short-circuited and of course will not operate and the battery as a whole will not function. This can be remedied by taking the cells out of the container and reversing their position—that is (referring to Fig. 2), cell *A* can be placed in position *B* and cell *B* in position *A*—and by removing the grounding washers from what are now the two outside terminals and placing them on the two inside terminals and also by removing the two insulating washers from what are now the two inside terminals and placing on the outside terminals. When this is done the internal ground will be on one of the two middle terminals which are normally grounded anyhow and thus will not affect the proper operation of the cell.

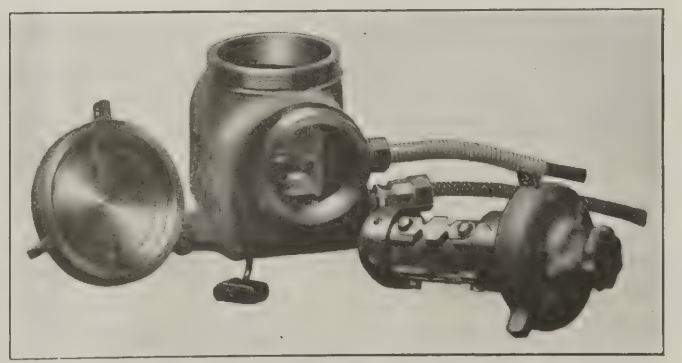
By this change it is readily possible to place back in service any cell that has become grounded internally on one of its terminals. In many cases this will eliminate the expense and delay occasioned by sending the battery back to the factory to be repaired.

The cells of these batteries should not be opened at the mines because this destroys the container and thus makes it impossible to reseal it properly.

Wilkes-Barre, Pa. O. E. KENWORTHY.

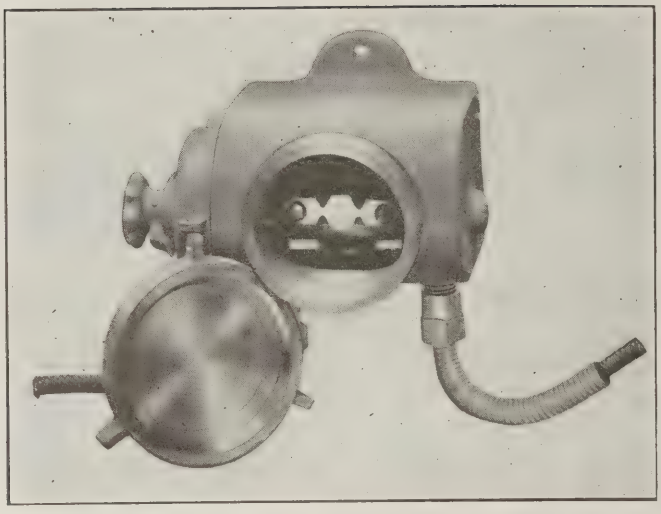
Flameproof Fuse Box

AN IDEA of what may be expected to be found on the permissible flashproof storage-battery locomotive can be gained from some of the latest developments in accessories and parts which have recently been brought out.



EXPLODED VIEW OF FUSE BOX

Fuse links are mounted on the cylindrical drum, which is inserted into the end of the fuse compartment. Three such fuse links amply protect the equipment and eliminate the necessity of refusing on the road, which would defeat the purpose of the scheme.



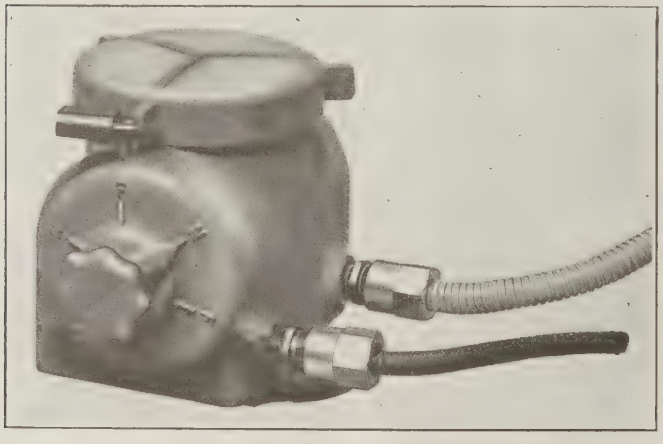
FUSES AND DRUM IN POSITION

With the fuse cylinder in position the inspection cap may be removed and all fuse links turned into sight. This of course can not be done except by the properly authorized person who does so in a non-gaseous location in the mine.

The schedule governing the design of the locomotive and its parts prohibits the opening of permissible compartments during operation; the blowing of a fuse therefore would necessitate the towing of the locomotive to the barn unless other arrangements were made.

To meet this objection the Mancha Storage-Battery Locomotive Co. has designed a permissible compartment in which three standard renewable fuse links are mounted on a drum. This drum can be operated by means of a handwheel indexed on the outside so as to show whether fused or neutral.

A compartment of this type is located at each end of the locomotive and connected into each battery lead so as to furnish complete protection against grounds



ASSEMBLED FLAMEPROOF FUSE BOX

The wires leading to the box are amply protected by a metallic covering. At the entrance to the box stuffing glands are provided. Change from one fuse to the other can be readily made by rotating the drum. A padlock securely locks all parts.

or short-circuits. Except under abnormal conditions it should never be necessary to go to the motor barn during a shift. The leads enter through stuffing boxes, and a lock also is provided to make the apparatus secure against tampering.

NEW COAL SAMPLING RECORD.—In a recent month the Pittsburgh experiment station of the U. S. Bureau of Mines established a new record for the analyzing of coal samples, 1,030 samples having been examined and reported upon. These samples were collected from the different fields of the country, including Alaska.

Care of Bearings on Generating Machines

FOR generating equipment fitted with self-oiling bearings, the following rules should be followed to insure continuity of service:

The well should be filled to such a height that the rings will carry sufficient oil upon the shaft. If the bearings are too full, oil will be thrown out along the shaft. The oil should be renewed about once in six months, or oftener if it becomes dirty and causes the bearings to heat.

The bearings must be kept clean and free from grit. They should be frequently examined to see that the oil supply is properly maintained and that the oil rings do not stick. Use only the best quality of oil. New oil should be run through a strainer if it appears to contain any foreign substance. If the oil is used a second time, it should first be filtered and, if warm, allowed to cool.

A warm bearing or a "hot box" probably is due to one of the following causes:

(1) Excessive belt tension.
(2) Failure of the oil rings to revolve with the shaft.
(3) Rough bearing surface.
(4) Improper fitting of the journal boxes.
(5) Bent shaft.
(6) Use of poor grade or dirty oil.
(7) Bolts in the bearing cap may be too tight.
(8) End thrust, due to improper leveling. A bearing may become warm because of excessive pressure exerted by the shoulder of the shaft against the side of the bearing.
(9) End thrust, due to magnetic pull, rotating part being "sucked" into the field because it extends beyond the field poles further at one end than at the other.
(10) Excessive side pull, because the rotating part is out of center.

If a bearing becomes hot, first feed heavy lubricant copiously, loosening the nuts on the bearing cap; and then, if a machine is belt-connected, slacken the belt. If relief is not afforded, shut down, keeping the machine running slowly until the shaft is cool, in order that the bearing may not "freeze." Renew the oil supply before starting again. A new machine should always be run at a slow speed for an hour or so in order to see that it operates properly. The bearings should be carefully watched to see that the oil rings are revolving and carry a plentiful supply of oil to the shaft.

Relation Between Phase and Capacity

WILL you be kind enough to explain through your columns the relation between phase and capacity of alternating-current equipment? By this I mean an explanation of the volt-ampere capacity of single-, two- and three-phase connections. ELECTRICIAN.

For a single-phase generator or transformer the output at any time, expressed in kva., is the product of the current in amperes and the pressure in volts divided by one thousand.

For a two-phase generator or transformer the output at any time, expressed in kva., is the sum of the two single-phase outputs as above. If the load is balanced the two-phase output is twice the output of either phase. For a three-phase generator or transformer with balanced load, the kva. output is the product of the line current, line voltage and 1.73 divided by one thosuand.]

Iron Sulphide in Coke Can Be Reduced by Air and Heat Also Free Sulphur, but Not in Sufficient Quantity*

Experiments Show That Ferrous Sulphide in Some Cokes Can Be Decreased 81 per Cent and Free Sulphur 22 per Cent—Solid-Solution Sulphur Unchanged—Sulphate Sulphur Increased—Roasting and Vacuum Fails

By Alfred R. Powell
Associate Chemist, U. S. Bureau of Mines, Pittsburgh, Pa.

In A paper† entitled "The Forms of Sulphur in Coal," contributed to the *Journal of the American Chemical Society*, I have described an investigation in which the forms of sulphur in coke were determined and described. Coke was found to contain four characteristic forms of sulphur—namely, ferrous sulphide, sulphates, adsorbed free sulphur and sulphur held in solid solution in the carbon.

While the coke is still in the oven only two forms of sulphur are present—namely, the first and the last of those mentioned. During the quenching, however, the sulphur of the coke is subjected to much oxidation, a portion of the ferrous sulphide being oxidized to free sulphur and sulphates, the sulphur in solid solution remaining unchanged. The coke, however, loses no sulphur during this process, as the free sulphur which is formed is retained by the coke in an adsorbed form.

Oxidize Sulphide and so Get Rid of Sulphur

As this ferrous sulphide is so easily oxidized, an investigation was undertaken to determine whether industrial advantage could be taken of this property for the desulphurization of coke. Although it is true that such a roasting process would not reduce the sulphur which is in solid solution, still the removal of the sulphur that is in the form of ferrous sulphide would undoubtedly improve the coke from the standpoint of the metallurgist. The betterment in the coke would arise not only from the decrease in total sulphur, but also from the large decrease in the ferrous sulphide, which is responsible for the contamination of the iron in the upper part of the blast furnace.

The desulphurization of coke by roasting in air is not a new idea, but dates back to the earliest days of coke manufacture. In 1871, Philippart‡ published the results of some work done by him on the desulphurization of coke by air, as well as a review of the results of earlier investigators. In these earlier experiments, nothing was known of the forms in which the sulphur existed in the coke, and the temperature measurements were only approximate, in consequence the results were neither conclusive nor complete. The desulphurization figures given by these early investigators generally showed a low efficiency for the process, but some extraordinary results were claimed by certain inventors. In the light of our new knowledge concerning the sulphur in coke, it seemed to be important enough to warrant investigation.

One of the first factors to be determined in this investigation was the best temperature for the oxidation of the ferrous sulphide in the coke. It might be assumed that the higher the temperature the faster would be the oxidation of the ferrous sulphide but it must be remembered that the coke itself would oxidize more rapidly at high temperature. It was, therefore, necessary to determine a mean temperature, that would best satisfy both conditions.

When Over Hot Coke Takes Sulphide's Oxygen

A series of tests at different temperatures was made, the powdered metallurgical coke being placed in a tube heated to the desired temperature, a slow current of air being passed over it. An analysis of the residue for ferrous sulphide determined the thoroughness of the oxidation, and the loss in weight of the sample showed the relative coke loss at different temperatures.

At 300 deg. C., the oxidation of ferrous sulphide proceeded rather slowly, and there was no loss of coke. At 400 deg. C., the oxidation took place much more quickly, and still there was no appreciable loss of coke. At 500 deg. C., the oxidation of the ferrous sulphide was complete at the end of a few minutes, and the coke loss was small, being under 1 per cent. At 600 deg. and higher a noticeable coke loss took place and the oxidation of the ferrous sulphide was slower, if anything, than at 500 deg. as the oxygen that should have combined with the sulphide was consumed in the combustion of the coke.

These experiments showed that 500 deg. was the best temperature for the oxidation of the ferrous sulphide, when the relative speeds of oxidation of the ferrous sulphide and the coke itself were considered. For this reason the temperature used in the treatment of the chunk coke was 500 deg., although several runs were made at temperatures as high as 650 deg., for reasons that will be described later.

Differentiating the Four Sulphurs in Coke

The method of analysis used to ascertain the percentage of the various forms of sulphur in the coke both before and after the desulphurization treatment I have described in another paper.* In brief this examination consisted in treating one sample of the coke with hydrochloric acid, the hydrogen sulphide evolved being a measure of the ferrous sulphide in the coke. The sulphate in the coke would be in this hydrochloric-acid solution, and could be determined as such. Then, another sample of the coke was reduced by heating it to a red heat in an atmosphere of hydrogen, and cooling it in the same atmosphere. This reduced the sulphates to sulphides, and also the adsorbed sulphur to ferrous sulphide.

*Article entitled "The Desulphurization of Coke by Air," in Reports of Investigations, U. S. Bureau of Mines.

†Vol. 45, 1923, pp. 1-15.

‡Philippart, M. A., *Revue Universelle des Mines*, vol. 28, 1871, pp. 261-318.

*Powell, Alfred R., "The Quantitative Determination of the Sulphur Forms in Coke." To be read before the Gas and Fuel Section of American Chemical Society, New Haven, 1923.

On treating this with hydrochloric acid, the hydrogen sulphide evolved would be a measure of the combined ferrous sulphide, sulphates and the adsorbed free sulphur. By subtracting the ferrous sulphide and the sulphates, which were already known, the content of free adsorbed sulphur could be calculated. Then the combined ferrous sulphide, sulphates, and free sulphur subtracted from the total sulphur gave the sulphur held in solid solution by the carbon. In this manner all four of the sulphur forms could be determined. The method is quite reliable, as has been proved by checking its results against others which have been developed in the course of investigations into the sulphur in coke. The comparisons have been very satisfactory.

Freed Chemically, Remains Physically Bound

Any process designed to secure the desulphurization of coke by air must involve at least two stages. The first stage consists of the oxidation of the ferrous sulphide of the coke to form iron oxide and free sulphur. The best temperature for this reaction has already been mentioned. The pressure of the air is important, because increased pressure tends to force the air into the pores of the coke, and therefore, promote the oxidation.

The second stage of the process consists in the removal of the free sulphur which is formed in the oxidation, and has been adsorbed on the surfaces of the coke. Three different methods for the removal of this sulphur were tried in this investigation. The first consisted in the production of a vacuum, whereby it was hoped that the sulphur would volatilize at the temperature of the coke at that point in the process—that is, 500 deg. The second method tried for the removal of the sulphur was the use of a higher temperature than 500 deg.

However, whatever temperature was used in this second stage of the process had to be used in the first stage also, as it would be impracticable to permit the coke to cool down from the oven temperature to 500 deg., and then to heat it again for the second stage of the process. For this reason, 650 deg. was about the highest point that the temperature could be raised. The third method for the removal of the free sulphur from the coke consisted simply in the continued passage of the air through the coke after the primary oxidation of the ferrous sulphide, so as to roast out the retained sulphur. This latter reaction always took place to some extent as the oxidation of the free adsorbed sulphur started before the primary oxidation of the ferrous sulphide was complete.

Hydrogen Will Not Serve with Iron Present

As the previous investigation of the coke sulphur had indicated that adsorbed sulphur readily could be removed from the coke by the action of hydrogen at a red heat, it might be assumed that such treatment might be efficiently applied after the oxidation of the ferrous sulphide, in order to remove the adsorbed free sulphur. However, in the instance mentioned, the iron had been removed from the coke by acid extraction before the hydrogen treatment. Where the iron remained in the coke, as it would in practice, the effect of hydrogen is simply to reverse the effects of the roasting and reconvert the free sulphur into ferrous sulphide. Such treatment is therefore out of the question.

As metallurgical coke must be kept in the chunk form, in which it is made, all of the desulphurization tests were performed on coke which ranged from 2 to 3 in. in diameter. By doing this, results could be obtained which would be comparable to large-scale practice, whereas, tests on powdered coke would have little real meaning.

The apparatus for performing the tests consisted of a 3-in. steel tube about 2 ft. long, which was wound with resistance heating wire. A thermocouple was inserted between the tube and the winding so that the temperature of the tube could be controlled. A frame held the tube in a vertical position. The lower end was closed by a cap through which a small pipe was inserted for the air inlet.

The upper end was closed by a blind flange, which could be easily removed for the insertion and the extraction of the coke. An outlet through this end of the tube conducted the air through a solution of sodium hydroxide and thence to a vacuum-pump. Valves were provided so that the coke could be kept under air pressure, under vacuum, or simply in a steady stream of air at any rate of flow desired. The purpose of the sodium hydroxide solution was the absorption of the sulphur dioxide produced by the roasting.

Use of Chunks of Coke Mars Experiments

One rather serious source of error was present in these experiments, and to eliminate it entirely seemed impossible. This was the fact that one chunk of coke had to be taken as representative of the original coke, while several other chunks from the same batch were taken for the test. In other words, it was impossible to crush the coke to get a homogeneous sample, as the tests had to be run on the coke of chunk size. However, from the analysis of different chunks from the same batch it was shown that the principal nonhomogeneity existed in the solid-solution form of sulphur. As this form remains unchanged in the coke under treatment short of its actual destruction, the quantity after test was considered to be the same as that in the original sample, and the total sulphur was corrected accordingly. In this manner results were obtained which were comparable.

Two different cokes were tested in this investigation. No. 1 was a high-sulphur coke manufactured in a vertical retort. In this coke the solid-solution form of sulphur predominated, so that little desulphurization was possible. No. 2 was a coke made from Illinois coal and was of such a type that proper desulphurization could have made it available for blast-furnace coke. The results of the different tests are given in Table I.

TABLE I—DESULPHURIZATION BY AIR OF COKE NO. 1

	Original	Run 1	Run 2	Run 5
Temperature, deg. C.	....	500	650	500
Roasting time, min.	....	30	30	210
Vacuum time, min.	....	10	10	none
Sulphur evolved as SO_2, per cent of coke	....	0.19	0.23	0.46
Coke loss, per cent	....	none	1	1
Sulphur as solid solution, per cent	1.90	1.90	1.90	1.90
Sulphur as ferrous sulphide, per cent	0.58	0.24	0.24	0.11
Sulphur as free sulphur, per cent	0.62	0.50	0.38	0.39
Sulphur as sulphate, per cent	0.10	0.13	0.10	0.31
Total sulphur, per cent	3.20	2.77	2.62	2.71

DESULPHURIZATION BY AIR OF COKE NO. 2

	Original	Run 9	Run 10	Run 11
Temperature, deg. C.	....	500	500	500
Roasting time, minutes	....	30	....	....
Vacuum time, minutes	....	10	(a)	(b)
Sulphur evolved as SO_2, per cent of coke	....	0.08	0.08	0.14
Coke loss, per cent	....	none	none	none
Sulphur as solid solution, per cent	0.84	0.84	0.84	0.84
Sulphur as ferrous sulphide, per cent	0.26	0.16	0.12	0.10
Sulphur as free sulphur, per cent	0.19	0.23	0.18	0.15
Sulphur as sulphate, per cent	0.02	0.04	0.06	0.06
Total sulphur, per cent	1.31	1.27	1.20	1.15

(a) Alternate roasting and vacuum every few minutes for 20 times.
(b) Alternate roasting at 4-lb. air pressure and vacuum every few minutes for 20 times.

In the runs where the vacuum treatment was used, it was not possible to reduce the pressure to below 4 cm.

of mercury. This was due to the fact that the apparatus was of metal and was comparatively large. In consequence leaks could not be avoided. Also the vapor pressure of the sodium-hydroxide solution which was in the system, was a limiting factor on the completeness of the vacuum obtainable.

Run No. 1 shows the effect of roasting and vacuum on the sulphur of the coke. Over half of the ferrous sulphide was oxidized, there was a slight decrease in the free sulphur, and a very small decrease in sulphate. The most disappointing feature of this run was the persistance of the free sulphur in the coke. The vacuum, apparently, was inefficient as far as the removal of the free sulphur was concerned.

Long Roasting Betters Coke But Little

Run No. 2 shows the effect of higher temperature on the results. Under these conditions more of the free sulphur is eliminated, but the final result is far from satisfactory. In No. 5 run the effect of long-continued roasting is shown. The result is much better oxidation of the ferrous sulphide, but this improvement is counterbalanced by the excessive formation of sulphates. The long roasting does not have much effect on the elimination of free sulphur, the obstinate retention of this free sulphur being the chief difficulty in any possible use of this process for the desulphurization of coke.

The desulphurizing effect of air on No. 2 is shown to be small by the results from run No. 9. By alternating the roasting and vacuum as in run No. 10, somewhat more sulphur is eliminated than in the previous run; but much free sulphur is still retained. By putting the air for the roast under 4-lb. pressure, and alternating this with the vacuum—as in run No. 11—still better results were obtained; but again the results gave no promise of industrial utilization.

Wherein the Much-Commended Process Fails

Summary and Conclusions—It is possible to draw the following conclusions from this investigation of the desulphurizing effect of air on coke:

(1) At temperatures near 500 deg. C., it is possible to oxidize the larger part of the ferrous sulphide in coke to iron oxide and free sulphur, without causing any appreciable oxidation of the coke itself.

(2) The free sulphur produced as just described is retained in the coke in an adsorbed form. It has been found impossible to remove this from the coke completely, and even part removal has been difficult. Several methods have been tried and the results may be briefly summarized as follows:

(a) *Vacuum.*—The application of a vacuum to the coke at the temperature at which the coke is roasted is inefficient. Little or no free sulphur is drawn out of the coke by this method.

(b) *Higher Temperature.*—From an industrial standpoint, the temperature used in the secondary stage of the process to remove the free sulphur should be the same as that used in the primary stage of roasting the coke, as it is impracticable to heat the coke after once it has been cooled. On the other hand, the coke cannot be heated much above 500 deg. C., so that there is an upper limit to the temperature—say 650 deg. Raising the temperature of the process to this latter figure has little added effect in the elimination of the free sulphur.

(c) *Secondary Roasting.*—By this method the passage of air through the coke is continuous beyond the point where the available ferrous sulphide has been oxidized to free sulphur. The results showed some added elimination of the free sulphur, and by the long-continued roasting, more of the ferrous sulphide was oxidized. An unfavorable feature of this long roasting was the excessive formation of sulphates.

(d) *Alternate Repeated Roasting and Vacuum Treatment.*—This method for reducing the free sulphur was tried both with the air at ordinary pressure and with a pressure 4 lb. higher than atmospheric. The result was a somewhat increased elimination of the free sulphur, but even then the major part of it remained in the coke.

(3) This investigation has indicated that the industrial desulphurization of coke by air is not practical as far as the methods which have been tested would apply. The chief difficulty in the application of the process lies in the tenacity with which the free sulphur is retained by the coke. If a method could be found for the complete removal of this free sulphur, metallurgical coke could undoubtedly be improved by the air treatment, for the solid-solution sulphur and the remaining ferrous sulphide enclosed in the coke-walls do not have as great a contaminating effect on the iron in the upper planes of the blast-furnace as has that part of ferrous sulphide which is capable of oxidation by this process.

Training Miners Adds to Their Efficiency

ALTHOUGH the literature of mine engineering is extensive, there is nothing in print in this country, and very little in England, which could enlighten the miner as to the methods by which he could attain maximum earnings by increasing the efficiency of his work at the face. Inquiry into the inequality of miners' earnings resulted in the Hudson Coal Co. assigning instructors in the actual work of mining to the ten or twelve employees in each operation whose earnings were least. This effort has been continued long enough to show that by instruction thus given, the average earnings of a group of miners thus selected can be increased $1 to $1.25 per day. This instruction covers the proper placement of the hole, the angle, depth and size it is to be drilled, the character and quantity of explosives to be used, the method of tamping, etc.

Honnold Says Producers Will Make Money In 1923—Maybe as Much as 6 Per Cent

"Coal producers will make some money this year," Dr. F. C. Honnold, secretary-treasurer of the Illinois Coal Operators' Association, told the *Chicago Journal of Commerce* in an interview the other day, "but their profits will not be large. The average company will do well to make 6 per cent on its investment."

Dr. Honnold prophesied that during the next three or four years a considerable number of operating concerns that sprang up mushroom-like during the period of inflation following the war will collapse in bankruptcy, but that many of the larger and stronger companies, having learned some vital truths about their industry by weathering that same period of inflation, will be able to show a fair profit in spite of restricted demand and a general tendency toward reduced prices of coal.

Speaking of Illinois, he said conditions are "not altogether satisfactory." There were then 5,000 cars of unbilled coal on mine tracks. Of these, 1,250 were loads of screenings—sizes that ordinarily are short at this time of year. Illinois mines are operating between 33⅓ and 40 per cent of their capacity as compared with a normal of 85 per cent. As many as fifty Illinois mines are down either temporarily for repairs or for the summer.



Problems of Operating Men

Edited by James T. Beard



Firebosses Who Use Electric Cap Lamps

E'ectric Lamp Gives Good Light—Is Not Extinguished in Bad Air—Expedites Work—Fireboss Can Travel Faster, Examine Larger Territory

REPLYING to William Dickinson's letter condemning the use of electric cap lamps by firebosses, *Coal Age,* March 29, p. 530, permit me to say that I have carried an electric cap lamp in my belt when performing the duties of fireboss and have found it a great advantage.

Like Mr. Dickinson, my experience in firebossing began in England (Lancashire), when such a thing as an electric lamp was not known. However, I feel that it should be impressed on the minds of all mining men that we are becoming more enlightened every day in regard to conditions, methods and appliances that make mining safer.

Found Cap Lamp a Great Advantage

It had always been my practice in firebossing to carry no other light than that of an approved safety lamp, until a few months ago when I came into possession of an electric cap lamp, which I have since carried in my belt when making my rounds in the morning. The lamp gives a good light and enables me to travel faster through abandoned places and, particularly, when climbing over falls.

To my mind, it is ridiculous to argue that the bright glare of the lamp blinds the vision so that the fireboss cannot see the faint gas cap that may form on a safety lamp. The fireboss who knows his business will not carry the electric lamp on his head. Carried in the belt, the light rays are reflected downward and do not hinder or prevent a fireboss from making an accurate test for gas.

On the other hand, the bright light is of great assistance to him if he has to restore a portion of brattice that has been broken down and which the fireboss must replace when making his rounds, in order to keep the place free from gas. If this is not done, the man who works there must be kept out of his place, until the regular bratticeman gets around to do the work.

Avoids Risk of Getting in the Dark

Still another advantage that can be claimed for the electric lamp, in the work of firebossing, is that it avoids the possibility of a man being left in the dark if his safety lamp is extinguished. This often happens when he is compelled to climb to the top of the coal to make a test in a place 10 or 12 ft. high.

It has frequently been my lot to lose my light in such cases. I could not tell whether the flame was knocked out by a jar or extinguished by gas. At those times, however, it was my duty to retreat to a place of safety to relight the lamp. This was generally a difficult thing to do, because of having to travel in the dark, and one can readily understand the advantage of the electric lamp in such a situation.

Let me say, again, that it is time for all mining men to appreciate the advantage there is in these new methods. Suppose a part of a fireboss territory accumulates blackdamp. In passing through such places, he is almost sure to lose his light, whereas if he has an electric lamp hanging to his belt, he need have no fear of being left in the dark wherever he goes.

Frontier, Wyo. JAMES ROBERTS.

ANOTHER LETTER

AFTER reading William Dickinson's letter, which appeared in *Coal Age,* March 29, p. 530, where he claims that, for a fireboss to carry an electric cap lamp with him when making his rounds in the morning, is a dangerous practice, I am inclined to disagree with our friend on that point.

We all realize that an electric cap lamp has no value in the matter of testing for gas. No one questions that fact; but when Mr. Dickinson says that, for a fireboss having a large district to cover, carrying such a lamp "would prove a menace in more ways than one," it is hard to know his reason for making such a statement.

As far as I have observed, his only reason for condemning the cap lamp in firebossing is that a fireboss' time is limited and he has no spare moments to be occupied in hiding his electric lamp when making a test for gas. This appears to me as a very slight pretext for depriving our firebosses of the many advantages to be derived by carrying along an electric lamp when making their rounds.

Can Examine a Larger Territory

Allow me, therefore, to give my reasons why a fireboss should use either an electric cap lamp or a pocket flashlight. In the first place, when examining a large territory, a fireboss will make better time by using the cap lamp. There is no doubt but that he can make a better examination of the roof and sides of all the working places, haulageways and travelingways, in his district, by making good use of the electric lamp he carries.

Judging from the reference Mr. Dickinson makes, with regard to the fireboss having no time to spare to hide his electric lamp when about to make a test for gas, it may be assumed that he is speaking of making a percentage test, which requires the lowering of the flame of the lamp and estimating the height of the cap should any be present.

If that is his practice he must have a small territory to examine. In most instances, I have found it impossible to get around in adopting such measures. Instead, I have used what I would call the accumulative test, by observing the appearance and action of the normal flame. I believe this has afforded equal satisfaction and safety as would be obtained by making a more accurate test to determine the percentage of gas, by lowering the flame and observing the height of the gas cap that may be formed in the lamp.

Reverse Cap When Making Test for Gas

Of course, if a fireboss comes upon a large body of gas it is necessary for him to take more time and examine carefully to ascertain the real conditions of the place. He must then lower his flame and make a careful test. At such times, however, it is an easy matter for him to turn his cap lamp to the side of his head or turn it back so as to shine behind him, whichever he may choose. The radius of illumination of a cap lamp covers but a small area and when the cap is turned about, as I have mentioned, the glare of the lamp will not interfere with the test he makes.

Before closing, I cannot forbear to say that a fireboss who finishes his shift in the condition described by Mr. Dickinson, who says that, after shedding his coat, vest and overshirt, his undershirt and trousers would be wet with the perspiration that poured from his body. This would seem to indicate, then, that our friend did not lose much time in stopping to lower his flame and make a careful test in each place examined, as I had feared. It is my conclusion that all firebosses should carry with them either a pocket flashlight, or an electric cap lamp, when making their rounds. W. W. H.

Clinton, Ind.

Danger in Use of Black Powder

Local explosion in Pocahontas field kills ten men—Miners compelled to use black powder in many of the mines—Need of law requiring exclusive use of permissible powder.

I WAS much impressed with the remarks of "Safety Inspector," writing from Welch, W. Va., whose letter appeared in *Coal Age*, April 19, p. 645, in regard to the relative danger in the working of non-gaseous and gaseous mines. He draws attention to the discussion of explosions occurring in gaseous mines as not being complete without referring equally to the danger of working non-gaseous mines.

Attention is drawn in that letter to the fact that coal dust is a most dangerous factor in the use of explosives. To my mind, this is one point that seems to be given little attention by many writers when treating the subject of mine explosion. This is particularly true where the explosive in use is black blasting powder.

Only a short while ago, there occurred a dust explosion, in the S. J. Patterson mine at Arista, in the Pocahontas field, in this state. The explosion caused the death of ten men, although its effect was comparatively local. According to the evidence gathered, the accident undoubtedly resulted from the accumulation of coal dust in or near the working places. Black powder was in use for blasting in the mine and the accumulated dust had been raised and ignited by the flame of an improper shot.

Any one who has had experience in the use of black blasting powder knows that when shots are fired, the flame not only fills the place but often extends a considerable distance back on the road. No matter how careful a company may be in requiring the loading out of the bug dust and fine coal from all working places, there is always enough fine coal dust that has accumulated in the gob and settled on the ribs and timbers along the road, and this is thrown into suspension in the air by the concussion when a shot is fired.

In fact, if the mine is dry and dusty it is impossible to keep the air free from dust, which is constantly stirred up by the cars being hauled in and out of the mine and by the various operations going on in the workings. It is this condition that makes the use of black powder extremely dangerous, because of the large volume of flame produced in firing.

Since the explosion in the Arista mine, the rule has been adopted in that mine, requiring the exclusive use of permissible powder; but the other mines in that vicinity do not seem to have profited by the lesson. Although these mines are equally dry and dusty and have practically no spraying or humidifying systems installed, they are still permitted to continue using black blasting powder in breaking down the coal. The condition is rendered more particularly dangerous because of the unskilled labor employed and the absence of any rules or regulations regarding the handling of the powder and the charging and firing of the shots.

Strange Indifference to Danger

It is hard to understand the indifference manifested regarding the use of black powder in these mines. In most cases, I would say, that the miners of the Pocahontas field are compelled to use black powder. In some instances even, the use of permissible powder has been positively forbidden by the companies operating the mines. I want to ask, Will our state mining department wait until the horses are stolen, before closing the stable doors?

In my experience I have found most non-gaseous mines ventilated by a single continuous air current, which everyone knows is a poor system of ventilation. Not only that, but those mines seldom have any rules or regulations restricting the time of firing shots, or limiting the amount of the charge, or providing for the inspection of the holes by competent inspectors, before charging and firing.

Instead, the miners are permitted to follow their own sweet will, charging and firing their holes how and when they please. The consequence is that the air currents, in these mines, continually carry a large amount of fine dust and are laden heavily with the smoke and gases produced by the shots. Throughout the shift, the men are compelled to breathe air that is injurious to health, to say nothing of the danger to which they are exposed by reason of a possible explosion occurring in some working place and being extended throughout the mine owing to the explosive condition of the mine air.

In closing, let me say there are several explosives, on the market, that are recommended by the U. S. Bureau of Mines and their use is also advocated by the West Virginia State Mining Department. Why should not the use of these explosives be made compulsory by law? Why should our mines be permitted to take chances with an explosive that has, in many instances, proved extremely dangerous? The subject is certainly worthy of careful consideration.

Springton, W. Va. Mine Worker.

Inquiries Of General Interest

Ascertaining Explosibility of Methane in Oxygen

Explosibility of Methane in Oxygen Mixture Questioned—Lower Inflammable Limit of the Mixture Calculated—Explosive Point Undefined

AT THE meeting of our mining class, the other night, a question arose regarding the explosibility of a mixture of nine cubic feet of methane (CH_4) in fifty cubic feet of oxygen. The question was asked: "Would such a mixture explode when contained in a vessel and a light applied?" Our instructor claimed that there would be no explosion. His reason for this conclusion is not clear to me and I will be grateful to see the matter explained in *Coal Age*. The most of us were inclined to think that this mixture was explosive. STUDENT.

Burnett, Wash.

The question of ascertaining at what point an ignitible gas will explode when the gas is added to an atmosphere of air, or to one of pure oxygen, can only be answered approximately, since the explosion of the mixture will depend not alone on the relative proportions of the gases forming the mixture, but on their uniform distribution, in order to bring about an intimate contact of the respective molecules throughout the entire volume and insure the necessary rapidity of combustion at every point. Much, also, depends on the intensity of the flame or spark producing ignition.

This condition is fully explained in reference to determining the lower explosive limits of methane in air, in *Mine Gases and Ventilation—Beard, Second Edition*, page 98. As there explained, the lack of uniform distribution of the gas in the air is the cause of the sharp snapping and crackling that is at times observed within a safety lamp introduced into a body of sharp gas. Actual explosion depends on the same condition existing throughout the mass of the mixture; but there is always a gradation each way, from the maximum explosive point to the lower and the higher explosive limits of the gas, the intensity of the explosion growing less and less till it ceases altogether.

On the other hand, the theoretical inflammable limit of a mixture of methane and oxygen is readily calculated. It is the point at which the heat generated, per pound of gas, in the complete combustion of the gas, is equal to the heat absorbed by the products of combustion and the excess atmosphere. Beyond this point, the excess of heat generated is manifested in the inflammation of the mixture. Briefly explained, the process is as follows:

The equation representing the combustion of methane (CH_4) in pure oxygen (O_2) is

$$CH_4 + 2O_2 = CO_2 + 2H_2O$$

Molecular weights,	16	64	44	36
Relative weights,	1	4	$2\frac{3}{4}$	$2\frac{1}{4}$

From a table of Heats of Combustion (*Mine Gases and Ventilation*, p. 66), the heat generated per pound of methane, burning to carbon dioxide and water vapor, is given as 23,513 B.t.u. Now, to find the heat absorbed by the products of combustion, carbon dioxide (CO_2) and water vapor (H_2O), multiply the specific heat of each of the products, by its relative weight per pound of methane, and that result by the rise in temperature above 32 deg. F., which in this case is 1,200 — 32 = 1,168, the temperature of ignition of methane being 1,200 deg. F. Then, the specific heat of carbon dioxide being 0.2163, the heat absorbed, per pound of methane consumed is

$$0.2163 \times 2\tfrac{3}{4} \times 1{,}168 = 694.726 \text{ B.t.u.}$$

The specific heat of water being 1, its relative weight in this case $2\frac{1}{4}$ lb. and rise of temperature 212 — 32 = 180 deg., gives for the heat absorbed by the water, $1 \times 2\frac{1}{4} \times 180 = 405$ B.t.u. Again, the latent heat of steam being 970.4 B.t.u. per pound, gives $970.4 \times 2\frac{1}{4} = 2{,}183.4$ B.t.u. absorbed in turning the water into steam. Finally, the specific heat of water vapor being 0.4805, its relative weight in this case $2\frac{1}{4}$ lb., and the rise in temperature of the steam 1,200 — 212 = 988 deg. F., the heat absorbed by the steam is $0.4805 \times 2\frac{1}{4} \times 988 = 1{,}068.152$ B.t.u. This makes the total heat absorbed by the water, converted into steam at 1,200 deg. F., 405 + 2,183.4 + 1,068.152 = 3,656.552 B.t.u., per lb. of methane consumed. The total heat consumed by the products of combustion is, therefore, 694.726 + 3,656.552 = 4,351.278 B.t.u. per lb. of methane consumed.

But, the heat generated being 23,513 B.t.u. and that absorbed 4,351.278 B.t.u., leaves an excess of heat 19,161.722 B.t.u. to be absorbed by the oxygen remaining unburned. In a large atmosphere of oxygen, this heat would be quickly dispersed, making the temperature too low for the ignition of the gas. The point is, therefore, to find what weight of oxygen will be required to absorb this excess heat and give a rise of temperature 1,200 — 60 = 1,140 deg. F., assuming the original temperature of the oxygen atmosphere to be normal, or 60 deg. F.

The specific heat of oxygen being 0.2175, the heat absorbed, per pound, for this rise of temperature is $0.2175 \times 1{,}140 = 247.95$ B.t.u. Therefore, the weight of oxygen required to absorb the excess heat, in the burning of a pound of methane and raising the temperature to the point of ignition of the gas (1,200 deg. F.) is 19,161.722 ÷ 247.95 = 77.2 lb. This makes the total weight of oxygen, per pound of methane burned, 77.2 + 4 = 81.2 lb.

The ratio by weight, methane to oxygen, is then 1:81.2; but the density of oxygen being twice that of methane, the volume ratio is 1:40.6 when inflammation takes place. The volume of the mixture, per unit volume of methane is then 1 + 40.6 = 41.6, and the percentage of gas in the mixture is 100 ÷ 41.6 = 2.4 per cent.

In conclusion, it is observed, in the equation previously given expressing the complete combustion of methane, the maximum explosive point is when the volume ratio, methane to oxygen, is 1:2; or 1 volume of methane in 3 volumes of the mixture, giving 100 ÷ 3 = $33\frac{1}{3}$ per cent of methane. In the proposed mixture of 9 cu.ft. of methane with 50 cu.ft. of oxygen, the percentage of methane is (9 × 100) ÷ 59 = 15.2 per cent. This being somewhat less than one-half the percentage of methane at its maximum explosive point, our judgment is that the mixture is not explosive, under ordinary conditions of ignition.

Examination Questions Answered

Examination for Mine Managers, Springfield, Ill., Mar. 19, 1923

(Selected Questions)

QUESTION—*In a coal field two miles square, both openings are at the lowest point of the property and the seam rises on a grade of 2½ per cent for a distance of 6,000 ft. The depth of strata at the openings is 210 ft. and the surface is perfectly horizontal over the whole extent of the property. The ventilation is produced by a forcing fan 15 ft. in diameter. It is found to be unable to supply the lawful quantity of air at the face of the workings. Therefore, with a view to economy, what means would you adopt to insure the lawful amount of ventilation for the mine?*

ANSWER—Assuming that all possible has been done to increase the circulation by cleaning up the airways, enlarging the breakthroughs, splitting the currents and shortening the distance the air must travel, the next step is to sink an air shaft at the most feasible point back in the workings and near the line of the main headings. The location of this air shaft should be determined by a careful study of the proposed plan of ventilation, so that the entire air current produced by the fan can enter and pass through the mine in two or more direct currents and no return airways will be required. The seam rising on a grade of 2½ per cent for 6,000 ft. will give a total rise in that distance of 6,000 × 0.025 = 150 ft. and make the depth of air shaft required only 60 ft. The sinking of one or more air shafts at convenient points in the workings where the depth from the surface to the coal is but 60 ft. would prove an important factor in the economy of ventilation and the future operation of the mine.

QUESTION—*Explain how you would determine the safe working load for a seasoned hemlock mine prop 10 in. square and 10 ft. long, assuming that the crushing load per square inch is 5,300 lb.?*

ANSWER—A mine prop whose diameter in inches is equal to its length in feet presents, practically, an equal resistance to crushing or bending. Therefore, the strength of a post 10 in. square and 10 ft. long can be estimated on its resistance to crushing. In mine timbering, the safe working load may be taken as one-third of the crushing load or, in this case, ⅓(5,300) = 1,766 lb. per sq.in. The sectional area of the post being 10 × 10 = 100 sq.in., the required safe working load is (100 × 1,766) ÷ 2,000 = 88.3 tons.

QUESTION—*If 65,000 cu.ft. of air is passing through a mine, per minute, what amount of methane must be picked up by the air current to render the return air dangerous?*

ANSWER—Very much will depend on the condition of the mine with respect to dust and the inflammability of the coal. If the air current is free from any appreciable quantity of dust, 2 per cent of methane in the return airway would not be dangerous. The danger line, calling for the adoption of measures to safeguard operations in the mine, may be assumed as reached when the return air contains, say 3 per cent of gas. If the volume of air entering the mine is 65,000 cu.ft. per min., this is 100 — 3 = 97 per cent of the return current under the assumed conditions, making the total volume passing in the return airway, 65,000 ÷ 0.97 = say 67,000 cu.ft. per min. In that case, the volume of methane the air current must have absorbed is 67,000 — 65,000 = 2,000 cu.ft. per min.

QUESTION—*How many tons of coal will be hauled in 8 hr., by an electric motor making 22 trips and hauling an average of 25 cars per trip, if the average net weight of coal, per car, is 4,500 lb.?*

ANSWER—Assuming the motor makes 22 round trips in 8 hr., hauling an average of 25 cars per trip, the average capacity of each car being 4,500 lb. of coal, the weight of coal hauled in the given time is (22 × 25 × 4,500) ÷ 2,000 = 1,237.5 tons.

QUESTION—*What material, in your judgment, should be kept at fiery or gaseous mines to meet emergencies that are likely to arise from explosions of firedamp?*

ANSWER—The mine should be equipped with a trained first-aid team and have on hand the necessary first-aid supplies and apparatus to enable the team to do effective work. This should include an approved type of breathing apparatus and oxygen tanks, together with the necessary bandages, splints, one or more pulmotors and the usual restoratives, olive oil, etc., for the treatment of burns and electric shock. The mine should be equipped with a good underground hospital, supplied with stretchers, blankets and other necessities for the giving of first-aid treatment to the injured. There should also be provided a suitable mine ambulance.

QUESTION—*What device would you use to remove gas from holes and cavities in the roof of rooms and entries?*

ANSWER—No attempt should be made to remove gas from holes and cavities in the roof or other void places, by brushing it out with a coat or other garment. To remove the gas, the air current passing through the place should be suitably increased and a special brattice erected to deflect the air into the hole or cavity in the roof or other void place where it is lodged.

QUESTION—*Do the furnace and fan produce ventilation as well in shallow mines as in deep ones and why?*

ANSWER—The action of a mine furnace depends primarily on the depth of the upcast or furnace shaft. The greater the depth of this shaft, the greater the height of the heated air column, which determines the ventilating pressure in the mine. Hence, furnace ventilation is not as effective in a shallow mine as where the coal lies at a greater depth below the surface.

On the other hand, in fan ventilation, a deep shaft means an increased mine resistance; and a larger proportion of the work of the fan is then absorbed in passing through the shafts. For that reason, a ventilating fan does more effective work in the ventilation of a shallow mine than a deep one.

QUESTION—*Does a high water gage always indicate a large quantity of air passing? What does a low water gage with a large quantity of air passing indicate?*

ANSWER—A high water gage may result from an increased mine resistance due to obstructed airways, and it is, therefore, no index of a large quantity of air in circulation.

When a large quantity of air is circulated under a low water gage, it indicates a small mine resistance, owing to large unobstructed airways.

58 Bids Submitted to Navy Department On 450,000 Tons of Bituminous Coal

Fifty-eight bids were submitted to the Navy Department and opened May 23 for supplying approximately 450,000 tons of bituminous or semi-bituminous coal for delivery at navy yards and naval stations during the fiscal year beginning July 1, next. Three bids were informal and were thrown out. They were those of the Lake & Export Coal Corporation, Huntington, W. Va.; Raleigh Smokeless Fuel Co., New York, and Coleman & Co., Philadelphia. The principal remaining bids were as follows:

30,000 tons, for delivery at Boston—Dexter & Carpenter Co., New York, $7.58 per ton, f.o.b. Navy Yard; Maritime Coaling Co., East Boston, $8.55, barge delivery W. A. Marshall & Co., New York, $7.41, rail delivery; Matlack Coal & Iron Co., New York, $7.39, rail delivery; Metropolitan Coal Co., Boston, $9.35, truck delivery; Weston Dodson & Co., Bethlehem, Pa., $9.22, rail delivery.

6,000 tons, for delivery at Chelsea, Mass.—Metropolitan Coal Co., $9.55 per ton; Weston Dodson & Co., $11.72.

9,000 tons for delivery at Brooklyn, N. Y.—Cosgrove & Co., Johnstown, Pa., $6.57 per ton; H. B. Haff, New York, $7.31; George D. Harris & Co., New York, $6.30; W. A. Marshall & Co., $7.02; Matlack Coal & Iron Co., $6.57; Morrisdale Coal Co., Philadelphia, $7; Pennsylvania Coal & Coke Corp., New York, $3.92; Quemahoming Coal Co., Somerset, Pa., $7.42, alternate $7.28, $7.05, $6.92 and $6.76; Titan Fuel Corp., New York, $6.49; Weston Dodson & Co., $8.22.

57,500 tons, for delivery at New York—W. H. Bradford & Co., Inc., Philadelphia, $6.19 per ton at coal pier, New Jersey, $6.44 at coaling plant, Brooklyn. $6.49 at Brooklyn naval hospital; Burns Bros., New York, $7.04 at coal pier, New Jersey, $7.39 at Brooklyn coaling plant, $7.39 at Brooklyn naval hospital; Consolidation Coal Co., $7.02 at New Jersey coal pier, $7.24 at Brooklyn coaling plant, $7.29 at Brooklyn naval hospital; Cosgrove & Co., Johnstown, Pa., $6.23 at New Jersey coal pier; Dexter & Carpenter Co., New York, $6.51 at New Jersey coal pier, $6 74 at Brooklyn coaling plant, $6.79 at Brooklyn naval hospital; W. A. Marshall & Co., $6.145 at New Jersey coal pier, $6.345 at Brooklyn coaling plant; $6.395 at Brooklyn naval hospital; Morrisdale Coal Co., $6.09 at New Jersey coal pier, $6.45 at Brooklyn coaling plant, $6.45 at Brooklyn naval hospital; Seiler Coal Co., New York, $6.54 for entire amount, $6.42 for part, at New Jersey coal pier, $6.78 for all, $6.65 for part, at Brooklyn coaling plant, $6.83 for all. $6 70 for part, at Brooklyn naval hospital; Titan Fuel Corp., $6.09 at New Jersey coal pier, $6.34 at Brooklyn coaling plant or naval hospital; Weston Dodson & Co., $8.74 at New Jersey coal pier, $9.74 at Brooklyn coaling plant or naval hospital; H. B. W. Haff, $7.18 at Brooklyn coaling plant or naval station.

45,000 tons, for delivery at Philadelphia—Cosgrove & Co., $6.19; Davis Coal & Coke Co., $6.44; Dexter & Carpenter Co., $6.54; Emmons Coal Mining Co., $6.46; Fidelity Coal Mining Co., Philadelphia, $5.83; W. A. Marshall & Co., $5.71; alternate $5.85; Maryland Coal & Coke Co., Philadelphia, $5.92; alternate $6.09; Matlack Coal & Iron Co., $5.99; Pennsylvania Coal & Coke Corp., $3.92; Weston Dodson & Co., $8.84; Whitney & Kemmerer, Philadelphia, $6.37.

20,000 tons, for delivery at Philadelphia—W. H. Bradford & Co., Inc., $6.06 at coaling piers, $6.24 at wharf; Dexter & Carpenter Co., $6.29 at coaling piers, $6.44 at wharf; Empire Coal Mining Co., $6.23 at pier, $6.41 at wharf; Fidelity Coal Mining Co., $5.56 at pier, $5.72 at wharf; W. A. Marshall & Co., $5.645 at pier, $5.78 at wharf; Maryland Coal & Coke Co., $5.67 at pier, $5.84 at wharf; Morrisdale Coal Co., $5.52 at pier, $5.67 at wharf; Quemahoming Coal Co., $6.04 at pier, alternate $6.17 $6.40 $6 54, $5.88, $6.22 at wharf, alternate $6.35, $6.58, $6.72, $6.06; Weston Dodson & Co., $8.59 at pier, $9.59 at wharf; Whitney & Kemmerer, $6.12 at pier, $6.24 at wharf.

35,100 tons, for delivery at Annapolis, Md.—Davis Coal & Coke Co., $6.94; Dexter & Carpenter Co., $6.50; Hall Bros. Co., Inc., Baltimore, $6.70; Hulmer Coal & Transportation Co., Philadelphia, $7.04; Iron Trade Products Co., Pittsburgh, $6.84; alternate $7.25; W. A. Marshall & Co., $6.71; Quemahoming Coal Co., $6.59; alternate $6.57, $6.72, $6.95, $7.09, $6.43; Weston Dodson & Co., $9.59.

50,000 tons, for delivery at Washington, D. C.—C. G. Blake Co., Cincinnati, $7.32 per ton; Davis Coal & Coke Co., $6.64; Dexter & Carpenter Co., $6.32, alternate $6.14; Low Volatile Consolidated Coal Co., Beckley, W. Va., $7.88 (25,000 tons); W. A. Marshall & Co., $6.20; Matlack Coal & Iron Co., $6.04; Pennsylvania Coal & Coke Corp., $6.76; Quemahoming Coal Co., $6.79, alternate $6.42. $6.29; Weston Dodson & Co., $8.84; White Oak Coal Co., Macdonald, W. Va., $7.06 (25,000 tons).

33,000 tons, for delivery at Indian Head, Md.—Davis Coal & Coke Co., $7.41 per ton, alternate (12,000 tons), $6.77; Emmons Coal Mining Co., $7; Fidelity Coal Mining Co., $6.19; W. A. Marshall & Co., $7.25; Matlack Coal & Iron Co., $6.59; Weston Dodson & Co., $8.91.

10,000 tons, for delivery at Indian Head, Md.—Consolidation Coal Co., $7.30 per ton; Davis Coal & Coke Co., $7.14; Emmons Coal Mining Co., $6 57; W. A. Marshall & Co., $7.22; Matlack Coal & Iron Co., $6.59.

10,000 tons, for delivery at Dahlgren, Va.—Dexter & Carpenter Co., $6.49 per ton, rail delivery; W. A. Marshall & Co., $6.68 rail delivery, $6.82 barge delivery; Matlack Coal & Iron Co., $6.59, rail delivery; Weston Dodson & Co., $8.91, rail delivery.

22,000 tons, for delivery at Hampton Roads, Va.—C. G. Blake Co., $6.88 per ton; Dexter & Carpenter Co., $6.18, alternate $6 11; Fayette Smokeless Fuel Co., $7.28; L. A. Snead Co. $7.15; Weston Dodson Co., $8.02; White Oak Coal Co., $7.45 (12,000 tons).

45,000 tons, for delivery at Norfolk—Crozer Pocahontas Co., Philadelphia, $7.45 per ton (22,500 tons); Dexter & Carpenter Co., $5.73, alternate $6.18, $6.11; Fayette Smokeless Fuel Co., $6 88; Low Volatile Consolidated Coal Co., $8.008; Pocahontas Fuel Co., Inc., New York, $7.44; L. A. Snead Co., $7.15; Weston Dodson & Co., $8.47; White Oak Coal Co., $7.773 (24,000 tons).

5,500 tons, for delivery at Portsmouth, Va.—C. G. Blake Co., $6.88; Dexter & Carpenter Co., $6.18, alternate $6.11; Fayette Smokeless Fuel Co., $7.28; Pocahontas Fuel Co., Inc., $7.44; L. A. Snead Co., $7.25; Weston Dodson & Co., $8.47.

10,000 tons, for delivery at Charleston, S. C.—C. G. Blake Co., $7.83 per ton; Crozier Pocahontas Co., $7.84; Dexter & Carpenter Co., $6.53, alternate $6.46; Wm. Johnson & Co., Charleston, $7.52; Pocahontas Fuel Co., Inc., $7.834; Roach Creek Coal Co, $5.85 (5,000 tons); Sloss Sheffield Steel & Iron Co., Birmingham, Ala., $6.30; L. A. Snead Co., $7.54.

8,700 tons, for delivery at Pensacola, Fla.—Adams, Rowe & Norman, Birmingham, $3.03, alternate $3.31; Cary & Co., Pensacola, $3.60, alternate $3.33; Frederick Gilmore & Co., Pensacola, $3.67; John A. Merritt & Co., Pensacola, $5.99, alternate $5.44, $5.37; National Coal & Coke Co., Birmingham, $2.25; Roach Creek Coal Co., $3; Sloss Sheffield Steel & Iron Co., $3.

2,000 tons, for delivery at Great Lakes, Ill.—Baumer Coal Co., St. Louis, $2.76; Chicago, Wilmington & Franklin Coal Co., Chicago, $3.64, alternate $3.08, $2.80; Cosgrove & Co., $3.30; Crear & Clinch Co., Chicago, $3.35; Dexter & Carpenter Co., $8.45, alternate $8.16; B. W. Gilmore & Co., Chicago, $3.24, alternate $3.90; Great West Coal & Lumber Co., Chicago, $3,248; Howl-Coulter Coal Co., Chicago, $3.36; Lake & Export Coal Sales Corp., Chicago, $2.65; O'Gara Coal Co., Chicago, $3.64; Old Bend Coal Corp., Chicago, $3.64; Peabody Coal Co., Chicago, $3.64; Reliable Coal & Mining Co., Chicago, $2.688; Roach Creek Coal Co., $3; Richardson Sons, Chicago, $2.91.

30,000 tons bituminous screenings, for delivery at Great Lakes, Ill.—Baumer Coal Co., $1.87; Chicago, Wilmington & Franklin Coal Co., $1.95, alternate $1.90; Cosgrove & Co., $2.15; Crear & Clinch, $2.07; Dexter & Carpenter Co., $7.60; B. W. Gilmore & Co., $2.17, alternate $2.57, $2.69; Great West Coal & Lumber Co., $2.52; Howl-Coulter Coal Co., $1.79; Lake & Export Coal Sales Corp., $1.75; O'Gara Coal Co., $2.69; Old Bend Coal Corp., $1.96; Peabody Coal Co., $1.96; Reliable Coal & Mining Co., $1.792; Roach Creek Coal Co., $2.05 (10,000 tons); Richardson & Sons, $2.52.

Convention Program of American Wholesale Coal Association Nearly Complete

The program of the seventh annual convention of the American Wholesale Coal Association, to be held in Cincinnati June 12-13, is nearing completion. The Executive Committee and Senior Council held a two days session with President Morton at Albany, N. Y., on May 10 and 11 to complete the plans for the annual convention and transact other business. The program was discussed thoroughly and



EXECUTIVE COMMITTEE AND SENIOR COUNCIL, AMERICAN WHOLESALE COAL ASSOCIATION

Top row—Borden Covel, Boston; Ira Cochran, commissioner and traffic manager, Washington; Charles A. Owen, New York City. Middle row—C. G. McGill, Toronto; Charles L. Dering, Chicago; Russell K. Pratt, Boston; C. F. Dunn, Detroit. Bottom row—E. M. Platt, Chicago; Jay W. Johns, vice-president, Pittsburgh; Seth W. Morton, president, Albany, N. Y.; G. H. Merryweather, secretary-treasurer, Chicago; Charles L. Couch, Buffalo.

efforts are being made to have a number of speakers who will be both entertaining and instructive. Considerable time will be allotted for discussion of the problems of the association in connection with the reports of the officers for the past year. The policy of the association for the future will, of course, be determined.

Plan to Certify American Coal for Export

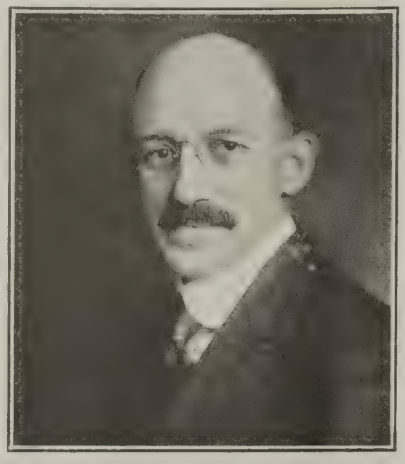
A start toward the establishment of export standards for coal was made at a conference in Washington May 24. Representatives of the railroads, the exporters and the government—in all some twenty-five persons—were called to Washington by Federal Fuel Administrator Wadleigh. The meeting was called with the approval of prominent producers of export coal.

Under the plan proposed the Bureau of Mines will certify to any foreign buyer the name of the district, the designation of the seam and the commercial name of the coal involved. While this falls far short of the standards of quality that many would apply on export coal, it is believed that this is a step toward safeguarding foreign buyers and reputable exporters from the poor quality of coal some exporters palm off on foreign buyers.

Commission Prefers Contact with Men Active in Industry; No Objection to Representation by Counsel

By Paul Wooton
Washington Correspondent of *Coal Age*

John L. Lewis, president of the United Mine Workers of America, appeared before the President's Coal Commission on May 25. No announcement was forthcoming from the commission as to what Mr. Lewis discussed. The usual Friday conference with the press was cancelled. It is understood, however, that Mr. Lewis confined himself largely to a discussion of conditions in Europe, particularly as they have a bearing on the coal situation. Since coal is such an important factor in Great Britain's ability to compete in world markets, the discussion is understood to have dealt with the broader aspects of the part played by British coal in foreign trade.



A. E. HOLBROOK

Most of the week ended May 26 was devoted by the Coal Commission to conferences with the members of its staff. The various staff reports due June 1 are of unusual importance as the study of the anthracite situation, which is to be reflected in the July 1 report, is now converging to the point where conclusions are being formulated.

A report was circulated to the effect that the Coal Commission had practically served notice on the United Mine Workers that it wants to hear from the union's officials rather than from any legal talent in its service. It was stated by a member of the commission that there is no intention whatever of dictating to anyone how he shall present his case. It is perfectly obvious that the commission prefers hearing from actual operators and from union officials rather than from attorneys, regardless of how distinguished they may be. Nevertheless it is safe to say that the commission will interpose no objection to the appearance of counsel. It may be predicted, however, that the commission will insist on addressing many of the questions which it has to ask to those actually engaged in the industry.

Apparently the commission understands that the briefs submitted to it most recently were intended for public consumption rather than for judicial consideration by the commission. Only one member of the commission seemed to be at all familiar with the material contained in these statements and it is suspected that he was assigned to read them so as to ascertain whether or not they really were intended for the commission's consideration.

The three anthracite district presidents of the United Mine Workers of America have been called to Washington for a conference with International President John L. Lewis and also with the Coal Commission. Thomas Kennedy of Hazleton, president of District 7, despite illness which had confined him to his home all week, left Saturday night in response to the call.

The Coal Commission has drafted Mr. Holbrook, now dean of the School of Mines, Pennsylvania State College, formerly assistant director of the Bureau of Mines, to investigate and report on safety methods in the coal mines. Mr. Wolflin, of the State Industrial Commission of California, and Mr. Rutledge, mining engineer of the State of Maryland, are assisting Mr. Holbrook.

Tentative Awards Made for Furnishing Coal To New York State Institutions

Bids opened on May 22 by the New York State Department of Purchases for furnishing and delivering between July 1, 1923, and April 1, 1924, approximately 167,000 net tons of bituminous slack, run-of-mine and three-quarter lump coal to various state institutions resulted in tentative awards being made on a basis of mine prices ranging from $1.75 to $1.80 for slack, $2.18 to $2.58 for run-of-mine and $2.59 for the three-quarter lump. For supplying 640 tons of smokeless coal George D. Harris & Co., of New York City, was awarded the contract at $2.45 per ton.

The specifications called for not more than 9 per cent of ash; sulphur not to exceed 2 per cent; volatile not to exceed 35 per cent, and not less than 13,750 B.t.u., which was interpreted to be the equivalent of good pool 11.

Pool 11 was quoted on May 21 on the New York market at $1.85 to $2.30 net ton f.o.b. mines.

George Hall Corporation, of Ogdensburgh, obtained the contract for delivering 13,600 net tons of run-of-mine to St. Lawrence Hospital at $2.54 per ton. Other awards made included 12,000 tons of run-of-mine to the Manhattan State Hospital to George D. Harris & Co., New York City, at $2.49 per ton; 22,500 tons run-of-mine to Central Islip to State Coal Co., Inc., New York City, $2.18; 1.200 net tons of three-quarter lump to Iroquois to Titan Fuel Co., New York City, $2.59 per ton; 2,000 tons of slack to the Binghamton State Hospital to W. A. Marshall & Co., New York City, $1.75 per ton; 10,400 net tons of slack to Buffalo institutions to the Operators Fuel Agency, Greensburg, Pa., and Weaver Coal Co., Buffalo, at $1.80 and $1.84 respectively, award depending on trial shipments. Other contracts awarded included the following: Finance & Fuel Co., of DuBois, Pa., for delivering 30,600 tons of run-of-mine to eight different institutions in northern New York at $2.48 per ton; Barnet Coal & Coke Corp., Buffalo, 18,800 tons run-of-mine to Middletown, Elmira and Sonyea at $2.58 per ton; J. P. Burton & Co., Cleveland, Ohio, 14,300 tons run-of-mine to Rochester, Albion, Batavia and Thiells, at $2.35 per net ton; Titan Fuel Corp., New York City, 4,300 tons nut and slack to the institution at Newark at $2; 1,600 net tons run-of-mine to Napanoch to Steamship Fuel Corp., New York City, $2.50, and 11,600 net tons run-of-mine to Great Meadow and Sing Sing prisons to W. G. Morton, Albany, at $2.20 per net ton.

At the same time bids were opened for furnishing and delivering approximately 104,000 gross tons of various sizes of anthracite to institutions in various parts of the state, of which the D. L. & W. Coal Co. obtained awards at company circular of 29,800 tons of No. 1 buckwheat; 20,000 tons No. 2 buckwheat; 8,500 tons No. 3 buckwheat, 1,755 tons chestnut, 2,200 tons egg, 6,880 tons stove and 4.135 tons pea coal.

The National Coal Association is now housed in its new quarters in the Southern Building at Washington. More floor space is provided than in the old quarters and much more desirable arrangement of the office is possible. Harry L. Gandy, executive secretary of the association, is making a field trip during which he will visit a number of the coal associations in the Middle West.

The Egyptian State Railways are negotiating for 150,000 tons of American coal, it is understood.

Court Confirms Reading Segregation Plan

The U. S. District Court at Philadelphia on May 22 confirmed the third modified plan for the segregation of the Reading companies and ordered counsel to submit a decree for approval of the court. The decree is to be presented by June 20. The court dismissed the exceptions noted to the third plan by certain of the common stockholders and by the government. The court, however, reserved jurisdiction to trustee the coal stock as suggested by the government if there should be an unexpected delay in working out the dissolution proceedings.

Under the provisions of the plan just approved the Reading Company would issue $63,000,000 in 4½ per cent bonds to run seventy-four years, and the Philadelphia & Reading Coal & Iron Co., divorced from the Reading Company under a decree of the U. S. Supreme Court, would issue $31,000,000 in 5 per cent bonds to run fifty years. These bonds would be exchanged for the present 4 per cent bonds.

Objections to the plan had been made by the government and by a large number of common stockholders of the Reading companies and some of the preferred stockholders. They were based chiefly on the grounds that the plan favored the bondholders and that its adoption would mean an increase in anthracite price to the consumer.

The Reading case has been in the courts for sixteen years and has been in the Supreme Court three times. In arguing the case for the government two weeks ago Acting Attorney General A. T. Seymour intimated that if the plan were approved an appeal might be taken to the Supreme Court.

Ask Support of Public to Preserve an Independent Source of Fuel Supply

The public is called upon to give its support to the preservation of an independent source of fuel supply, and to show its appreciation of the loyal services of the mine managers and workers in the non-union coal fields during the last strike in a resolution adopted at the last session of the annual convention of the National Association of Manufacturers, held in New York City on May 14, 15 and 16. The resolution, which was presented by M. C. Atkins, of Indianapolis, chairman of the Committee on Resolutions, pledges the co-operation of the association to the U. S. Fuel Commission. It reads:

"The uninterrupted production and distribution of coal at reasonable cost is vital to our national health, safety and industry.

"With more than half of the world's coal supply within our borders, coal never became a serious problem until after attempts at governmental regulation and organized combinations to interrupt production.

"The significant words of the President of the United States, who recently declared to Congress, 'The simple but significant truth was revealed that except for such coal as comes from the districts worked by non-organized miners, the country is at the mercy of the United Mine Workers,' call for an expression of appreciation on behalf of the people of the nation of the loyal services of the managers and employees of the non-union fields, who by their uninterrupted and effective labors preserved the households, transportation and productive industry of the United States from deprivation of essential fuel.

"It is therefore in the public interest that continuing support be given to the preservation of an independent source of fuel supply, which no combination can arbitrarily close to the needs of our people.

"We extend our co-operation to the U. S. Fuel Commission and urge upon its attention that no form of collective bargaining or agreement can receive public approval that is not accompanied by practical guarantee for its interpretation and the enforcement of its terms by independent adjudication in the event of disputes. It is recommended for thoughtful consideration that all such agreements by their terms include provision for their filing in established courts of record and in the event of dispute as to their meaning be subject to judicial interpretation, to which interpretation the parties thereto agree in advance to be bound."

At the morning session of the convention the delegates listened to an address by former Governor John J. Cornwell, of West Virginia, on "The Coal Situation," an abstract of which was printed in *Coal Age*, May 17.

Government Fuel Yard Makes Awards

The U. S. Bureau of Mines announced on May 21 the awarding of contracts for supplying bituminous coal to the Government Fuel Yards in Washington during the coming fiscal year. The awards, so far as made, are on the basis of the bids opened on May 15 and are as follows: Chesapeake & Potomac Fuel Co., 15,000 tons New River run of mine at $4.30 per gross ton, f.o.b. mines; Fayette Smokeless Fuel Co., 30,000 tons New River run of mine at $4.31 per ton, f.o.b. mines; White Oak Coal Co., 36,000 tons New River run of mine at $4.48 per ton, f.o.b. mines; Commercial Coal Mining Co., 30,000 tons Pennsylvania run of mine at $3.64 per ton, f.o.b. mines; Consolidation Coal Co., Maryland run of mine at $7.50 delivered in barges.

W. M. Wilshire Becomes Vice President Of Carnegie Coal Co.

W. M. Wilshire has resigned as general manager of sales for the Consolidation Coal Co., New York, to become vice-president in charge of sales for the Carnegie Coal Co., Pittsburgh. The Carnegie Coal Co. has been reorganized by its president, John A. Bell, who has merged with it other extensive coal acreage and operations in the Pittsburgh district, generally known as the Bell properties. This company now has a normal productive capacity of upward of five million tons a year. As the head of the sales department of the Carnegie Coal Co. Mr. Wilshire succeeds J. T. M. Stoneroad, who is retiring from active participation in the business, his interest having been purchased by Mr. Bell, as recently announced in *Coal Age*.



W. M. WILSHIRE

For the past twenty-three years Mr. Wilshire has been associated with the Watson interests operating in West Virginia and other fields. In the sales department of the Consolidation Coal Co. he has participated actively in this company's aggressive market and trade development.

William Mann Wilshire was born and reared in Cincinnati, his grandfather having been a pioneer of the Queen City. His first schooling which led to his career in the coal business was had with the late Andrew Stevenson, then assistant general freight agent of the Baltimore & Ohio R.R. at Baltimore. In 1897 Mr. Wilshire became private secretary to the late Oscar G. Murray, at that time, with Judge John K. Cowan, a co-receiver, and subsequently president of the Baltimore & Ohio system. In this position Mr. Wilshire succeeded his brother, F. W. Wilshire, who is now vice-president in charge of sales for the Consolidation Coal Co. In 1900 W. M. Wilshire went to Chicago with the title of traffic manager for the Fairmont Coal Mining Co. From Chicago he went to Baltimore and from there to Philadelphia, as assistant to F. W. Wilshire, who was then manager of the Consolidation Coal Co. at Philadelphia, and whom he succeeded. He was in charge of the Philadelphia office, which is a most important post in the organization, for a dozen years, moving to New York in 1920 to become general manager of sales.

Convention of Michigan-Ohio-Indiana Coal Association Discusses Problems of the Retailer

(Special Correspondence)

Summed up from beginning to end, segregating the social side from the speeches, the reports from the election of officers and the general commingling of two or three elements of the coal industry, a most necessary factor to the well-being of the trade, probably the most progressive action taken at the meeting of the Michigan Ohio-Indiana Coal Association at its sessions at Cincinnati May 22, 23 and 24, was contained in the set of resolutions offered by Charles Albright, of Cleveland, as chairman and drafted by the Resolutions Committee, composed of Mr. Albright, H. H. Deam, of Bluffton, Ind.; J. A. Van Buelen, of Grand Rapids, Mich., and Louis O'Connell, of Tiffin, Ohio.

These show a tremendous breadth of thought upon the coal retailer's problems and, briefly, call for printing of the names of the railroads on which the coal men's yards or sidings are located on their firm's stationery; compilation by members of a list of dealers in their city or district who would be acceptable as members of the organization; a record of each member's average yearly tonnage in anthracite and bituminous coal so that this data may be kept fresh for use when called for by state or federal investigating bodies; immediate notification of station agents or railway officials of empty cars on sidings or in the yards to keep equipment moving; a move to deter dealers from advancing any money for the delivery of coal other than through the deposit of a certified check on receipt of the bill of lading or the placing of this in the hands of his bank until the receipt of the bill of lading; condemnation of any sharp practice by which trade marks or any other evidence of special coals might be placed in fuel produced elsewhere or by other companies so that deception is practiced; against criticism of operators, wholesalers or any other branch of the trade, for the reason that all branches of the industry have a hard enough time to attend to their own business; formation of a committee of five from each of the three states to iron out car-shortage tangles and an endorsement of Secretary Hoover's endeavors along that line with the appointment of emergency transportation committees to assist in this work; a state and national affairs committee in each state so that the members of the organization can keep in touch with the moves for the betterment of the industry in other places.

Five Hundred Present at Opening

Over five hundred registrations were received at the convention headquarters by Wednesday morning, when President Robert S. Magee of the Cincinnati Coal Exchange formally welcomed the visitors. President Homer C. Gill replied and the first speaker was Tom L. Lewis, of Charleston, W. Va., secretary of the New River Coal Operators Association. He spoke on "What Is the Matter with the Coal Industry?" In part he said:

"If I were to try to tell you all that there is the matter with the coal trade it would take me a week. Let's understand that this is one of the greatest basic industries in the United States and ranks second to agriculture.

"One of the great troubles with the coal man is that he has failed to recognize the power of interchange of thought—he has for years overlooked the power of organization. Operator, wholesaler and retailer each has lived in his own little world, each man for himself.

"In 1896 I worked in eastern Ohio for $1.32 a day—they were loading coal in southern Illinois in those days for 10c a ton. Compare that with the present mining costs, and you will see why the miners were forced to organize and why three-quarters of the producers of that time were facing bankruptcy. I helped to organize the Miners' Union because I believed in education, conciliation and arbitration and respect for other people's rights.

"The reason that I am now opposed to miners' organizations is that they do not believe in any one of these, but recognize only one power, and that is might. In the past four years the United Mine Workers have defied the United States, from the President on down, and they have taken two Presidents by the throat and said, 'You must surrender,' even though it was at a cost of the suffering of the people of this country.

"The result of this strife and strikes has been the formation of the President's Coal Commission, in which I have the utmost confidence. The members, I believe, will present all of the facts and will make a report that will solve some of the problems."

Following his talk came J. A. Morris, chairman of the Operating Committee of the American Railway Association. He declared that within three months work would be started upon the Cincinnati terminals that would provide adequate facilities for the movement of all coal produced below the Ohio River through the Cincinnati gateway.

"You gentlemen are interested in the question of car supply," said Mr. Morris. "I might say to you that if there was such a thing as a 100 per cent car supply we couldn't handle it. There are plenty of reasons why there is no such a thing as a 100 per cent car supply, and as one instance I might say that there is one coal dealer in Cincinnati right now who has 163 cars on track that he can't move."

In the afternoon those visiting the convention were taken on a sightseeing trip of the city and in the evening the Cincinnati Coal Exchange was the host to the convention-ers at the Zoo.

Morrow Gives Glimpse of Coal Outlook

Thursday's sessions opened with a talk by J. D. A. Morrow, president of the Morrow Callahan Coal Co. and better known through his association with Dr. Garfield's Fuel Administration and later with the National Coal Association. In his characteristic way Mr. Morrow summed up the evidence to give a glimpse of the coal outlook. He ran down through the essential industries, through the railway ramifications, through the textile, auto and other basic industries and showed that all of them in April and May were working at top speed, in some instances at higher velocity than they were in war times or the armistice period. Coming to the building trades he said that it was true that there had been cancellations of a hundred million dollars worth of work this month, "but we have come to the strange place that it is the cancellation of these contracts that makes news," he said.

He showed that the cost of living is really lower than it was in 1920 and that work is more plentiful, that there is a downward trend to the price of stocks in Wall Street—always a sign that some one is taking a profit—so with the cost of living down and wages up, according to his reasoning, the general purchasing power of the individual in this country is increased and matters generally are in good shape.

All the way through Mr. Morrow kept close to the effect of all of this upon coal. He showed that there was a grave possibility of the transportation facilities of the country being unable to handle the coal mined, that consumption is keeping pace with production to the point that no immense reserves can be built up.

"There are plenty of mines and plenty of labor; the big question is whether labor will work or not. Remember the anthracite agreement expires Sept. 1. Of course the Coal Commission is on the job and we are relying on it to keep things moving. Whether they will or not I do not know and I doubt if they know—without asking John Lewis first—then there is the probability of trouble looming up on April 1. All of this casts its shadows before it. There are the pessimists and the optimists—both advance their own causes and theories. It is my opinion that in four or five weeks the situation will have so straightened itself out that one can see what is ahead of the coal man for the coming year."

Following Mr. Morrow's talk came the passing of the resolutions and then the nominating committee, composed of

Raymond B. Mathers, of Richmond, Ind., chairman; M. J. Hornberger, of Youngstown; Harry Eberts, of Wyandotte, Mich., and Dewey Blocksma, of Grand Rapids, reported the choice of the following: For President, H. W. Barknecht, of Muskegon, Mich., Vice-President, Louis, O'Connell, of Tiffin, Ohio; Secretary, B. F. Nigh; Trustees, Homer C. Gill and Charles Albright, Ohio; D. T. Rolf and H. H. Deam, Indiana; C. A. Pollock and William Donker, Michigan, all of whom were elected unanimously.

The closing event of the convention was a trip down the Ohio River on the excursion steamer "East St. Louis" as guests of the Philadelphia & Cleveland Coal Co., to its big plant recently installed between North Bend and Addyston, where the details of the machinery placed there was explained by Resident Manager Parsons and his assistant Ernie Spreen.

"New Deal" in Northwest Trade?

If half the subtle predictions which are at large within coal circles in the Northwest are correct, it makes little difference what the Interstate Commerce Commission's ruling on the Northwestern rate case may be; there is going to be a new deal in the coal business. Some of the rail trade declare that the sole basis of the complaint was that the dock interests had such a large investment in the docks that it must be protected, even at the cost of upholding uneconomical methods. They declare that if the dock trade cannot meet all-rail competition it is because they have too heavy an overhead through obsolete methods.

They further suggest that it is not impossible for the rail trade to enter the dock business, shipping Illinois and Indiana coal to Lake Superior docks for storage during the summer, and distributing it through the late summer and autumn at a cost below the Eastern coal prices. This is said to be seriously under consideration. Some doubt its practicability since they believe that Middle Western coal will not stand the loading and unloading because of breakage and expensive degradation. But the rail men predict confidently that a victory for the dock contention merely means new competition for them to combat.

Anthracite Production Down 50 Per Cent; Fewer Workers and Workdays Reported

Pennsylvania's anthracite mines last year produced but 40,134,561 tons of coal, or slightly less than one-half of the total amount turned out by the mines in 1921. The decline in output was due to the strike of mine workers, lasting five months. The figures on the anthracite industry were completed last week by the bureau of statistics and information of the Pennsylvania Department of Internal Affairs.

These figures show that the anthracite produced last year in the ten counties where it is mined had a value of $232,765,500 at the mines, while in 1921 the value of the coal at the mines was $481,261,100. Last year the mines worked on an average of 143 days while in 1921 the average number of days worked reached 217. There were 140,353 employees last year, as compared with 166,831 in the preceding year. Of the total employees last year, 68,162 were Americans white, 174 were Americans colored and 72,017 were foreigners. The mine workers were paid last year a total wage of $140,111,600. The total payroll in 1921 was $283,968,700. The capital invested in the operations last year amounted to $339,495,800. Of the total value of the coal produced in 1922, coal valued at $173,313,200 was shipped outside of Pennsylvania. During last year 29,692,602 tons of anthracite was shipped out of the state. In 1921 the value of the coal shipped outside of the state was $390,829,000.

These figures afford some interesting deductions. On the basis of the state's report it appears that:

For every ton of coal the labor cost (wage bill) was $3.49.

Out of every dollar received for coal (value at the mine) 60.2c. was paid out for wages.

Average daily wages for mine workers, all classes, was $6.98.

Average annual earnings—in a year which included a strike of 164 days—were $998.

After paying wages the operators had remaining from coal revenue a sum equivalent to but 27.29 per cent of the investment reported by the state, out of which margin all expenses for supplies, management and superintendence, taxes of all sorts, sales and interest had to be met.

Luzerne County led the other anthracite counties of the state last year with a production of 14,776,698 tons valued at $91,917,700. Schuylkill County stood second with a tonnage of 11,405,669 valued at $60,555,200.

The average days the mines were in operation, number of employees, total wages and the value of the production last year by counties follows:

Counties	Average Days in Operation	Average No. of Employees	Total Wages	Value of Production
Carbon	160	5,177	$5,757,600	$8,591,300
Columbia	134	1,463	1,243,900	2,849,300
Dauphin	180	1,790	1,916,700	2,642,400
Lackawanna	146	25,437	24,794,400	41,690,000
Luzerne	134	53,164	51,488,100	91,917,700
Northumberland	146	13,606	14,478,300	20,421,500
Schuylkill	151	37,173	38,078,000	60,555,200
Sullivan	151	754	548,000	1,034,200
Susquehanna	179	996	984,600	1,392,800
Wayne	143	793	822,000	1,671,100

Burns Bros. Merger Plan Ready

M. F. Burns, president of Burns Brothers, made public on May 23 the complete plan for the recapitalization of Burns Brothers and the agreement of the merger of the properties with the National Coal Corporation, in a letter to stockholders calling a special meeting for June 14 to vote approval of the proposal.

Under the plan only two classes of stock of the new company will be outstanding, against four classes now outstanding. Of the present outstanding stock both classes of preferred will be retired and the Class A and B common stocks will be exchanged for 8 per cent cumulative preferred and common stock of the new company.

The proposed conditions of the merger in respect of exchange of stock are as follows:

(a) The new company will pay to the holders of the prior preference stock of Burns Bros. $120 per share and all cumulative and unpaid dividends thereon and an amount equal to a dividend at the rate of 7 per cent per annum from the last dividend date to the date set for the surrender thereof in a notice to be given as provided in the agreement of merger.

(*b*) The new company will pay to the holders of the preferred stock of Burns Bros. $110 per share and all cumulative and unpaid dividends thereon and an amount equal to a dividend at the rate of 7 per cent per annum from the last dividend date to the date set for the surrender thereof in a notice to be given as provided in the agreement of merger.

(*c*) The holders of the Class A common stock of Burns Bros. will receive in exchange for each share of such stock one share of 8 per cent cumulative preferred stock of the new company of a par value of $100 and one share of the common stock of the new company.

(*d*) The holders of the Class B common stock of Burns Bros. will receive in exchange for each share of such common stock one share of the common stock of the new company.

The capitalization of the new company will consist of $10,000,000 par value preferred stock and 500,000 shares of common stock. Of the common stock 25,000 shares have been issued at a nominal price to managers of the company and parties interested in the underwriting of the new stocks, and will remain outstanding.

Mr. Burns, in his letter, further points out that "The agreement of merger requires the National Coal Corporation to provide the funds necessary to pay off the present prior preference and preferred stocks of Burns Brothers and it is contemplated that to accomplish this the National Coal Corporation will issue for cash shares of its common stock substantially equivalent in amount to the aggregate shares to be issued in exchange for the outstanding Class A and Class B stock of this company. There will be submitted to the meeting detailed information relative to financial arrangements and relative rights which may be offered to stockholders to subscribe for the new common stock."

Coal Retailers to Hear Talks by Wadleigh, Cushing, Bryden and Parker

F. R. Wadleigh, Federal Fuel Administrator; George H. Cushing, editor of *Cushing's Survey;* J. C. Bryden, chairman of the Special Committee Bituminous Operators, and E. W. Parker are among those who will address the sixth annual convention of the National Retail Coal Merchants' Association, which will be held at Scranton on June 25, 26 and 27.

At the first session on Monday morning reports from the various officers, including Homer D. Jones, the president, will be read, as well as the report of the Reorganization Committee, of which Wellington Bertolet is chairman. Walker Cottrell, of Richmond, Va., is to be the toastmaster at the luncheon at which John H. Durkin, Mayor of Scranton, is to speak. Mr. Wadleigh and Mr. Cushing are to address the members of the association at the afternoon session on Monday.

The association banquet is to be held that evening, with President Jones presiding.

At Tuesday morning's session various committee reports are to be presented and at the luncheon to follow Mr. Bryden is to make his address. The election of officers at the afternoon session is to be followed by an address by Mr. Parker on "Mining and Preparation of Anthracite."

The anthracite operators will entertain the delegates to the convention at dinner Tuesday evening. Wednesday will be devoted to an inspection of the mines.

"Mining Superincumbent Beds," a Topic At Anthracite Section, A.I.M.E.

Called together to give and hear evidence on the effect which the extraction of a lower bed will have on one above it, the Anthracite Section of the American Institute of Mining and Metallurgical Engineers met at the Westmoreland Club, Wilkes-Barre, Pa., Saturday, May 26, the technical discussion being preceded by a dinner at which an election was held for the new officers of the section. E. P. Mathewson, president of the A.I.M.E., and Jack Armour, of *Coal Age*, made the only addresses.

At the close of the banquet Mr. Norris briefly reviewed the paper presented at the February session of the A.I.M.E., by H. R. Eavenson as to certain experiences in the mining of superincumbent seams in the bituminous regions, and Douglas Bunting gave a record of his observations in the mines of the Morris Run Coal Co., in the Blossburg region, where, by the way, the coal is not anthracite but contains 21 per cent of volatile matter. In those mines the Bloss bed had been almost entirely removed, though the exact percentage of recovery was somewhat in doubt. Roughly 50 ft. above was the Morgan bed, separated by an interval of hard sandstone except for a thin bed of fireclay under the Morgan bed, with a thin bed of cannelly coal under that. The Morgan bed was worked with pairs of gob headings 20 ft. wide and with 50-ft. centers. The rooms were driven 42 ft. wide.

The first extraction figured about 62½ per cent and the second about 25 per cent, but figuring in clay veins, which were not infrequent, the actual percentage of recovery of merchantable coal probably reached 92 per cent. The roof above the Morgan bed, between that bed and the Seymour, consisted of 45 to 75 ft. of solid sandstone. In many places the Morgan bed and the rock below it had sheared so that both had been lowered as much as 15 in. The upper sandstone, being thick and strong, had not partaken in that movement. In consequence an opening of varying depth up to 15 in. was left above the coal in the Morgan seam. Such areas were in places quite large.

The testimony of several engineers showed that vacuities of this kind caused by shear were not uncommon in the anthracite region, and the question arose whether it was desirable to have a roof which would afford such resistance, and thus make such vacuities possible, F. E. Zerbey holding that it was undesirable and Mr. Bunting declaring that it was. Several speakers declared that they were mining coal above seams where the coal had been second-mined and also above seams that had been squeezed shut, as over the scene of the Twin Shaft disaster.

The recovery under these circumstances was quite successful. Caving did not create the disturbance frequently charged to it even when the coal excavated was 30 ft. thick. It should be stated, however, that where the greater thickness was found the coal usually was under heavy pitch. The roof disturbance, however, frequently added to the cost of mining by reason of the introduction of false synclines and anticlines, which complicated the already troublesome coal contours.

Visitors from New York in addition to the aforementioned were Sidney Jennings, former president of the Institute, Dr. F. F. Sharpless, secretary, and R. D. Hall.

Engineers Adopt Program in Storage Study

A definite program for the conduct of an intensive study of certain phases of coal storage was laid down at a meeting in Washington on May 25 of the coal-storage committee of the Federated American Engineering Societies. This committee decided to determine to the best of its ability "the engineering, chemical and economic factors" involved in the storage of coal, and the influence of those factors on storage at the mine and by various classes of consumers. The study has been co-ordinated with those being made on the same subject by the President's Coal Commission and by the Federal Fuel Distributor.

Adopt Price Schedule for Settlement of Accounts of Tidewater Coal Exchange

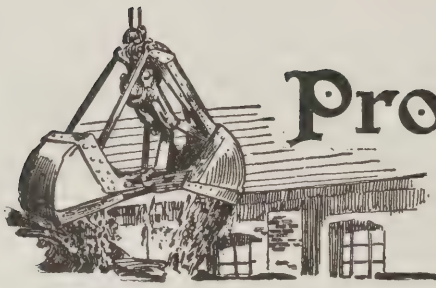
A schedule of prices to be used as a basis for closing out the debit and credit tonnage accounts of the Tidewater Coal Exchange, Inc., now in the hands of receivers, was adopted at a meeting of the debtors and creditors of the exchange and is now being used in settling accounts.

In presenting the proposed schedule of prices the receivers, Charles A. Owen, Howard Adams and James E. Manter, stated that the Chancery Court of Delaware had held that the title to the property involved in the tonnages of the pools of the exchange was and is in the tonnage credit members of each of said pools, and that the Court had directed the debits and credits to be completely settled on the basis of each pool. The receivers stated that it was impracticable to make such settlement because in nearly every pool tonnage debtors were involved who are in the hands of receivers or out of business; therefore it would be necessary for the debtors and creditors to agree among themselves on a method of settlement.

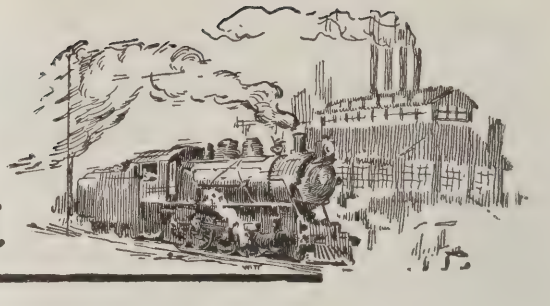
The schedule of prices adopted by the meeting is based on gross tons and covering the period from May 1, 1920, to Sept. 30, 1021, follows:

SCHEDULE OF PRICES PER GROSS TON, F.O.B. MINES

Pool	1	4	9–71	10–12	11–15	14	18	21–34 40–54 64	30–37	31–38	33–39 53–63	43	44	60	61
Month	RM	RM	RM	RM	RM	RM	RM	RM	LUMP	RM	LUMP	LUMP	RM	LUMP	RM
May 1 to Sept. 30, 1920	$11.50	$10.80	$11.50	$10.50	$10.25	$10.50	$10.00	$10.00	$11.15	$10.65	$10.50	$10.00	$9.80	$11.40	$10.90
Oct., 1920	11.25	10.80	11.00	10.50	10.25	10.50	10.00	10.00	11.15	10.65	10.50	10.00	9.80	11.40	10.90
Nov., 1920	7.60	7.15	7.40	7.00	6.70	6.85	6.45	6.75	7.25	7.00	7.00	6.75	6.50	7.50	7.25
Dec., 1920	6.25	5.30	5.70	5.05	4.75	4.90	4.40	4.75	5.85	5.60	5.00	4.75	4.50	6.10	5.85
Jan., 1921	4.50	3.50	4.10	3.35	3.10	3.25	2.60	3.10	4.15	3.90	3.35	3.10	2.95	4.35	4.10
Feb., 1921	4.15	3.15	3.40	2.90	2.50	2.70	2.00	2.50	3.75	3.50	2.75	2.50	2.35	3.95	3.70
March, 1921	3.85	2.95	3.25	2.80	2.35	2.60	1.80	2.35	3.50	3.25	2.60	2.35	2.20	3.65	3.40
April, 1921	3.85	2.85	3.15	2.75	2.25	2.50	1.60	2.25	3.25	3.00	2.50	2.25	2.10	3.30	3.15
May, 1921	3.75	2.80	3.10	2.70	2.25	2.45	1.60	2.00	3.00	2.75	2.25	2.00	1.85	3.20	2.95
June 1 to Sept. 30, 1921	3.70	2.50	2.90	2.45	2.05	2.30	1.60	1.80	2.75	2.50	2.05	1.80	1.65	2.95	2.70



Production and the Market



Weekly Review

The country's business is crossing an economic tableland. It is not going downgrade. Well-advised opinion is that the country is fortunate in having relief from the rapid ascent of February and March. The great volume of buying power produced by the unprecedented amounts being distributed in wages is a real element of stability. There is full employment, no stocks and no overproduction. None of the elements of depression is present in the existing situation.

Coal, both hard and soft, is responding to the steady demand with large outputs. Of anthracite there is not sufficient production even at such an unprecedented level for this time of year as over 2,000,000 net tons per week. Prices hold firm and independents are taking premiums over company circulars. Bituminous coal, on the other hand, is capable of such large output that no difficulty is experienced in getting supplies. The better coals are offered in ample amounts to meet the demand of discriminating buyers, and the lower grades are hard to move. Inquiries are plentiful for industry and the railroads are buying. Spot prices are below contract prices and are dropping slowly and steadily.

April Output 9 Per Cent Less Than March

Soft-coal output for the first 119 working days of 1923 was slightly ahead of the corresponding period for the active years of 1917, 1918 and 1920, and nearly one-third ahead of that period of the years of depression, 1919, 1921 and 1922. Output in April was 42,564,000 net tons, a decrease of 9 per cent compared with March.

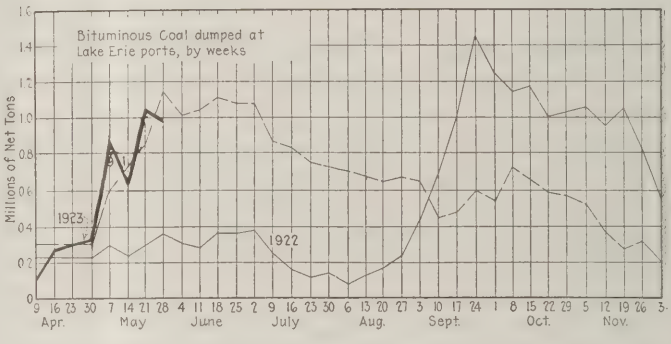
Stocks of anthracite in the hands of producers on April 30, as reported by the Department of Commerce, were 182,000 tons, compared with 161,000 tons March 31. There were 2,775,000 tons in stock on April 30, 1922.

Declines in prices occurred in the Pocahontas, Clearfield, Cambria, Somerset and western Kentucky districts, with advances in Pittsburgh, Kanawha and eastern Kentucky. *Coal Age* Index of spot prices of bituminous coal registered 217 on May 28, a loss of four points in a week. The average price was $2.63.

Business is dull in the Middle West. Large consumers are picking up distress coals but have not yet started to stock. Consumers in New England who last year used Southern coals have placed orders for good-sized tonnages of Pool 9 and 10 grades of Pennsylvania coals because of lower prices on all-rail coal.

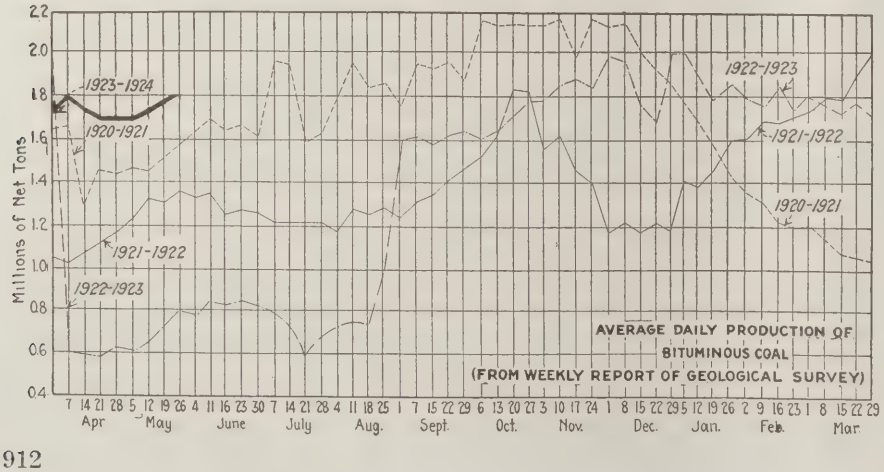
The export market is quiet. Baltimore custom returns show that during the first 24 days of May 26 of the 34 steamers leaving that port took 18,801 tons of bunkers and that 236,129 tons of cargo coal was dumped.

More strength is shown in the Lake trade. Dumpings



are increasing. It is estimated there is at least 1,000,000 tons of coal at the Head-of-the-Lakes. Anthracite is going forward in good volume, although Buffalo shipments from the beginning of the season to May 22 inclusive were 238,680 tons less than in the corresponding period in 1921, when they amounted to 687,600 tons.

"Preliminary estimates of production of soft coal during the week ended May 19 indicate an increase to 10,293,000 net tons, a gain of 118,000 over the revised estimate for the week preceding," says the Geological Survey. "Thus for two weeks an upward tendency in production is shown. This tendency is further shown



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
May 5	4,164,000	10,061,000
May 12 (*b*)	4,433,000	10,175,000
May 19 (*a*)	4,481,000	10,293,000
Daily average	747,000	1,716,000
Calendar year	157,607,000	210,025,000
Daily av. cal. year	1,330,000	1,769,000
ANTHRACITE		
May 5	6,000	2,021,000
May 12	7,000	1,903,000
May 19	8,000	2,045,000
Calendar year	21,824,000	39,563,000
COKE		
May 12 (*b*)	97,000	317,000
May 19 (*a*)	72,000	332,000
Calendar year	2,593,000	7,634,000

(*a*) Subject to revision. (*b*) Revised from last report.

by early returns on car loadings during the week May 21-26, which forecast an increase of 5 to 8 per cent over last week, or a total of 10,700,000 to 11,000,000 tons."

Hampton Roads dumpings for all accounts were 361,434 net tons during the week ended May 24, as compared with 333,977 tons in the previous week.

Domestic sizes of anthracite continue to be rapidly absorbed, with the trade asking for larger shipments. Companies and independent operators are well sold up, considerable coal going into the Northwest and Canada. With few exceptions retail dealers have not yet started to stock up.

No New Business in Midwest

Dullness prevails throughout the markets of the Middle West just as it has prevailed for a month. There is less distress coal now than for two or three weeks because nobody is trying to push anything. Southern Illinois screenings have firmed up a shade as a result and are uniformly bringing $1.75, with few undercuts. There remain a good many no-bills in parts of the southern Illinois field, however, and domestic coal is still weak at the circular price of $4.10. A good deal of it brings $3.50. Little other coal is moving. Demand is picking up slightly for smokeless and anthracite without price changes in those fuels.

The countrywide stocking program that was expected to save the situation at this season of the year has not developed in the Middle West. Two or three railroads whose finances are firmest are buying steadily, but that is the only relieving sign.

The fields of central Illinois, Mt. Olive, Standard district and in the Du Quoin region are doing little. Two days running time a week is the best that any operating mine can do on open-market business and few of them are operating at all except to make contract deliveries. Du Quoin domestic sizes do well to bring $3.25. Mt. Olive lump hardly attains that height. The Wabash R.R. is storing a little Mt. Olive in piles along its line through that field.

Little Doing in St. Louis

A few apartment-house owners in St. Louis are taking a little Standard 2-in. lump at $2@$2.25 for summer storage. This plus a light demand for anthracite, smokeless and coke is all the business there is. City steam trade is slack and the country takes no steam fuel at all. Tonnage for thresh-

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

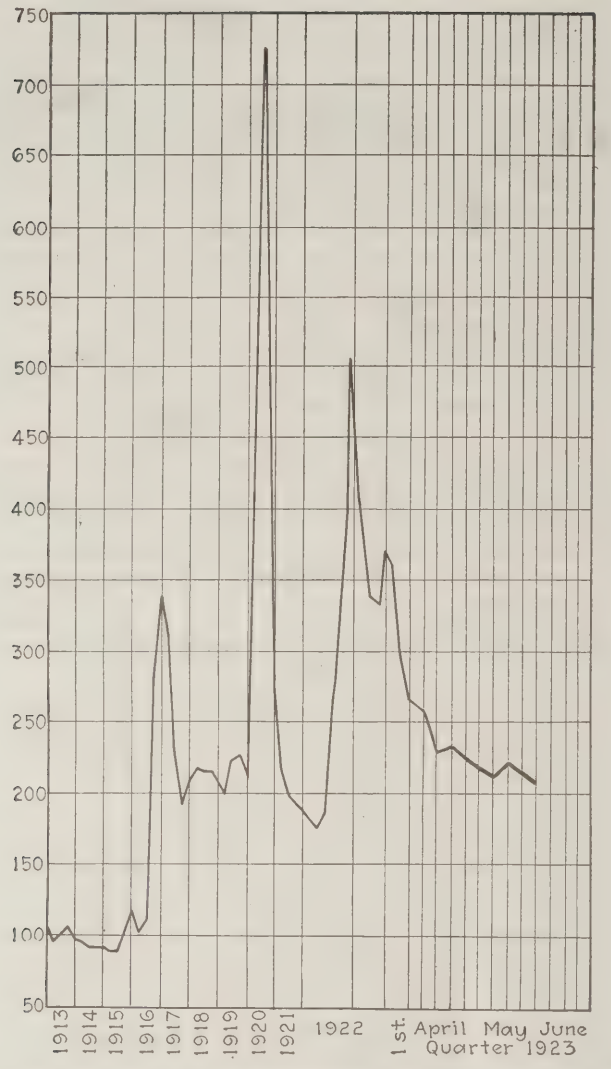
	Market Quoted	May 29 1922	May 14 1923	May 21 1923	May 28 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.55	$6.25	$6.25	**$6.00@$6.50**
Smokeless mine run	Columbus	3.40	4.10	4.05	**4.00@ 4.30**
Smokeless screenings	Columbus	3.25	3.75	3.70	*3.35@ 3.85*
Smokeless lump	Chicago	3.40	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	3.15	3.85	4.10	4.00@ 4.25
Smokeless lump	Cincinnati	3.40	6.00	6.25	6.00@ 6.50
Smokeless mine run	Cincinnati	3.15	4.25	4.25	4.00@ 4.50
Smokeless screenings	Cincinnati	3.00	4.10	4.25	4.00@ 4.50
*Smokeless mine run	Boston	6.15	6.85	6.85	*6.25@ 6.50*
Clearfield mine run	Boston	3.15	2.75	2.60	*2.00@ 2.75*
Cambria mine run	Boston	3.65	3.60	3.25	*2.60@ 3.50*
Somerset mine run	Boston	3.40	3.10	3.00	*2.25@ 3.00*
Pool 1 (Navy Standard)	New York	.....	3.75	3.75	3.50@ 4.00
Pool 1 (Navy Standard)	Philadelphia	.....	4.00	3.80	*3.55@ 4.00*
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.80	2.90	2.90	*2.55@ 3.25*
Pool 9 (Super. Low Vol.)	Philadelphia	3.60	3.00	2.85	2.55@ 3.20
Pool 9 (Super. Low Vol.)	Baltimore	3.25	2.75	2.75	*2.50@ 2.60*
Pool 10 (H.Gr.Low Vol.)	New York	3.60	2.50	2.50	*2.20@ 2.75*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.25	2.40	2.35	*2.15@ 2.55*
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.25	2.25	2.30	*2.15*
Pool 11 (Low Vol.)	New York	3.25	2.20	2.05	1.85@ 2.30
Pool 11 (Low Vol.)	Philadelphia	2.75	2.00	2.05	*1.80@ 2.25*
Pool 11 (Low Vol.)	Baltimore	3.05	2.00	2.00	*1.90@ 2.00*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.10	1.85	1.85	**1.75@ 2.25**
Pool 54-64 (Gas and St.)	Philadelphia	2.75	1.85	2.05	**2.00@ 2.15**
Pool 54-64 (Gas and St.)	Baltimore	3.00	1.80	1.80	*1.75*
Pittsburgh sc'd gas	Pittsburgh	.....	2.85	2.85	2.75@ 3.00
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.00	**2.15@ 2.35**
Pittsburgh slack (Gas)	Pittsburgh	.....	1.75	1.85	*1.60@ 1.75*
Kanawha lump	Columbus	3.45	3.25	3.25	*2.50@ 3.00*
Kanawha mine run	Columbus	3.25	2.20	2.20	*1.90@ 2.20*
Kanawha screenings	Columbus	3.10	1.75	1.75	1.60@ 1.90
W. Va. lump	Cincinnati	3.40	3.75	3.10	*3.50@ 4.50*
W. Va. Gas mine run	Cincinnati	3.30	2.20	1.80	**1.75@ 2.00**
W. Va. Steam mine run	Cincinnati	3.10	2.20	1.80	**1.75@ 2.00**
W. Va. screenings	Cincinnati	3.10	2.00	1.65	*1.35@ 1.65*
Hocking lump	Columbus	3.60	2.80	2.75	*2.35@ 2.75*
Hocking mine run	Columbus	3.55	1.95	1.95	*1.75@ 2.10*
Hocking screenings	Columbus	3.55	1.60	1.45	*1.25@ 1.50*
Pitts. No. 8 lump	Cleveland	.....	2.90	2.95	2.40@ 3.50
Pitts. No. 8 mine run	Cleveland	$3.25	$2.15	$2.15	*$2.10@$2.20*
Pitts. No. 8 screenings	Cleveland	3.25	1.60	1.65	*1.40@ 1.60*
Midwest					
Franklin, Ill. lump	Chicago	.....	3.80	3.80	3.50@ 4.10
Franklin, Ill. mine run	Chicago	.....	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	.....	1.75	1.80	1.75@ 1.90
Central, Ill. lump	Chicago	.....	2.30	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.85	1.85	1.75@ 2.00
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 4th Vein screenings	Chicago	.....	1.85	1.85	1.75@ 2.00
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.65	1.55	1.50@ 1.65
Standard lump	St. Louis	.....	2.60	2.25	2.00@ 2.50
Standard mine run	St. Louis	.....	1.80	1.80	1.75@ 1.90
Standard screenings	St. Louis	.....	1.50	1.50	1.50
West Ky. lump	Louisville	3.20	2.60	2.60	*2.10@ 2.50*
West Ky. mine run	Louisville	3.20	1.90	1.90	*1.75@ 1.85*
West Ky. screenings	Louisville	3.20	1.60	1.60	*1.25@ 1.50*
West Ky. lump	Chicago	3.10	2.60	2.60	*2.25@ 2.50*
West Ky. mine run	Chicago	3.10	1.80	1.80	*1.25@ 1.50*
South and Southwest					
Big Seam lump	Birmingham	2.00	2.70	2.70	2.70
Big Seam mine run	Birmingham	1.70	2.05	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	3.10	3.75	3.75	3.50@ 4.00
S. E. Ky. mine run	Chicago	3.10	2.85	2.35	2.25@ 2.50
S. E. Ky. lump	Louisville	3.10	4.00	3.75	3.50@ 4.00
S. E. Ky. mine run	Louisville	3.10	2.50	2.50	*2.00@ 2.50*
S. E. Ky. screenings	Louisville	3.10	1.90	1.90	*1.50@ 1.80*
S. E. Ky. lump	Cincinnati	3.30	3.35	3.35	**3.50@ 4.00**
S. E. Ky. mine run	Cincinnati	3.15	2.00	1.80	**1.65@ 2.00**
S. E. Ky. screenings	Cincinnati	3.15	1.80	1.60	*1.25@ 1.85*
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 4.50
Kansas mine run	Kansas City	4.20	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.75	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Pre-Strike Company	May 21, 1923 Independent	May 21, 1923 Company	May 28, 1923† Independent	May 28, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.00	8.00@ 8.35	$8.50@11.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.25	6.00@ 6.30	6.30@ 7.50	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.25@ 3.50	3.50@ 4.15	**2.75@ 3.50**	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	3.00@ 3.50	3.50	*2.75@ 3.50*	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.50@ 2.50	2.50	**2.25@ 2.50**	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.00@ 2.50	2.50	*1.75@ 2.50*	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 217, Week of May 28, 1923. Average spot price for same period $2.63. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

ing this year has dropped to about one-fifth of what might be called normal. Oil and gasoline appear to have beaten coal to this market.

Kentucky Looks Forward a Month

The general demand on western Kentucky mines is slow. Few mines report better than an average of two days a week except a few with contracts. Operators are beginning to see the futility of overloading trackage with unbilled coal, which merely weakens the market. Screenings are weaker in price despite the fact that there isn't much demand for lump or block. However, there is a fair demand for nut sizes for summer stove use. Indications are that screenings may stiffen somewhat when lump demand shows further softness and when steam plants shift to screenings after Lake trade on larger sizes increases the volume of fine coal on the market.

The feeling is that with lump coal selling at $3 and up and screenings at probably around $1.25 a ton, mine-run will meet with little demand.

Northwest Docks Are Getting Business

The price-cutting campaign to regain markets lost to Illinois and Indiana rail shippers is said to be winning business throughout the southern part of Minnesota and in North Dakota. However, the margin of profits for both sides has practically disappeared, and the volume of trade is not heavy because dealers still think the war between the docks and the rail men will bring further advantage to them.

There is a good call from industrial concerns and the iron ranges. These consumers seem to be satisfied with the present levels, and it is to them and to the railroads that much of the shipping is being done. Prices at Duluth remain about the same, the following quotations being for lump, run of pile and screenings: Youghiogheny, $7, $6 and $4.50; Hocking, $6.75, $5.75 and $4.25; splint $7.50, $6.50 and $4.50; Kentucky lump, $8 to $9.50. Pocahontas has dropped off from the $12.50 level to $11, $7.50 and $6.75.

At Milwaukee receipts have been heavy but trade is dull. Unseasonably cold weather keeps up a suggestion of domestic and heating business and a little anthracite is moving off the docks to inland dealers all the time.

West Buys Little Coal

Light buying still prevails throughout the West. Kansas City and Oklahoma sales offices feel a slight call for threshing coal from the southern end of the wheat belt. A very small storage movement is going on, which includes semi-anthracite, the price on which is slated to go up 50c. at once. Other quotations remain unchanged.

In Colorado heavy rains and chilly weather have kept up a small domestic and heating trade, which holds the market fairly steady. Mines average not over three days a week. There have been no circular changes during the week. Clearing of the blockade in Tunnel 50 on the Moffatt road has opened up the outlet from Routt County.

The only thing that keeps Utah business going is raw spring weather. Domestic consumers are doing no storing in spite of the summer reductions. Mines are averaging about two days a week.

Conditions in Ohio Vary

Trade at Columbus continues quiet and draggy. Buying is limited to immediate wants. Renewal of contracts is not active, as many consumers are buying at low prices when distress coal is available. Pocahontas and smokeless grades are the strongest features of the domestic trade, as well as West Virginia splints and Kentucky coals. For the past few days there has been a better tone to the Cincinnati market than for sometime. Steel buyers are again in the market. Better buying for the lake trade resulted in better prices for 2-in. lump, most of it being held $3@$3.50. At Cleveland the demand is fair. Industrial steam consumers are obtaining their requirements in the open market, and retail buying is quiet.

The Pittsburgh gas-coal market shows no material change. Mine-run is not moving to any great extent, while gas slack commands little if any premium over steam slack on account of heavy offerings. A slight improvement is noted in central Pennsylvania in spite of low prices, many orders from New England being reported. During the week ended May 20 there were 16,970 cars loaded, as compared with 16,300 cars the previous week.

Buffalo consumers are buying slowly and at low prices and are not adding to their reserve stocks.

Railroad buying is believed to be responsible for slightly better conditions in southern West Virginia high-volatile fields. Transportation conditions are better in northern and southern West Virginia and mines on the Norfolk & Western are increasing their production. Inquiries from the tidewater market are largely confined to gas coals.

New England Buys Only Quality Coals

While there has been restricted buying the past week on the part of certain manufacturers in New England, the purchases have been almost exclusively of the better grades from central Pennsylvania. A few of the quality coals are sold up now for June, and the next move will be higher quotations both for delivery extended over several months and for July and August. As yet the medium coals have not been affected; car distribution during June will have some bearing on quotations, however, and the trade is much interested to see when the turn will come.

Meanwhile the Hampton Roads coals have eased off

materially in price. Efforts to curtail the volume of coal for the Virginia terminals have not succeeded, and once more there are accumulations and widespread solicitation for spot orders. No. 1 grades are quoted at $6.50, with seconds at $6 @$6.25, and only light inquiry. Export demand is by no means staple, and the $7 level the agencies tried to hold cost them a considerable tonnage which has already begun to move from central Pennsylvania via Philadelphia. For distribution inland there is also very little demand. The $8 price on cars Boston is still high enough to drive business toward the all-rail route among buyers who are not wedded to the Southern coals, and more than likely the rehandlers at this end will soon modify their quotation to correspond with receding figures at Hampton Roads.

Embargoes that were in effect against destinations on the New Haven and on the Boston & Maine during much of May have now been raised, and receipts at the Hudson River gateways will soon show a material increase. The trade is not much encouraged, however, for it is realized that transportation disabilities are more deep-seated that can be cured by any temporary expedient.

New York Market Notes Improvement

There was an improvement noticed in the New York market. Buyers continue to make inquiries and the better grades of coal were well sold up. At the piers 2,297 cars were reported on May 25, a considerable decrease from the previous week. Some sales of distress coal at low prices were made. There has been no tendency on the part of Philadelphia consumers to stock up, but there are reports that they will start about July 1. The export situation continues to interest the Baltimore market. In Birmingham, Ala., the spot market is quiet. Bunkering was somewhat better, some trans-Atlantic boats taking on coal for the return voyage.

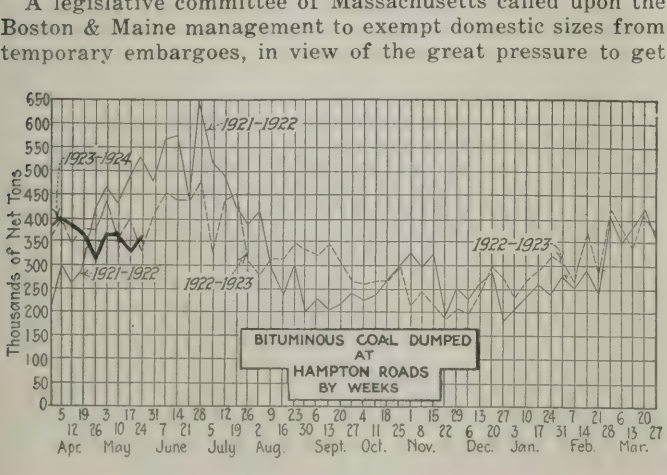
Lake Loading Shows Activity

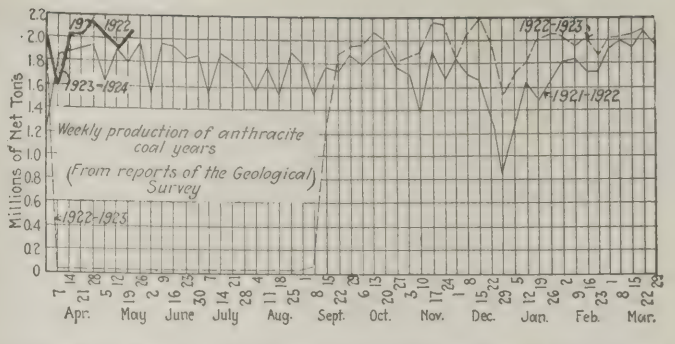
Loading of boats is going on actively, aided considerably by improved car supply at Cleveland. On May 24 the railroads had 15,624 cars at the lower lake docks and 5,000 cars in transit. In the Pittsburgh market sales in the lake trade were heavier. Some producers in the southern Ohio field have small lake contracts, Lake dumpings for the week ended May 28 were 884,538 net tons of cargo coal and 45,661 net tons of fuel coal, making the dumpings for the season 4,248,601 net tons of cargo coal and 186,010 net tons of fuel coal.

Domestic Anthracite Moving Heavily

Heavy shipments of domestic sizes of anthracite are going into the Northwest, Canada and New England. In the East deliveries are insufficient to enable retail dealers to begin stocking. Stove coal is the hardest of the domestic sizes to be obtained but there has been no let-up in the call for the other coals. Steam sizes are slowly moved. During the week ended May 19 the American Railway Association reports that 3,159 cars of anthracite passed through the principal gateways over the Hudson River into New England.

A legislative committee of Massachusetts called upon the Boston & Maine management to exempt domestic sizes from temporary embargoes, in view of the great pressure to get





supplies forward. Cancellation of the embargo had at that time already been determined upon however.

Movement via the New York and Philadelphia piers continues in reasonably good volume, especially at Port Richmond. Practically all the tonnage of the Philadelphia & Reading Ry. fleet is now in operation, and the quantity of coal dumped will compare favorably with years like 1921 and 1922.

"Production of anthracite in the week ended May 19 increased 7.5 per cent over the production in the week preceding," says the Geological Survey. "The nine principal carriers of anthracite reported loading 39,106 cars, from which it is estimated that the total output, including mine fuel, local sales, and the product of dredges and washeries, was 2,045,000 net tons.

"Preliminary reports of loadings in the first three days of the week May 21-26 indicate a smaller output, principally on account of the low rate of production on Whit Monday."

Coke Output Increases Slightly

Production of coke for the week ended May 19, says the Geological Survey, shows an estimated output of 409,000 net tons, an increase of 8,000 tons when compared with the previous week. An increase of 25,000 tons in the Pennsylvania-Ohio region more than offset small losses in the southern and middle Appalachian states and in Colorado and New Mexico.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to May 12, 1923 Inclusive	Week Ended May 12, 1923
U. S. Total	55.7	....	....	....
Somerset County	74.9	36.3	34.0	(a)
Panhandle, W. Va.	51.3	57.3	56.6	67.5
Westmoreland	58.8	65.8	56.5	60.4
Virginia	59.9	55.7	57.0	65.0
Harlan	54.8	22.1	25.7	41.6
Hazard	58.4	16.4	24.3	31.1
Pocahontas	60.0	36.6	38.3	40.0
Tug River	63.7	28.8	35.9	34.8
Logan	61.1	26.2	31.6	35.9
Cumberland-Piedmont	50.6	31.7	49.3	49.9
Winding Gulf	64.3	30.4	35.8	38.7
Kenova-Thacker	54.3	42.4	36.8	45.0
N. E. Kentucky	47.7	28.4	29.8	40.4
New River	37.9	31.6	37.2	42.7
Oklahoma	59.6	59.1	45.3	59.3
Iowa	78.4	75.9	72.3	47.1
Ohio, Eastern	46.6	40.8	37.2	52.4
Missouri	66.8	76.3	70.4	53.7
Illinois	54.5	49.9	44.1	31.5
Kansas	54.9	55.9	46.0	45.1
Indiana	53.8	37.7	48.3	31.4
Pittsburgh†	39.8	41.2	38.0	49.9
Central Pennsylvania	50.2	53.4	49.1	54.3
Fairmont	44.0	35.5	38.6	56.3
Western Kentucky	37.7	32.4	32 1	29.4
Pittsburgh*	31.9	56.1	62.3	76.0
Kanawha	13.0	15.6	24.3	34.5
Ohio, Southern	24.3	38.1	30 8	26.0

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended May 12, 1923	974,531	175,158
Previous week	961,029	175,866
Same week in 1922	767.094	78,789

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
May 14, 1923	18,419	2,776	23,761	15,653
Same date in 1922	343,689	218,466	....	....
May 7, 1923	16.081	3,195	28,316	16,672

Foreign Market And Export News

British Output Continues at High Mark; Demand for Welsh Coal Improves

British coal production for the week ended May 12 was 5,603,000 tons, says a cable to *Coal Age*. This compares with 5,325,000 tons the previous week and 5,825,000 tons for the week of April 21 last, the post-war record.

Official figures of the British Board of Trade, says the Bankers Trust Co. of New York, shows that during the first three months of 1923 exports of British coal was 18,694,402 tons, which was almost 1,500,000 greater than in the corresponding period of 1913. In March of this year Germany received 1,836,399 tons of British coal and France 1,805,204 tons.

There is an improvement in the demand for Welsh coal and the operators feel confident they will be kept busy throughout the year. Many buyers are anxious to cover their requirements for the balance of the year. Continental demand is heavier in spite of the unsettled conditions in the Ruhr. Output of Welsh coal is now at the rate of 58,000,000 tons a year, as compared with 56,750,000 tons in 1913, while exports from Wales are above the pre-war level.

The north of England market is strong. German, Russian and Scandinavian buyers are pressing the operators, with French and Belgian demands active, while Italy's demands are easier.

Less Activity at Hampton Roads

Business at Hampton Roads last week showed little activity, and prices weakened with a slowing up in the movement of vessels. Supplies of coal continued to depreciate, due to heavy movements by rail to the West.

Export business held its own so far as movement was concerned, but few new orders being received the bulk of the coal moved to foreign ports having been bought last month for May delivery. The bunker trade showed a slight reduction.

Some heavy coastwise movements were recorded, one cargo being consigned to the West Coast by water. The piers at Hampton Roads operated on an indifferent schedule, but shippers regarded the slight depression as only temporary.

United States April Domestic Coal Exports

(In Gross Tons)

	1922	1923
Coal:		
Anthracite	109,290	421,922
Value	$1,057,378	$4,500,531
Bituminous	714,995	1,384,879
Value	$3,479,041	$8,674,885
Coke	28,413	201,788
Value	$243,417	$2,291,187

	Ten Months Ended April	
	1922	1923
Coal:		
Anthracite	2,891,241	2,869,307
Value	$31,262,142	$31,527,677
Bituminous	12,095,699	11,286,109
Value	$63,101,455	$72,220,483
Coke	246,543	737,788
Value	$2,147,135	$8,148,865

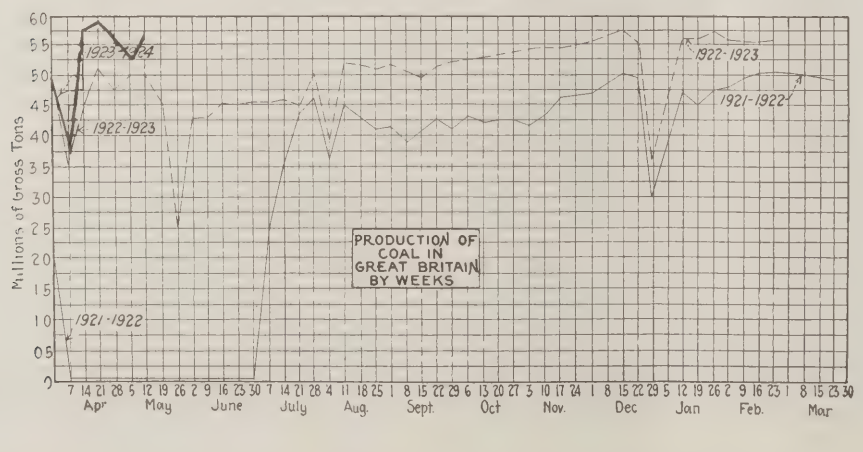
French Fuel Consumption

Fuel consumption of France during March of this year and for the first quarter of 1923, in metric tons, follows:

Coal	March	First Quarter of 1923
Output	3,012,116	8,638,381
Imports	2,022,687	5,671,951
	5,034,803	14,310,332
Exports	301,974	791,489
Consumption of raw coal	4,732,829	13,518,843

The above figures include raw coal subsequently transformed in coke and briquets.

Coke	March	First Quarter of 1923
Production (from collieries ovens only)	149,285	402,961
Imports	126,924	695,166
	276,209	1,098,127
Exports	24,439	88,223
Consumption of coke	251,770	1,009,904
Briquets		
Production (from collieries works only)	262,316	780,160
Imports	41,776	203,404
	304,092	983,564
Exports	25,191	76,220
Consumption of briquets	278,901	907,344



Export Clearances, Week Ended May 19, 1923

FROM BALTIMORE

	Net Tons
For Canada:	
Am. SS. Sudurco, for Canada	511
For France:	
Br. SS. Wearpool, for France	8,689
Nor. SS. Samnanger, for France	6,525
Ital. SS. Tiereno, for France	7,397
Fr. SS. Portiers, for France	6,493
Br. SS. Roxbury, for France	7,500
Br. SS. Strathfillan, for France (Coke)	4,640
Nor. SS. Dagfield, for France (Coke)	6,590
For Germany:	
Jap. SS. Malta Maru, for Germany	8,554
Swed. SS. Araton, for Germany	6,841
For Italy:	
Ital. SS. San Giuseppe, for Italy	7,792
For Sweden:	
Swed. SS. Boden, for Sweden	7,210

FROM PHILADELPHIA

For Belgium:	
Belg. SS. Persier, for Antwerp	...
For Cuba:	
Dan. SS. Silkeborg, for Havana	...
Dan. SS. Phonix, for Havana	...
For France:	
Br. SS. Lesreaul, for Dunkirk	...

FROM HAMPTON ROADS

For Argentine:	
Br. SS. Loyal Devonian, for Campana	4,789
For Brazil:	
Braz. SS. Santarem, for Rio de Janeiro	2,657
Br. SS. Vulcan City, for Rio de Janeiro	6,694
Br. SS. Polycarp, for Para	535
Br. SS. Diadem, for Buenos Aires	6,468
Br. SS. Nile, for Rio de Janeiro	7,708
Ital. SS. Arsa, for Rio de Janeiro	7,495
For Cuba:	
Nor. SS. Wagland, for Havana	3,000
For France:	
Nor. SS. Balto, for Dunkirk	9,817
For Germany:	
Du. SS. Hvidehavet, for Hamburg	4,520
Nor. SS. Hallgyn, for Hamburg	9,382
For Holland:	
Du. SS. Tjibeson, for Rotterdam	13,685
For Italy:	
Ital. SS. Iddesleigh, for Savona	6,131
For West Indies:	
Latvian SS. Katie, for St. Lucia	3,000
Nor. SS. Christian Michelsen, for Fort de France	5,361

Hampton Roads Pier Situation

	May 17	May 24
N. & W. piers, Lamberts Pt.:		
Cars on hand	1,135	1,037
Tons on hand	71,137	64,333
Tons dumped for week	90,159	102,909
Tonnage waiting	1,700	6,200
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,487	1,699
Tons on hand	84,470	95,400
Tons dumped for week	129,109	125,080
Tonnage waiting	14,346	16,118
C. & O. piers, Newport News:		
Cars on hand	1,543	12,052
Tons on hand	90,660	68,135
Tons dumped for week	78,926	94,720
Tonnage waiting	11,695	5,300

Pier and Bunker Prices, Gross Tons

PIERS

	May 19	May 26†
Pool 9, New York	$5.50@$5.75	*$5.35@$5.75*
Pool 10, New York	4.50@ 5.25	*4.35@ 5.25*
Pool 11, New York	4.00@ 4.50	*3.75@ 4.50*
Pool 9, Philadelphia	5.90@ 6.35	*5.85@ 6.15*
Pool 10, Philadelphia	5.00@ 5.55	*4.95@ 5.45*
Pool 11, Philadelphia	4.10@ 4.55	*4.00@ 4.55*
Pool 1, Hamp. Roads	7.00	*6.75@ 7.00*
Pools 5-6-7, Hamp. Rds.	5.25	5.00@ 5.25
Pool 2, Hamp. Roads	6 75	*6.50@ 6.75*

BUNKERS

Pool 9, New York	5.80@ 6.05	*5.65@ 6.05*
Pool 10, New York	4.80@ 5.55	*4.65@ 5.55*
Pool 11, New York	4.30@ 4.80	*4.05@ 4.80*
Pool 9, Philadelphia	6.15@ 6.35	*6.10@ 6.30*
Pool 10, Philadelhia	5.15@ 5.95	*5.10@ 5.85*
Pool 11, Philadelphia	4.30@ 4.90	*4.25@ 5.00*
Pool 1, Hamp. Roads	7.00	*6.75@ 7.00*
Pool 2, Hamp. Roads	6.75	*6.50@ 6.75*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	May 19	May 26†
Admiralty, large	40s.@42s.	**41s.@42s.6d.**
Steam, smalls	32s.6d.	*30s.@32s.6d.*
Newcastle:		
Best steams	32s.6d.	**32s.6d.@34s.**
Best gas	32s.6d.@35s.	32s.6d.@35s.
Best bunkers	34s.@35s.	33s.6d.@35s.6d.

† Advances over previous week shown in **heavy type**; declines in *italics*.

News Items From Field and Trade

ALABAMA

An active statewide **movement is under way to have the state abandon the coal-mine contract labor of its convicts.** It will be made a live issue in the summer session of the Legislature.

Three suits have been filed at Birmingham against the United Mine Workers asking damages aggregating $900,000, the allegations being that the union directed the strike in the Alabama coal fields two years ago and that as a result of it interstate shipments of coal were interfered with and the coal companies lost large contracts. The plaintiffs in the suits, who ask $300,000 each, are the Roden Coal Co., Cahaba Coal Co. and the Blocton Cahaba Coal Co. The trials have been set tentatively for October in the U. S. District Court at Birmingham.

ALASKA

The U. S. Geological Survey announces that **surveys have been made of 16 of the largest mining districts, including all of the important coal fields of Alaska.** The surveys cover a total of 5,000 square miles.

The Secretary of the Interior has authorized the building of a spur 4½ miles long from the Matanuska branch of the Alaska R.R. to what are known as the Moose Creek coal mines in the Matanuska field. These mines contain a good quality of steam coal suitable for export and for use on the government railroad. The estimated cost of the new construction work is $125,000 and the chairman of the Alaskan Engineering Commission estimates that it will save the railroad nearly the entire cost during the first year. Two areas now covered by government coal leases, upon which a large amount of money has been expended in preliminary development work, will be reached by the proposed spur. The cost of the improvement will be contributed in part by the coal-mining lessees.

COLORADO

The Colorado Fuel & Iron Co. hopes to reduce or stop the flow of gas into its Morley mine, in Las Animas County, by tapping a deposit of gas sand near the mine. So a well hole is to be drilled 3,000 ft. into the supposed location of the gas sand. Possibly the drill hole will draw upon the pressure of gas sufficiently to prevent the gas from leaking into the mine through a fissure.

ILLINOIS

Mine No. 2 of the **Chicago-Sandoval Coal Co.,** located at Sandoval, opened May 15 and resumed production. The mine has been closed for a month.

The mine operated by the **Spring Creek Coal Co.,** near Springfield, has been temporarily closed for repairs, as has also **Victoria Collieries Co.** mine at Tamaroa and **Paradise Coal Co.** mine at DuQuoin.

Consumers of electric power in the southern Illinois field deny that the recent strike of Central Illinois Public Service Co. linemen caused them any serious loss or inconvenience. Occasional brief shutdowns is all that any of them report. The strike is now settled.

The Bissell Coal Co. has closed down its mine at Bissell, in the Springfield district. **There are now eighteen large mines** closed in the Springfield district.

The Western Coal & Mining Co. will sink a new mine two miles north of Hurst, in the edge of Williamson County. This company is now operating Mine No. 2, employing 600 men. The new mine will be known as No. 3. It is said that the new mine will be larger than No. 2 and will employ more men. It is proposed to erect 150 houses for the miners near the new shaft.

Following a recent decision by the Illinois Commerce Commission, **the Illinois Central R.R. will begin immediately to construct two and one half miles of track to connect with the Big Four road.** The new branch of the I. C. will begin near the mine of the Dering Coal Co. between Eldorado and Raleigh and will connect with the Big Four tracks near Wasson. This branch is in direct route of large coal mines in the vicinity and will be used largely for coal transportation purposes by the Illinois Central.

The city of West Frankfort, located in the center of the largest and richest coal field in Illinois, with eight large collieries as its principal industries, is fortunate in the fact that practically all of these mines have kept operating steadily and **boasts of a semi-monthly payroll of all the mines of approximately $260,000.** The highest bi-weekly pay since the strike was $360,000, and the average, $300,000.

The coal severance tax bill now before the Illinois Legislature **has been amended** so that it provides a 2c. per ton tax at the mine instead of a tax of 8c. The bill has not been reported out of committee, however.

INDIANA

The Indiana Coke & Gas Co. was sued in the federal court at Indianapolis, Monday, May 16, by the Mississippi Valley Iron Co. of St. Louis, Mo., for $1,750,000. The plaintiff alleges that the coke company delivered an inferior grade of coke, that deliveries were not made according to contract and that deliveries ceased before the expiration of the contract.

The Rader Coal Co. of Indianapolis is to provide the 1924 supply of No. 4 Indiana mine run for the Marion County tuberculosis hospital at Sunnyside, the county infirmary and the Marion County asylum for the incurable insane at $2.40 a ton. This is $1.05 a ton less than the price paid last winter by the county.

The Bloomington Block Coal Co. has been incorporated at Bloomington for the purpose of doing a mining business. The organizers are John S. Risher, Helen T. Risher and Ina R. Irvine.

Suit to obtain judgment of $60,000 for damages was filed May 2 in federal court by the **Worth-Husking Coal Co., of Chicago,** against the **Indiana Power & Water Co. and the Indiana Power Co.** The plaintiff alleges that the defendant company broke a coal contract said to have been entered into on July 17, 1919, by the plaintiff and the **Indiana Power & Water Co.** providing for the shipment to the **Worth-Husking Coal Co. by the Indiana Power & Water Co.** of from 1,400 to 1,800 tons of coal a day from July 21, 1919, to March 15, 1920. The plaintiff alleges that the Indiana Power & Water Co. was taken over by the Indiana Power Co. on Nov. 15, 1919, and that the latter company failed to carry out the contract, shipping in all only 11,300 tons of coal. The original contract is said to have called for the shipment of 50,400 tons.

The Indiana Fuel Supply Co., of Indianapolis, **has filed a preliminary certificate of dissolution.**

H. C. Booth has been appointed receiver for the Black Comet Coal & Mining Co. in a suit filed by Edwin F. Daniels et al. on notes and to foreclose chattel mortgage and for the appointment of a receiver. The Black Comet Coal Co. owns electrical and other equipment in mines formerly operated by them, now leased by the Burr Oak Coal Co.

Because of the laxity in the mining industry in the Bicknell field, **many of the miners' families are reported to be leaving for Detroit and cities in Ohio,** where the automobile and tire business is booming. Recently the American No. 2 mine in the Bicknell field, employing about 450 men, and the Bruceville mine with about 400 men, were closed down indefinitely. Both Pan-Handle mines, which employ about 350 men, have been closed, and Freeman mine No. 2 was closed some time ago. Other mines in the Bicknell field have been working only about two days each week with the exception of Edwardsport, which has had good working time continuously.

IOWA

The Knoxville Mining Co., of Knoxville, will sink a shaft mine, instead of developing a slope mine, as was originally intended.

The Norwood-White Coal Co. has opened a new coal field consisting of about 1,000 acres between Herrold and Grimes. The vein is about 200 ft. below the surface and varies from 4 to 6 ft. in thickness.

Tests which have been made in Cedar and Orange townships, near Albia, show a rich vein of coal at a depth ranging from 150 to 300 ft. Ten test holes have been sunk and it is expected that the tests will be completed by July 1. Edward Coyne, who is directing the tests, has about 3,000 acres of land under lease and has more land under privilege of lease if there is proved to be sufficient coal under the land to warrant leasing. The coal is about of the same quality as that mined by the Shuler Coal Co., near Alpha.

The Davis County Board of Supervisors has **filed suit for $250,000 against the Bloomfield Coal & Mining Co.** for alleged damages to that amount sustained by the county hospital building, near Ankeny, as a result of mining operations.

Production of the mines of Iowa during 1922 was 4,679,683 tons, which included 2,350,582 tons of prepared lump, 1,599,864 tons of mine-run and 729,237 tons of slack. The mines operated but seven months because of a warm winter and the strike. There were 9,218 miners on the average in the Iowa mines, with other underground workers numbering 3,349 and 1,273 surface workers. The third district employed 13,840 of the total number and Polk county 1,883 men.

KANSAS

The Lively Mining Co., capitalization $100,000, has been chartered in Kansas to operate a mine near Pleasanton, in Linn County. Work of sinking the first shaft will begin early in July. The incorporators are W. E. Lively and E. J. Lively, Pittsburg; G. T. Lively, Scammon; Mrs. A. C. Marlatt, Kansas City; and Woodrod Wilson, Denver, Colo.

The Fidelity Coal Co., composed of Joe E. DuBreuil, Oliver Barrett and John W. Cosby, all of Topeka, **has purchased the Jackson-Walker Coal Co.** and will be located at 619 East Eighth Avenue. Mr. DuBreuil has been manager of the Jackson-Walker Co. for the past two years.

KENTUCKY

The present term of the Perry County Circuit Court at Hazard will be largely taken up with the **trial of Floyd and Monroe Kilburn, charged with shooting to death Frank Horn, superintendent of the Coneva Coal Corporation,** at Chevies last winter. Horn who was a former captain in the army and former sheriff of the county, was killed while endeavoring to break up liquor traffic on company property.

MARYLAND

C. W. Hendley & Co., of Baltimore, which has been in business since 1902, has been incorporated under the title of C. W. Hendley & Co., Inc. The officers of the new corporation are Charles W. Hendley, president; W. Winchester White, vice president and treasurer, and Samuel S. M. DuBois, secretary and general manager.

MINNESOTA

A report has been published that hard coal was struck by well diggers near Crookston, at a depth of 60 ft. Samples are in the hands of the University of Minnesota, but it is a safe guess that they will not reveal any anthracite.

O. P. B. Jacobson, of the state railroad and warehouse commission, will send out a recommendation to the coal trade, **urging early buying** of coal by consumers, to avert any trouble in the fall. It is based upon a wire from Herbert Hoover, Secretary of Commerce, on the subject, which included urging co-operation with the dock concerns in an organized step to secure and store coal for winter use.

MISSOURI

J. W. Alder, cashier of the Bank of Merwin, at Merwin, **has taken leases on 2,600 acres of land** between Merwin and Amoret, on the Kansas City Southern R.R., and several new coal mines will be opened in western Bates county.

The airshaft of the coal mine east of Hamilton caved in recently and it will require at least thirty days to repair the damage. The hole made by the cave-in is about 35 ft. in diameter and extends down to solid rock about 48 ft. below the surface.

The U. S. Bureau of Mines rescue car No. 6 has arrived at Moberly, and will remain there until **June 2, when a mine-rescue dem-**

onstration will take place. Rescue training classes have been instituted at Keota, Higginsville, Bevier and Huntsville. Alex J. Miller and T. R. Williams are in charge of the car. Governor Arthur B. Hyde, of Missouri, will be invited to Moberly when the rescue demonstration is given.

A dividend of 75c. per man per working day has been declared by the Co-operative Block Coal Co. of Macon, a large mine operated on a co-partnership by the miners. This dividend is declared from the profits above operating expenses and goes to each man as a sort of bonus over his $7.50 per day wage. For each day put in by the miner he gets 75c. in excess of his stated earnings.

NEW JERSEY

Dr. Oliver Bowles, mineral technologist of the Bureau of Mines, **has been designated** by Secretary Work to be **superintendent of the new mining experiment station** of the bureau **to be established at Rutgers College,** New Brunswick, N. J. He will assume office July 1.

In a statement made public by former Senator Frelinghuysen Governor Silzer of New Jersey is urged to call a special session of the State Legislature **in order to enact laws which will protect the people of New Jersey against suffering from a coal shortage** during this coming winter. Senator Frelinghuysen attacks the inflated prices of coal and urges that additional remedies against the anthracite combination be enacted into law by Congress.

NEW YORK

The Stephens Fuel Co., of Bronx Borough, New York City, **has taken a group life insurance policy** covering each employee for $1,000 and, in the case of salesmen and managers, for $2,000, with a provision for free nursing service. Following this action by the Stephens Fuel Co. the **Weber, Bunke, Lange Coal Co.** took a similar policy.

Announcement has been made by the Berwind-White Coal Mining Co. of the **withdrawal of its subsidiary, the Bermuda Bunkering Co.,** which has done a bunkering business in Bermuda. The modern coal-handling machinery and floating plant of that company will be operated in the future by William E. Meyer & Co. and John S. Darrell & Co. The recent conclusion of arrangements under which Meyer & Co. and Darrell & Co. will stock Berwind coal exclusively in the future has made it unnecessary to continue local operations. Bunkering by Berwind-White at Bermuda has averaged between 20,000 and 30,000 tons yearly. No figures were given in connection with the sale of the Berwind-White plant to the two British companies, which took it over jointly.

OHIO

The Nelsonville & Murray Coal Co., Nelsonville, has been incorporated with a capital of $50,000 to mine and sell coal. Incorporators are M. P. Ohlinger, Walter Wolf, Gertrude Wolf, H. V. Wolf and Alice Ohlinger.

The Long Hill Coal Co., Nelsonville, has been chartered with a capital of $25,000 to mine and sell coal in the Hocking Valley field. Incorporators are L. J. Eberle, R. S. Oxley, A. H. Schory, A. P. Amann and M. E. Voll.

The Hartz Coal Co., Dover, has been chartered with a capital of $10,000 to mine and deal in coal as well as other minerals. Incorporators are George Hartz, John A. Hartz, Edna Hartz, Edward M. Hartz and Ed. C. Seikel.

PENNSYLVANIA

R. G. Skinner, a graduate of Cornell University and for a number of years connected with the Scranton Electrical Construction Co., has gone with the Scranton Electric Co. as assistant to Charles Dawson, who is the power solicitor and commercial engineer for the Scranton Electric Co.

N. H. Patton, of W. H. Patton & Associates, manufacturers' representatives, will in the near future transfer his residence from Philadelphia to Pittsburgh, where he will have charge of work in that territory.

The Philadelphia & Reading Ry. spends $10,000,000 every year for fuel, according to Charles P. Dampman, head of the fuel conservation movement on the road. Engineers, firemen, yardmasters, car inspectors and other employees directly interested in the fuel problem from all parts of the division attended a meeting held at Reading recently. Mr. Dampman urged the saving of a shovelful of coal wherever possible and quoted statistics to show that a saving would be effected if every fireman on the road would conserve a shovelful of coal daily. John Scheofele, road foreman of engines, also spoke and called the attention of the men to unnecessary black smoke, which is a big factor in fuel conservation.

Frank Wise, power engineer of the power department of the Scranton Electric Co., has transferred his connections to the American Gas & Electric Co. at Wheeling, W. Va., as power solicitor.

Conveyors Corporation of America, Chicago, Illinois, **announce the appointment of the Pittsburgh Machine Products Co.,** Oliver Building, Pittsburgh, **as district representatives.** The Pittsburgh organization will handle sales in western Pennsylvania and the northwestern part of West Virginia.

The Glen Alden Coal Co. has increased the dividend rate on the common stock of the company by declaring a payment of $2 a share on the issue, payable June 20 to stock of record June 1. An initial dividend of $1.50 was paid on Dec. 20, last.

Shipments of coal from the Girard Estate properties in the anthracite district in 1922 were 2,050,257 tons, a decrease of 933,465 tons, or 31 per cent, according to the fifty-third annual report of the Directors of City Trusts, Philadelphia. The decrease was due to the anthracite miners' strike. The estate's proportion of the total shipment of anthracite coal from Pennsylvania in the year was 5 per cent, the highest since 1880; 344,607 tons of coal were reclaimed from culm banks in the year, 10,479 tons less than in 1921. Since 1889, when the reworking of culm banks was first taken up on the Girard Estate, 7,001,319 tons have been reclaimed from this source. During the sixty years of active mining on the Girard Estate there have been marketed from it 85,445,442 tons.

Sam Noble, who was elected check weighman and **Joseph Peteavage,** who was elected check docking boss at a meeting of the No. 9 colliery local, of the Pennsylvania Coal Co. on May 14, **resigned their jobs the next morning.** George Hurry and John Pleasatine, their respective predecessors, made a demand on the local for an increase in pay to $12 a day, it is said. They had been receiving $8 a day from the miners for their work.

Joseph J. Jermyn's interests in the coal mining company of Jermyn & Co., which operates a colliery at Old Forge, **have been sold to** George B. Jermyn, E. B. Jermyn, Walter M. Jermyn, R. G. Jermyn and R. A. Downey. The change becomes effective on July 1, next. Jermyn & Co. acquired title to the mining property at Old Forge about thirty-five years ago. Ownership of the operations has remained in the family down through the years. The production of the colliery is from 1,200 to 1,600 tons of anthracite daily. At the present time the colliery is being operated to its maximum of production, with 800 men on the payroll.

The Commissioners of Schuylkill County have decided not to await the long legal suits against the coal companies that are refusing to pay taxes on the $410,000,000 increased valuation on their lands, but **have decided to use their power at once to enforce collections.** This can be done by selling the personal properties of the companies and lands on which taxes have not been paid. Large tracts of land at Minersville already have been turned into the Commissioners and proceedings will be begun to sell these as well as others which will be reported within another week. The county officials say the coal companies not only are delinquent on a whole year's taxes, but they soon will be penalized for delinquency on a second year. It is believed that before the matter can be brought before Court an adjustment will be reached.

Claiming that all the men awarded back pay under a recent decision of Dr. Charles F. Neill of Washington, umpire of the Anthracite Board of Conciliation, had not been given the money said to be due them, the **1,050 employees of the Lattimer, Milnesville and Hollywood mines of C. P. Hardee Bros. & Co., Hazelton, struck May 23.**

The Anthracite Conciliation Board on May 16, ordered the Hudson Coal Co. to eliminate a time check system, already in force at several Hudson collieries. Under the decision, which was written by Umpire Charles P. Neill, the company must immediately remove a check-in and out system at the East End and Baltimore No. 5 collieries, in Wilkes-Barre, as well as at the Marvine mine, in Scranton. Plans to put the same system of timekeeping at other Hudson operations are automatically stopped by the ruling. The decision is also important because in it the board declares the company has no "right to make any changes without the consent of the other party." Fight against the check-in and out system was waged by District President Brennan since October, 1921, when the company first established the new timekeeping method at the Marvine.

Merger of four coal-producing companies under the name of the Irwin Gas Coal Co. with total assets of $3,000,000 has been announced at Greensburg. The companies absorbed by the Irwin company are the Amend Coal Co., the Salem Gas Coal Co. and the Ninevah Coal Co. The merged company operates six mines with a daily output of 4,000 tons, four being located at Export and one each at Seward and Uniontown, all in the western Pennsylvania field. R. H. Jamison, of Greensburg, is president of the company.

State charters have been issued for the following companies: **Inter-County Anthracite Co.,** Philadelphia, mining and dealing in coal, coke and coal lands; capital stock, $5,000; E. A. Samsel, 4514 Osage ave., Philadelphia, treasurer; W. H. Gotwald, Schwenksville, and W. C. Jenkin, Philadelphia, incorporators. **Briar Hill Coal Co.,** Butler; $100,000; mining, preparing and shipping coal. The incorporators are Harry A. Gould, 106 Zeigler ave., Butler, treasurer; C. H. Gould, Ellwood City and C. F. Becker, Butler. **Chickaree Coal Co.,** Ebensburg; $25,000; mining and preparing coal for the market and dealing in coal lands. The incorporators are Murray J. Shiffer, Ebensburg, treasurer; William C. Shiffer and Clementine Shiffer, Ebensburg.

The Senate Finance Committee apparently is satisfied to allow **the Department of Mines to remain as a separate unit of the state government.** The Pinchot code originally provided that the department should become a bureau of the Department of Labor and Industry. This plan met with opposition and several weeks ago the code was amended so that the department remains as it is. The latest revised copies of the code were ready for the Legislature when it reconvened this week and while there were some minor changes in it, the Department of Mines was untouched.

TENNESSEE

Fire recently at the Cambria Coal Co. mine at Briceville, caused a loss of approximately $70,000. The company will rebuild at once.

Reductions in the retail price of coal have been announced by dealers in Memphis. Practically all dealers are selling Kentucky lump coal, which formerly sold for $8.75 a ton, for $7 per ton, and Kentucky nut coal, which formerly sold for $8.50 a ton, for prices ranging from $6.50 to $6.75 per ton. The reductions were said by several dealers to be a result of cheaper prices announced by the mines. The West Kentucky Coal Co. announced a cash price of $6.75 on Tradewater lump coal and $6.25 on Tradewater egg and nut.

UTAH

The trial of the men charged with the murder of a deputy sheriff in Carbon County during the strike last year is being held in Salt Lake City. It took four and a half days of strenuous examination of the veniremen to get a jury.

VIRGINIA

Directors of the **Virginia Iron, Coal & Coke Co. resumed dividend payments** May 24 on the common stock of the company with the declaration of a dividend of 2 per cent on the issue. The dividend was passed in June, 1922. The regular semi-annual dividend of 2½ per cent on the preferred also was declared, both payable July 2 to stock of record June 16.

WEST VIRGINIA

Organization of **the Everett Coal Co.,** of Clarksburg, was perfected a few days ago by the election of the following officers: Karl G. Davis, president; J. A. Ferrel, vice-president; Dr. E. M. Pearcy, treasurer and Louis A. Carr, secretary. This company, having large holdings in Brooke County near Wellsburg, has completed arrangements for early development of its coal property.

At a sale held under a decree of the Circuit Court of Braxon County **R. R. Biddle and C. L. Thompson, of Philadelphia, purchased the property, equipment and assets of the United Coal Co.** This company has been operating three mines in the vicinity of Gilmer, on the Charleston Division of the Baltimore & Ohio R.R., these mines being known as the Darnall, Kather-

ine and Bracket mines. The purchasers have completed arrangements to operate under the name of the Quaker Coal Co. The same concern owns several hundred acres of coal land in Somerset County, Pa. Ernest G. Smith of Weston has been placed in charge of the mines at Gilmer as superintendent.

Charles R. Martin, of Bingamon, has been **appointed manager of the Fairmont office of the Fairmont-West Virginia Gas Coal Co.,** recently organized by Robert Y. Brown, New York coal broker, to operate a mine recently acquired by Mr. Brown on the Bingamon branch of the Western Maryland. For a period of about nine years Mr. Martin was connected with the Jamison Coal & Coke Co., having been payroll clerk, assistant superintendent, chief clerk of the Fairmont office and for several years superintendent of the Bingamon, Fortney and Josephine mines of the Marion Gas and Wyatt-Bingamon coal companies. Mr. Martin's successor at the mines just named will be S. L. Poole, who has been the mine foreman.

The MacEachen Company, recently organized by Washington people and chartered under the laws of West Virginia with an authorized capital stock of $3,000,000, is given the right under its charter to manufacture mine-loading machines, mining machines and mine cars of all kinds, to own coal lands, operate mines and to erect power plants for the manufacture and sale of electric power. The new enterprise was incorporated by Roderick MacEachen and F. V. Murphy, of Washington, D. C.; Charles Wingerter, of Wheeling; J. W. Davison, of Grant Town, and H. E. Grau, of Fairmont. Mr. Davison is an official of the New England Fuel & Transportation Co. The company will have its principal office in Fairmont, W. Va., and will operate in Marion County.

Organization of the Sterling Black Mining Co. presages further development of coal lands in Boone County. This concern has been incorporated with 1,000 shares of no par vale, the seat of operations to be at or near Altman, in Boone County. Among those interested in the new enterprise are G. W. Coyle, of Columbus, Ohio; Sam Brown, of Pittsburgh, Pa.; T. L. Johnson, Frank Kerns and T. F. Somerville, of Charleston.

It is understood that the **New River and Pocahontas Consolidated Co. is negotiating for the plants and properties of the Ephraim Creek Coal & Coke Co., near Thayer,** which adjoin those of the New River and Pocahontas company.

Since May 1 a large corps of civil engineers representing the Chesapeake & Ohio have been in the vicinity of Ronceverte, W. Va., for the purpose of making a survey of the proposed branch line railroad of the Chesapeake & Ohio to the western Greenbrier coal fields.

T. L. Lewis, who at one time was head of the international organization of the United Mine Workers, but who in recent years has been the secretary of the New River Operators' Association, has resigned to devote his time to his own personal business. Mr. Lewis is now an operator as well as editor and owner of *The Coal Mining Review* and desires to devote his entire time to his mines and to the *Review*. He will, however, continue to act in advisory capacity to the New River association, it is announced. S. C. Higgins, who for several years has been the traffic manager of the association, will succeed Mr. Lewis as secretary of the association and will combine the office of secretary and traffic manager. The office of the secretary will be at Mt. Hope in the future.

The Fort Clark Coal Co. resumed operations at its mine between Lost Creek and Mont Clare in Harrison County on May 15, after an idleness of eight months. This company has just negotiated a fuel contract which will furnish employment to every man usually employed at the mine. This company normally employs about 75 miners.

The Raleigh Coal & Coke Co. is engaged in building a road from the company's offices at Raleigh to an intersection with the county road near the Raleigh Coal & Coke Co. station. A 12-foot road is being constructed under the same specifications as are used for county and state highways. The piece of road to be built will cost approximately $10,000.

The American Coal Co., which operates the Pinnacle, Piedmont and Crane Creek operations in Mercer County, has put into commission buses for the use of miners and their families. The buses operated on schedule will accommodate from eighteen to twenty persons and will be used to take the miners to and from their work. The company, the first to provide buses for employees, will not charge the men any fare. The announced purpose of the company in using buses is to encourage the miners in working more steadily.

The Fairmont & West Virginia Coal Co., organized by Robert Y. Brown and others and with general offices in New York, Pittsburgh, Cleveland and other cities, will open an office in Fairmont, following its purchase of a mine in the Fairmont region. The company a little earlier in the month purchased the Shadybrook mine of the Banner Coal Co. on the branch line of the Western Maryland Ry. Offices are to be secured in the Bethlehem Building. Harry MacAlarney, of Ebensburg, will be the manager of the Fairmont branch of the company. A. L. Black, superintendent. It is planned by the purchasing company to increase the capacity of the plant from seven cars a day to 25 cars a day.

Howard N. Eavenson, formerly with **the United States Coal & Coke Co.,** and now a consulting engineer of Pittsburgh, has in association with other Pittsburgh people organized the Pittsburgh Coal Land and Railroad Co., the headquarters of which are at Pittsburgh. This company is capitalized at $100,000. Associated with Mr. Eavenson in the new enterprise are Newell G. Alford, J. R. Hicks, B. K. Folger, all of Pittsburgh, Pa.

The Atlas Coal & Coke Co. of Chicago, Ill., has been authorized by the secretary of state to hold property and transact business in West Virginia.

The following West Virginia **coal companies have been dissolved** as corporations: Ohio Wheeling Coal Co., Will-Earl Coal Co. and the E. L. Sternberger Coal Co.

I. K. Dye, well known in coal circles in northern West Virginia, has been appointed secretary of the Elkins Chamber of Commerce.

The Fairmont & Cleveland Coal Co. has purchased 125 acres of coal land from the Connellsville & Fairmont Coal Co., on Teverbaugh Creek near Worthington. The tract just acquired is a portion of 1,000 acres originally sold to the Connellsville & Fairmont Coal Co., which is operated by K. K. Kramer and associates of Connellsville, Pa. The coal in the tract acquired is in the Sewickley seam and has not heretofore been developed.

The Pocahontas Fuel Co. will soon open another mine in the Wyoming County field, not far from the Itmann mine in Wyoming County, on the line of the Virginian Ry. In order to afford shipping facilities for the new mine it will be necessary for the Virginian to extend its line. There are about 2,000 acres in the tract which the Pocahontas company will begin to develop. The same company is making extensive improvements at Pocahontas, having begun the erection of a number of dwellings for the use of company officials and the clerical force of the company. The building program undertaken is with a view to relieving the housing shortage at Pocahontas.

The Reese Creek Coal Co. is a new concern ust launched by Milton people, having a capital stock of $50,000 and with headquarters at Milton. Interested as incorporators of the new enterprise are Robert J. Lockey, H. C. Heck, V. L. Hall, Lucia C. Heck and Josye H. Hall, all of Milton.

The Burger Coal & Coke Co. and the **Northern Fuel Co.** have been organized by the same people. Headquarters of both concerns are to be at Wheeling. The first-named company is capitalized at $25,000 and the latter at $100,000. Both concerns will engage in the coal business in the Northern Panhandle of West Virginia. Active in organizing both enterprises were A. E. Bryant, Nell Moran, A. S. Burger and H. L. Arbenz, of Wheeling.

WASHINGTON, D. C.

The order of the District of Columbia Court of Appeals in remanding to the District Supreme Court the case of the McAlester-Edwards Coal Co. **with directions to issue a writ sought by the company to compel the officials of the Chickasaw and Choctaw tribes of Indians to recognize a patent for surface lands in Pittsburgh County Okla., was approved by the U. S. Supreme Court** in a decision rendered May 21. The company operates a coal mine in Pittsburg County. Under an act of Congress of Feb. 8, 1918, surface lands were set aside for patent where mines were operated under legal leases on Indian lands, operating companies being given priority. The McAlester-Edwards company filed for surface rights and $2,291 was accepted as part payment. Officials of the tribe refused to accept $10,360 tendered by the company as the balance of the purchase price fixed by appraisement, contending that the Secretary of the Interior had misinterpreted the act. The company petitioned the District of Columbia Supreme Court for a writ to compel acceptance and issuance of the patent. That court sustained a demurrer, which the Court of Appeals reversed, the latter court being upheld by the U. S. Supreme Court.

WISCONSIN

Joseph W. Simpson has been elected president of **The Milwaukee-Western Fuel Co.,** Milwaukee, effective May 10, 1923.

CANADA

Coal mine officials' examinations, as provided under the coal Mines Regulation Act of British Columbia were scheduled for May 29, 30 and 31, at Merritt, Nanaimo, Cumberland and Fernie.

The installation of coal bunkers on the waterfront of the harbor of the **City of Vancouver is proposed** by a coal mining company of the Province of Alberta, the intention being to make a bid for the mercantile requirements of that growing Pacific Coast port.

F. W. Glover, who has been superintendent of the collieries of the Princeton Coal & Land Co., Nicola-Princeton District, **has been appointed general manager.** It is reported that the coal property has been taken over by English interests, that the measures are to be developed more intensively than heretofore, and that production soon will be materially increased.

Coal-mine operators and the businessmen of the province of Alberta generally are disappointed that a greater reduction in freight rates has not been offered by Sir Henry Thornton, president of the Canadian National Railways, in order to permit the development of the market of Ontario for Alberta coals. It has been agreed that the rate shall be $9 a ton as against the present rate of $12.50 a ton from Edmonton to Toronto.

The Trades and Labor Council of Vancouver Island thinks the time has arrived when organized labor should urge upon the authorities the need for a more stringent enforcement of mine regulations, to still further safeguard the men employed in coal mines in the province. The council at a recent meeting expressed its dissatisfaction with the finding of the commissioner investigating the recent accident in the Canadian Collieries (Dunsmuir) Limited, No. 4 mine, at Cumberland, and blamed the operators for not keeping a sufficient volume of air moving in the mines. It was decided to get in touch with labor organizations on the mainland, with a view to enforcing the Coal Mines Regulation Act upon the operators as well as the men.

The strike at the Blackstone mine, at Foothills, Alta., has been settled by the men agreeing to resume work at $7.50 per day, without any signed contract. The strike began on March 31, when the mine owners refused to renew the agreement with the United Mine Workers. The settlement, it is understood, includes the Foot Hills Collieries.

The new budget announced in the Dominion House of Commons by the Hon. W. S. Fielding, on May 11, **provides for a duty of 0.3c. to 0.6c. per gallon on petroleum** not in its natural state and of a specific gravity heavier than 0.79. Crude petroleum remains on the free list. **This tariff has been imposed at the insistance of the coal miners and coal operators of Vancouver Island,** who have been backed by their local members to the Dominion Parliament and by the Provincial Minister of Mines. The new tariff has been aimed against fuel oil, which has been imported in large quantities to the British Columbia coast cities. Whether the coal interests which have been lobbying for this new tariff will benefit by it to the extent that they anticipate seems problematical. Consumers have become weary of high miners' wages and high prices for coal, and there has been an enormous development of hydro-electric power throughout the province to replace power plants previously driven by steam. So far as the bunkering of oil-burning steamers is concerned, it is likely that the duty will be avoided by bunkering at United States, instead of British Columbia, ports. In the new tariff the free importation of anthracite is to be amended to include lignite.

Traffic News

An important precedent is involved in the case of the Smokeless Fuel Co., Inc., versus the Norfolk & Western Ry., counsel for the carrier declare. "Conditions similar to those which existed in the spring of 1920," says the brief for the carrier, "and which led to the establishment of the Lamberts Point Coal Exchange, may arise again —indeed are believed by some to be in sight already. If so, it might be most expedient to revive the pooling arrangements to relieve those conditions and any rulings now made by the commission necessarily will have great influence upon the renewal of such arrangements."

Announcement was made at Pineville, Ky., on May 4, by Don Price, assistant to O. B. Hollingsworth, division superintendent of the Louisville & Nashville R.R. at Middlesboro, of plans for **immediately starting work on double tracking 40 miles of road from Pineville to Harlan,** which would result in the entire Cumberland Valley division from Corbin to the heart of the coal fields being double tracked, giving the road capacity for handling all the coal that can be loaded at the mines now in operation and for some years to come. Double tracking beyond Harlan is not deemed necessary as the road branches there into the Poor Fork branch going to Benham and Lynch.

The report of the Delaware & Hudson R.R. Co., which has just celebrated its 100th anniversary, shows that during 1922 there were produced by the affiliated corporations of the company, including the product of the washeries, 4,423,864 gross tons of coal, a decrease of 4,698,544 tons, or 52 per cent when compared with 1921, or, according to the report, 11 per cent of the year's total output of the Pennsylvania anthracite mines and washeries. The gross operating revenues of the company for 1922 amounted to $37,823,256, which is $7,953,603 less than in the previous year, due, according to President L. F. Loree, to the national strike of the United Mine Workers, general and miscellaneous reductions in freight rates ordered by the Interstate Commerce Commission and the increased divisions of 15 per cent allowed most of the New England railroads. Notwithstanding decreased rates and divisions, earnings from freight transportation, exclusive of anthracite and bituminous coal, increased $847,362, or approximately 6 per cent. President Loree also states that it cost $2,800,000 to keep the mines in condition during the strike, such as operating the boiler plants, pumping and ventilation. Among the items included in the decrease of $3,219,476 in operating expenses for the year as compared with 1921, Mr. Loree cites the decrease of about $491,000 in the cost of fuel consumed. Revenue from coal transportation during 1922 was $15,276,651.47, as compared with $24,876,088.55 in 1921. The company owns 322,416 shares of stock of the Hudson Coal Co., $50 par value, valued at $16,120,800, and 15,000 shares of the stock of the Northern Coal & Iron Co., par value $100, valued at $1,500,000.

During 1922 there were shipped through the Panama Canal, from the Atlantic to the Pacific, 386,922 tons of coal, as compared with 539,536 tons in 1921, a decrease of 152,614 tons. Of this amount 120,417 tons came from the United States and 217,187 tons from the British Isles. South America received 167,984 tons of the coal, Australia, 51,472 tons, Hawaii, 17294 tons and Canada 6,016 tons. During the same twelve months 43,423 tons of coke passed through the Canal to the Pacific Ocean. The British Isles was the source of 31,117 tons, and the United States furnished 4,578 tons of the total. Of this tonnage 28,164 tons went to South America, 1,228 tons to Australia and 100 tons to Canada. Australia shipped 136 tons of coal to the "east coast of the United States" during the year.

The Missouri-Illinois R.R. has asked for authority to publish rates on coal to stations on the Mississippi River & Bonne Terre Ry., St. Francois County R.R. and the St. Louis-San Francisco Ry. via routes other than the established routes without observing the provisions of the fourth section of the Interstate Commerce Act.

On account of **accumulation an embargo was placed May 11 by the Boston & Maine R.R.** on all carload freight from the New York Central R.R. at Rotterdam Junction and Troy, N. Y., for movement to and via the Boston & Maine, except livestock, perishable and railroad supplies, including company fuel.

Argument before the full Interstate Commerce Commission of the case of the **Chicago Coal Merchants Association vs. the Atchison, Topeka and Santa Fe Ry. will take place in Washington June 12.** The case of the **Winding Gulf Colliery Co. vs. the Chesapeake & Ohio R.R.,** the hearing of which was assigned for July 13 at Charleston, W. Va., before Interstate Commerce Commissioner Examiner T. J. Butler, has been cancelled and **the case reassigned for June 18 at Washington** before Examiner W. H. Wagner.

Freight rates applicable on buckwheat and barley sizes of anthracite **from Hudson Pa., to Pompton Lakes, N. J., have been found unreasonable** in an opinion handed down by the Interstate Commerce Commission. The rates were assailed by the E. I. duPont de Nemours & Co. and were unreasonable, the Commission holds, to the extent that they exceeded $1.80 per gross ton prior to Aug. 26, 1920, and to the extent that they exceeded $2.52 per ton on and after that date. Reparation was awarded.

Questions involved in the case of the **Valley Camp Coal Co. vs. the Baltimore & Ohio R.R.** will be considered at an Interstate Commerce Commission hearing at Cleveland, June 18. Examiner Donnally will preside.

On account of an accumulation the **New York, New Haven & Hartford R.R.,** on May 22, **embargoed** all freight for public delivery on tracks of the Union Freight Railroad at Boston, Mass.

Obituary

Henry Woodland, secretary-treasurer of the Allis-Chalmers Co. of Milwaukee, Wis., died of cerebral hemorrhage May 14 at his home in Milwaukee. He took sick the afternoon before. Prior to his going to Milwaukee in 1901, Mr. Woodland had been with the Gates Iron Works of Chicago. For years he had been well known in the machinery industry.

William Goodridge Evans, aged 36, died of pneumonia at his home in Pittsburgh on May 16. He was assistant to the president of the Harris Pump & Supply Co. Mr. Evans was born in Shenandoah.

Thomas B. Brown, foreman at the Virginia mine of the Lacey Coal Co., Millsboro, received injuries on May 15 from which he died later in the day. Mr. Brown was 65 years old and had been a mine foreman for 30 years. He was in the act of placing the haulage rope over a sheave wheel when injured.

Publications Received

"Modern Byproduct Coking and the Koppers Company's New Combination Oven," a paper by Joseph Becker, read before the meeting of the Eastern States Blast Furnace & Coke Oven Association in Buffalo, Oct. 5, has been printed in booklet form, with illustrations. Mr. Becker is a consulting engineer of the Koppers Co., Pittsburgh, which is publishing the paper.

Map of the bituminous coal region of Pennsylvania showing inspection districts and location of mine-rescue stations, with type of appliances used. Mine Safety Appliances Co., bulletin No. 83.

Natural-Gas Manual for the Home, by R. A. Cattell. Bureau of Mines, Washington, D. C. Technical paper 325; 30 pp.; 6x9 in.; illustrated. Contains information on how efficiency in the production and utilization of fuels may be increased and waste prevented. The manual has been prepared for those who use natural gas in their homes.

Approximately 250 cases, illustrating many phases of the questions involved in the relations of employers and employees, are presented in Bulletin 309, **"Decisions of Courts and Opinions Affecting Labor, 1921,"** recently published by the U. S. Bureau of Labor Statistics.

The printed digest of the proceedings of the **Trunk Line mileage scale hearing,** held in New York, Oct. 23-27, 1922 (including necessary exhibits), is now ready for distribution by the State Law Reporting Co., New York City.

Economic Combustion of Waste Fuels, by David M. Myers. Bureau of Mines, Washington, D. C. Technical paper 279; 51 pp.; 6x9 in.; illustrated.

Annual Report of Director of the Bureau of Foreign and Domestic Commerce for fiscal year ended June 30, 1922. Pp. 144; 6x9 in.

Coming Meetings

Iron and Steel Exposition at Buffalo, N. Y., Sept. 24-28. Association of Iron and Steel Electrical Engineers, Empire Building, Pittsburgh, Pa.

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine-Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Coal Association will hold its sixth annual convention June 19-22 at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Retail Coal Dealers' Association of Texas will hold its eighteenth annual convention at Galveston, June 11 and 12. Secretary, C. R. Goldmann, Dallas.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

The Illinois Mining Institute will hold its summer meeting on board a boat on the Illinois River, cruising between St. Louis, Mo. and La Salle, Ill., June 7-9. Secretary, Martin Bolt, State House, Springfield, Ill.

West Virginia Coal Mining Institute has set June 12 and 13 for its annual meeting, to be held at Hotel Waldo, Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Ninth National Exposition of Chemical Industries at the Grand Central Palace, New York City, week of Sept. 17. Manager, Charles F. Roth, Grand Central Palace, New York City.

The Engineering Section of the **National Safety Council** will hold its second meeting of the year on June 12 in the Board of Commerce Building, Detroit, Mich., in co-operation with the Detroit Safety Council.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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The Purchasing Agent on Coal Contracts

FOUR resolutions concerning coal were adopted by the National Association of Purchasing Agents at their recent convention, each of which is designed to promote the relations between the buyer and seller and to tranquillize the coal market. One urges that consumers find the coal that best suits their needs and endeavor to purchase that same coal each year. In other words, establish the proper channels for trade and stay in those channels instead of shopping around for every purchase, playing one shipper against another in the search for minor price concessions. Turned around, the advice is good for the seller, and some coal operators have built a successful business around the policy of satisfying their customers so well that no energy is lost in continually seeking new ones.

Coupled with this is the advice to buy and store coal in the summer months against the winter's requirements, depending on annual contracts rather than spot purchases. Contracts always have been and always will be the backbone of business and were it not for recent experience in the coal trade this advice would seem superfluous. The violent fluctuations in the price of coal in some recent periods have induced a process of guessing the market from day to day rather than attempting a long look ahead. It were well indeed for the purchasing agents to lend a hand in restoring normal conditions.

With respect to the form of contract it was resolved that "The National Association of Purchasing Agents recommend to all mining and wholesale companies that each annual contract written show the percentage such contract bears to the expected output of the mine or mines producing the coal sold and that all contract customers be kept advised of the percentage of expected output contracted."

This proposal must be interpreted not as an endorsement of the form of contract that permits the operator or shipper to shave down deliveries on the basis of car supply but rather as a plea to the shipper to put all his cards on the table and afford the buyer an opportunity to check his performance. Buyers have by no means been altogether willing to accept the modern contract stipulation that when car supply falls off and spot prices mount, the shipper has the right to put a portion of his output on the open market and at the same time force the consumer to enter that same market for tonnage sufficient to make up what the shipper holds back. If, however, that is the contract right of the producer, then the purchasing agent is asking by this resolution the reasonable right of access to the records to check the performance of the seller.

The suggestion of the purchasing agents that after a flat price is named in a contract and provision made that "the average price charged for coal under the life of the contract shall not exceed the contract price" but that monthly variations in price shall be permitted is not particularly helpful, if indeed it has any point. A contract may name a flat price or it may simply represent an agreement as to tonnage with proper provision for setting the price currently. Both forms are in common use, but to attempt to join them can avail nothing, unless it be that the seller thereby calculates to have a top price set but no bottom. It will be noted that nothing is said about the average price not falling below the set amount.

Is Conciliation to Give Way to Direct Action?

FOR some twenty years it has been the agreed-upon procedure to settle disputes between the mine workers and management in the anthracite mines of Pennsylvania by arbitration and conciliation. Matters in controversy have followed up through mine committees to a board composed equally of operators and representatives of the miners. Disagreement there has put the question to an umpire whose decision has been recognized as final. Thus have the essentials of peace been preserved in what prior to 1902 had been a most turbulent industry.

There is soon to be an election in the anthracite region, in which the issue is the continuance of the existing order. Cappellini, long a disturbing factor, is running for the office of district president of the United Mine Workers against the organization candidate, Brennan. His program, his appeal, is the settlement of disputes and grievances by strike rather than the established machinery of arbitration and conciliation. An Italian, the unofficial but acknowledged leader of some 10,000 of his countrymen in the district about Pittston, Cappellini has an established record of successful outlaw strikes. He is admitted to have been behind the persistent outbreaks at the collieries of the Pennsylvania Coal Co. that characterized 1920 and 1921.

Despite the handicaps under which it has worked, the absolute adherance to customs and practices of a decade ago, the Conciliation Board, established by the Roosevelt commission, cannot be judged otherwise than as successful. That it represents a perfect arrangement neither side will contend, but it has functioned as a court of last resort and its decisions or those of its umpire have been quite generally respected. It seems to many that the time has come to extend its powers and functions to embrace matters of equity as well as interpretations of contract, but this would put too great a strain on its simple machinery. Better procedure would be to modify the terms of the contract, to negotiate and agree mutually on changes in working conditions and local wage rates.

An insurgent victory in Brennan's district can mean but one thing—that the already sadly ruffled feathers of the dove of peace will be further plucked. Trouble will perch on the banner of the United Mine Workers and strife and strike will further disrupt the production of anthracite. On June 26 the tri-district convention of the hard-coal miners' union meets to formulate

policy and demands on the operators for the contract that is to replace that expiring Aug. 31. If Cappellini sits with Golden and Kennedy it must be admitted that at best the prospects are for a considerable demand for anthracite substitutes in the East next winter.

There is as yet no reason to suppose that a peaceful settlement and new contract cannot be arrived at without an organized cessation of work; there is no occasion for predicting a strike on Sept. 1, but there is for fearing that trouble will attend the growing power of outright radicalism in the ranks of the hard-coal workers. It is small consolation to note that the Lewis policy of militancy is in a fair way to reap some that it has sown.

Desulphurizing Coke

IRON has an unfortunate way of taking up sulphur, and when it has acquired it the two are not easily separated. Bituminous matter always contains more or less sulphur. Unfortunately most of our American coals have more than we would desire in view of the fact that we have to use them for the manufacture of good commercial iron.

The coals that do not have an excess of sulphur rapidly are becoming exhausted, and we are beginning to realize that it is impossible to wash combined sulphur out of many coals because it has not segregated itself in sufficiently large masses and in some cases is not segregated at all, being part of the resins and humus of the coal.

As some coals that badly need desulphurizing cannot be deprived of their sulphur the question naturally has been raised, Cannot sulphur be taken from the coke? The coking process having modified the sulphur constituents under reducing conditions, air being absent perhaps coke by being heated in the presence of air may have some, at least, of the rest of the sulphur removed. Thus we would duplicate the reasoning of sewage purification, which utilizes the combined efforts of anaërobic and aërobic bacteria.

Unfortunately, as Arthur R. Powell shows in the article published in *Coal Age* last week, little hope exists that oxidation will make a sufficient change in the sulphur content to justify thus processing it. The sulphide of iron turns to iron and free sulphur, but that freedom is only relative. The sulphur is freed from the iron but held physically by the coke and consequently may recombine with the iron in the reducing zone near the mouth of the furnace to form iron sulphide.

In the iron-sponge zone the temperature once more liberates the sulphur, which is absorbed either by the iron or the lime of the charge. Whether iron sulphide or free sulphur enters the furnace makes no difference —the result is the same. The sulphates also are quite likely to be reduced, and hence sulphur, when it is in the form of a sulphate, may be regarded as almost as undesirable as when it appears as a sulphide.

The only form of sulphur that seems free of objection in the furnace is the sulphur in solid solution in the carbon. Even in this form its relative harmlessness does not appear proved. This sulphur in one of the cokes described by Mr. Powell runs 1.90 per cent, the other sulphur totaling only 1.30 per cent. As in three runs the aggregates of these other sulphurs were reduced to 0.87, 0.72 and 0.81, or from 33 to 45 per cent, it would still seem that an improvement worth while has been effected. With the other kind of coke the reduction in the sulphur, excluding solid-solution sulphur, was from 0.47 to 0.43, 0.36 and 0.31, the reduction varying from 10 to 35 per cent, which is a less significant quantity.

The Bureau of Mines is to be commended for its inquiries into the desulphurization of coke. They are being extended so as to embrace the effect of steam on that fuel product. It is to be hoped that in view of the importance of the subject, investigation will go on regardless of results, especially if they are no more discouraging than those in Mr. Powell's article.

"Fiddling While Rome Burns"

THIS time-worn phrase has lost none of its meaning with the passing of the centuries. It needs no amplification and no extended explanation.

It has been reported that the National Coal Association will have its annual convention this year at Atlantic City and that the usual two-day business session will be replaced with a four-day jamboree topped off with a boxing match.

It will hardly be seriously contended that the bituminous-coal operators of this country, who make up the constituency of this organization, are mentally incapable of taking part in a serious discussion of the problems that confront them, nor is there the slightest ground for assuming that the majority of these men are unappreciative of their present situation. True enough, for the moment there are no pressing problems of price, of labor, of distribution. Summer is here and the strain of a winter's coal troubles are past, but the strained relations between the public and the operators, the public and the miners and the operators and the miners have not been relieved. The country is impatiently waiting for the industry and the U. S. Coal Commission to tell it what can be done about high prices and periodic shortages.

This industry, which Lawrence Abbott recently said is the "worst hated" in the land, is on trial. The public's representatives are sitting in Washington seeking facts and hoping for interpretations of these facts that will lead to sane thinking about coal and constructive suggestions for the conduct of the industry. The men of the industry, above all others, are urged to come forward with help. Is a meeting of good fellows in the carnival spirit to be their best answer? Or is it that all that can be said has been told? Some forceful truths about the conduct of the United Mine Workers have been spread on the record but no scalps are yet hanging to the belt of the Special Committee of the Bituminous Coal Operators. It is time to beat the tomtoms and have a carnival when the victory is won. A council of war is more appropriate while the fight is on.

KANSAS, THE STATE OF CARRIE NATION, Sockless Jerry Simpson and the blue-sky law, will try anything at least once. It never hesitates officially to make an effort in any direction. But in the matter of opening its coal mines when there is none to buy the coal, in inducing railroads to reduce rates in summer to make coal more attractive financially, and in convincing consumers they should pile up storage heaps when they are afraid such heaps will burn spontaneously, the ambitious state unfortunately is finding out that some nuts are hard to crack. Thus far Kansas has not been able to do in a week what the rest of the nation has found impossible in a generation. But there is hope for the nation.



Steps in Recovery of Anthracite from Waste Piles

Early Mines Wasted All Coal Smaller Than Chestnut—First Waste-Pile Washers Produced Only Pea Size and Smaller—Crushers Now Break Up Larger Coal and Wash It—Coal Unspoiled by Time

By William Griffith
Consulting Engineer, Scranton, Pa.

THE use of anthracite for domestic purposes originated in the Wyoming coal fields in 1808, after the famous discovery by Judge Fell that with natural draft the coal would burn in a grate. For many years after that time, however, no method or process was known for consuming the fine coal which on a fuel bed filled the openings or draft spaces between the larger lumps and choked the fire, causing it to die out. Therefore in the early years of the anthracite trade only the "run-of-mine" coal larger than what we now call the chestnut size was sold or shipped.

The coal was blasted down in the mine and the sizes larger than chestnut were stripped from the fine coal with rakes and hauled out in mine cars. All the coal of finer size—chestnut and smaller—was left in the mine as waste. The marketable coal was then shipped, large and small lumps together, for a number of years, until the market demanded that the larger lumps be separated for engine and blast-furnace fuel and that the smaller ones be reserved for domestic purposes. Therefore screens were constructed at the mines to separate the run-of-mine coal into more acceptable sizes.

Almost 20 Per Cent of Coal Thrown Away

But the market soon demanded a larger proportion of domestic coal than the screening process produced; therefore about 1852 the Delaware, Lackawanna & Western R.R. Co. began breaking some of the larger coal and preparing it in sizes for domestic use. This company was followed by the Delaware & Hudson Co., and later by all the other operators.

This breaking down of the larger sizes produced a large percentage of small, unsalable coal at every mine (about 15 to 20 per cent) which had to be thrown out as waste at an expense of 5 to 15c. per ton. Thus began the old-time culm piles which though for years objects of great interest to those visiting the coal fields were a great nuisance and loss to the coal operators, who knew of no way to dispose of the good coal in them.

Thus originated also the higher prices asked in the market for domestic sizes of coal over the run-of-mine or smaller sizes, because the building of expensive breakers, filled with machinery, greatly increased the cost of the coal, the more careful preparation of the product involved much labor and the breaking of the coal into domestic sizes occasioned much loss. These additional costs were chargeable directly and entirely to the preparation of coal of domestic size. The waste piles consisted of about 80 to 90 per cent of pure coal of sizes too small to be utilized by any then known method and of from 10 to 20 per cent of slate and bone refuse picked out of the coal by boys as it passed through the breakers.

But as time passed progress was made in the art of burning fine anthracite. Methods and machinery were perfected for burning first the coarser, and later the smaller particles of culm, so that about 1867 we find pea-coal sizes returned separately for the first time in railroad toll reports. In 1887 buckwheat coal became useful.

About this time the accumulations in the culm piles attracted such public attention that the Legislature of Pennsylvania in 1889 passed "An Act to create a commission to investigate the waste of coal mining, with a view to the utilization of such waste, and making an appropriation for the expense thereof." This commission, appointed by Governor Pattison, rendered its report in 1893.*

The commission suggested purposes for which small anthracite was useful, methods of using it, etc., and one of the direct results of the commission's activities and its report was the immediate invention of several important devices for consuming fine anthracite. In 1895 rice coal was shipped for the first time, and in

Note—Headpiece shows a modern culm bank which has been deposited under water. This is clearly shown by the stratification of the material.

*The writer is the only surviving member of this commission.

1896 began the first efforts for conserving the smaller coal from the waste piles.

For a number of years prior to 1896 most of the coal breakers throughout the anthracite region had been equipped for preparing the smaller sizes and had been shipping increasing quantities as rapidly as the growing demand required. Therefore the waste of small sizes gradually ceased. They no longer went to the waste pile, but were burned at the mines or shipped from the breakers directly to market, the same as other sizes, and consequently the composition of the waste from breakers to culm piles gradually changed.

Instead of 80 to 90 per cent of the material consisting of small-sized pure coal, as formerly, the more modern waste piles contained only the coarser waste—slate and bone, lumps in part of slate and in part of coal—and a percentage of pure coal which passed to the waste pile on account of the imperfect cleaning processes in the breakers. The percentage of merchantable coal of domestic sizes which went to the waste pile varied with conditions and equipment.

The low prices then universal tended to produce an indifference to waste and a reluctance to expend capital for the reconstruction of plants. For many years the standard method of cleaning domestic sizes was to have boys pick out the impurities as the coal passed them in chutes. The coal sometimes being wet, made it difficult to select the impurities that should be thrown out, and the results were correspondingly wasteful. Gradually machinery has replaced the breaker boy, and the proportion of good fuel sent to the waste dumps has decreased; but the accumulations of good coal of domestic sizes left in the waste dumps amounted to millions of tons.

From the foregoing we note therefore that anthracite waste thus far was of two quite different kinds: First, the old-time culm pile, composed of 80 to 90 per cent of small coal of pure, merchantable quality and 10 to 20 per cent of slate and impurities. At the present day most of the rich waste piles of the earlier days have been worked over and the coal largely conserved and shipped to market. The old-time rich culm pile no longer exists.

Second, the more recent waste pile, which can still be found throughout the region. It consists of the slate and bone, and of good coal some of which is inevitably wasted owing to the imperfection of our processes of separating impurities from the coal. Added to these also is the secondary waste from washing the old-time culm pile, consisting of all sizes above pea coal contained in the original pile, plus the fine dust or silt residue of the washing process.

Early Conservation—The first efforts to conserve commercial coal from the old-time piles began about 1896 and later, and were made by individuals in search of economical processes. These experiments at first were disappointing and costly, but gradually ripened into an economical standard process which was universally adopted. Small screening and washing plants were erected costing from $5,000 to $20,000 each, depending on the quantity of material and capacity of the plant. In these the contents of the pile were screened with the aid of water, no attempt being made to break down the larger lumps or to screen for coal of domestic size, all of which latter was thrown out as part of the secondary waste. Only the pea coal and the smaller steam sizes were saved.

As the old culm piles were gradually worked over and disappeared from the landscape, there still remained the refuse from the breakers and the secondary waste from the culm-pile washeries, many of which were known to be rich in domestic sizes of pure coal, and all of which, if it could be cleaned and separated from the slatey refuse, would provide much excellent and valuable fuel for both steam and domestic purposes, for be it known that anthracite coal in piles does not slake or deteriorate perceptibly with age, as do some grades of soft coal. In proof of and to emphasize the latter fact I give in Table I an analysis of a sample of pure coal which I recently took from an old waste pile deposited about 1855, and therefore exposed to weath-



WASHERY AT WINTON, PA., OWNED BY THE RHONDDA COAL CO., OF SCRANTON

This is a typical washery of the better class. It began operations in December, 1917, and has shipped 466,000 tons of coal to market to date. A culm bank is a pile of good coal, bone and rock. The coal is as good as when mined, but it cannot be separated without the necessary equipment. Yet some of the fly-by-night companies have delivered culm to market imperfectly cleaned and even entirely uncleaned. The size of this breaker will show why; they seek to enter the market without meeting the necessary expense of erecting and operating such a building, which with the machinery it contains is a costly investment.

ering for 65 or 70 years, and an analysis of a sample of a fresh-mined pure coal of the present day, both made by McCreath & Son, of Harrisburg, Pa.

TABLE I—ANALYSIS OF CLEAN WASTE-PILE COAL AND CLEAN FRESH-MINED COAL

	Coal Mined in 1855	Fresh-Mined Coal
Moisture	4.640	3.040
Volatile matter	8.677	6.360
Fixed carbon	81.820	84.066
Ash	4.863	6.534
	100.000	100.000
Sulphur	0.645	0.772
British thermal units, approximate	13,902	13,637

These analyses prove conclusively that at this particular point the old long-stored coal is still the better fuel.

In 1915 the increasing scarcity and advancing prices of anthracite, coupled with improved machinery and cleaning processes, stimulated experimental efforts to recover valuable coal from some of these slate and refuse piles, and, as in the case of the old-time culm pile, these later experiments, though costly, eventually resulted in the evolution of the modern washery plant for winning good, merchantable coal of both domestic and steam sizes from the modern slate piles and the secondary refuse.

The Modern Washery—The modern coal washery in order properly to prepare coal for domestic and steam purposes must be equipped to handle rapidly and dispose of daily large quantities of slate, rock coal, etc., separating from it the merchantable coal and shipping it prepared to conform with a standard at prices acceptable to its customers. This can be satisfactorily accomplished only through the use of much costly machinery, largely of recent invention, and of greater efficiency than the old-time screening and hand-picking methods.

Roughing plants at the pile separate the coarse refuse and immediately dispose of it, only the richer grade of material going to the washery building, which must be equipped with expensive machinery—rolls for breaking down the large lumps, and modern screens, jigs and other separating devices for the sizing and cleaning of coal for domestic purposes, and vibratory tables and other cleaning machinery for preparing the buckwheat and smaller steam sizes.

Consequently an efficient modern washery is a costly investment. I happen to know the cost of several such plants in the Wyoming-Lackawanna fields. Three of these washeries cost about $120,000 each, and one over $200,000. Elsewhere in the anthracite field there are efficient plants, some of which probably cost much more. All of them have been in operation for several years, producing large quantities of coal—from 300 to 1,000 tons each daily. These washeries are constructed and arranged for separating clean coal from the mass of refuse, and much care is taken to produce as clean a product from these waste piles as that obtained from fresh-mined coal. These first-class plants produce chestnut and pea for domestic use, cleaned to the standard which has been maintained and which consumers for many years have found acceptable.

In order to drive home these facts I give in Table II analyses by McCreath & Son of samples I took during May, 1923, one being a sample of washery pea coal from one of the first-class washeries in the Lackawanna valley and one, an average sample of pea coal prepared from coal just mined.

TABLE II—PEA COAL FROM A WASHERY AND ONE FRESH FROM THE MINES

	Washery Pea Coal	Pea Coal Fresh from Mine
Moisture	3.660	2.930
Volatile matter	8.526	7.552
Fixed carbon	69.587	72.259
Ash	18.227	17.259
	100.000	100.000
Sulphur	0.681	0.641
British thermal units, approximate	12,116	12,251

Although this washery coal, as the analyses prove, is almost of equal quality with fresh-mined, it naturally does not command quite as high a market price, therefore this coal has been selling during the past winter at an average price 5 or more per cent less than the average published circular price for independent coal.

The conservation of coal from waste piles of anthracite has been for a long time and is now an important industry. Tables I and II show, what is well-known, that anthracite when stored does not deteriorate with age. The coal now taken from these slate piles, though it has lain exposed to the weather from 10 to 30 years, is as good a fuel as it ever was. In the words of another: "The story of the recovery of this coal is one of the most striking examples of the conservation of

Slate Bank and Slush Pond

This is at the Marvine colliery of the Hudson Coal Co. About 100,000 tons of refuse is removed in a single year's operation. The modern waste pile is lean indeed compared with the rich piles of earlier years which contained coal thrown away to save the cleaning that the blow of a sledge or a pick would have effected, and coal rejected because smaller than chestnut and in some instances coal of chestnut size also.



natural resources and of the elimination of waste in the great industries that the history of our country records." If it were not for the lower-priced washery product of the past few years it is probable that the people would pay even higher prices for fresh-mined coal than have already obtained.

In conclusion, I wish to admit frankly that in the coal industry, as in all other industries of the country, there are unscrupulous persons. Some of the small, independent so-called washery operators have been shipping absolutely "rotten stuff" whenever the coal trade was in such straits that an inferior product could be sold. To prepare anthracite properly for the market is costly. When people without efficient and expensive equipment attempt to ship coal from waste piles they of necessity must ship dirty coal or refuse. It is recorded that Mr. Haldeman, investigator for the fuel distributors, found a number of shippers active in the production and sale of unburnable coal, among whom were "a former prize fighter, a former saloon keeper, an ex-convict, and others of questionable repute." In one instance it is reported that no attempt was made to separate coal and impurities. The "run-of-the-bank" was crushed and sized, run into bins, and then shipped to market. I cannot understand why legal action has not been taken ere this against individuals thus manifestly conducting a fraudulent business.

An attempt has been made recently through sensational and intentionally misleading propaganda to cast the onus for this illicit business upon the legitimate coal-washery operations. The reputable operator refuses to accept this undeserved odium. He is engaged in a legitimate business requiring a large investment of capital, is producing a uniformly good product of standard grade. This is sold by honest methods, at prices satisfactory to customers of long standing, who may with only casual inspection easily distinguish this standard coal from the meretricious trash already mentioned.

Big Losses in Improper Fan Operation*

By J. R. Robinson
Consulting Engineer, Pittsburgh, Pa.

MINE fans are of two types: the disk or screw-propeller type and the centrifugal. The disk fan is essentially a wheel with blades instead of spokes, each blade being curved like those on the screw propeller of a steamship. It is mounted on a shaft and set within a circular casing which is made just large enough that the wheel can rotate without interference.

The disk fan usually is erected in a drift mouth and in such a position that the axis of the wheel is in line with the airway. It is so bratticed about the casing that no air can pass without going through the wheel. Thus when the fan is set in motion the atmospheric pressure is on the outside of the brattice and the maximum mine pressure is on the inside.

The air is assumed to pass through the disk fan in a straight line parallel to the axis of rotation of the wheel, but in practice a large part of the air passing through the wheel is thrown outward at varying angles against the casing and against the sides, roof and floor of the mine. Where the pressure is high a large part of the air returns again and again through the wheel near its center.

Certain parts of this air travel in an elliptical curve and consequently do not enter the mine. Therefore they perform no useful work. Owing largely to this feature of the disk fan it does not economize the power it uses and therefore should not be employed where large quantities of air and high pressure are required.

This type of fan is used mostly for development work and in mines covering a restricted acreage which require only a small quantity of air at a low water gage. Sometimes it is used on larger mines where conditions permit it to be effective as a ventilator, but, though it may give good service, it is not economical in the use of power.

The Shoemaker Coal Co.'s mine at Lilly, Pa., is ventilated by an 8-ft. disk fan, chain-driven from a 60-hp. two-speed motor. At my visit to this mine last March the fan was passing 76,450 cu.ft. of air per minute at a 2.5-in. water gage. This is an unusual performance for a disk fan. The power in the air using the well-known formula was

$$\frac{76{,}450 \times 2.5 \times 2.5}{33{,}000} = 30.11 \text{ hp.}$$

The power passing through the motor as read by the wattmeter was 83.4 hp. The unit efficiency therefore would be

$$\frac{30.11}{83.4} = 36.1 \text{ per cent}$$

which is exceptional for a disk fan, considering that it is working against a 2.5-in. water gage.

In general the observations I have taken on disk fans have shown unit efficiencies of less than 20 per cent—in some cases as low as 5 per cent—so that the work of this disk fan is unusually good, but a good centrifugal fan made to suit the conditions of this mine would not use more than 45 hp., so that by using a disk fan much power is being wasted.

Centrifugal Fan for Volume and Pressure

The centrifugal fan has many shapes, varying from the old-fashioned paddle wheel of the Guibal fan to the most modern multivane wheel, but all of them work on the same principle—centrifugal action. In this type of fan the air is taken into the center of the wheel parallel to the axis of rotation and passes through a spiral curve leaving the wheel at the tips of the blades at a right angle to the axis of rotation. This action of the air is due to the rotation of the wheel on its axis and the form of the vanes or blades of the fan wheel.

The fans most generally in use are of this type, because when thus constructed they have a capacity for producing high pressure and are economical in the use of power. If properly designed to meet the conditions of quantity and pressure, the centrifugal fan can be made to provide any desired quantity of air at the pressure or water gage that the mine may require, and will do the work with a mechanical efficiency of upward of 70 per cent. That is, it will do so if the fan is designed to meet the known conditions of a given mine.

It does not follow that a fan made to suit certain known conditions, which meets these conditions successfully, and works with 70 per cent mechanical efficiency or over, will work with an equal efficiency when the conditions are changed.

As an illustration of this I will cite a mine that came under my observation recently. This mine was being ventilated by a multivane fan of a standard make. The maker guaranteed 75 per cent efficiency for the fan

*Address delivered before Coal Mining Institute of Fifteenth Bituminous District of Pennsylvania, May 19, at Barnesboro, Pa.

when working against conditions represented by 80,000 cu.ft. of air per minute at 2-in. water gage. The fan was belt-driven by a 50-hp. direct-current motor.

The fan was passing but a little more than half the quantity mentioned, and yet the motor was slightly overloaded. The officials of the coal company were displeased because they were unable to speed the fan any more with the present motor. Upon investigation I found that the fan was well constructed and well installed. I also found that the quantity of air passing through the mine was 46,000 cu.ft. per minute, that the water gage was only 1.4 in. with the fan at full speed and that the motor was carrying a load of 55 hp.

Now you will observe at a glance that both the quantity of air passing and the water gage were less than expected. You will also note that the mechanical efficiency of the unit was low.

The power in the air =

$$\frac{46{,}000 \times 1.4 \times 5.2}{33{,}000} = 10 \text{ hp.}$$

and the horsepower in the motor is 55. The mechanical efficiency therefore would be

$$\frac{10}{55} = 18 \text{ per cent}$$

This fan gave such poor results that the management expected that I would condemn it. Let us look into these observations and see where the trouble lies. If the fan had been speeded up until it passed 80,000 cu.ft. per minute through this mine the water gage would have risen to considerably more than 2 in., for it changes as the square of the quantity of air passing through the workings. We should therefore have the following equation:

$$80^2 : 46^2 :: x : 1.4, \text{ or } x = 4.23 \text{ in.}$$

You will observe that to pass the required quantity of air the water gage must be made twice that for which the fan was designed. When the fan was running at a speed to make the required water gage the mine was unable to take as much air as the fan was attempting to pass, so that the air was being taken into the wheel, and a large portion of the air was backing out of the inlets.

The motor was performing work on the air that was thrown back through the wheel, but no measurement of it could be taken, as only that portion of the air that passed through the mine could be measured as to quantity and pressure. Hence the unit was wasteful, but it was not the fault of the fan, for the maker of it had designed it for certain conditions, and when it was put to work the conditions against which it had to operate were not those for which it was designed; therefore economy could not be expected.

Surface Ducts Should Be Kept Tight

The leaks that so frequently occur between the fan and the point of measurement within the mine are often overlooked. This makes many fans appear to be wasteful of power when really they are efficient. It is of the utmost importance that the connection between the mine and the fan shall be practically free from leakage, for imperfections in sealing pass the air made by the fan from the duct or airshaft to the atmosphere in the case of a blowing fan, and in the reverse direction in the case of an exhaust fan. This occurs at the maximum speed at which the air travels, for the pressure at the leak always is more than the mine pressure. I will give you an illustration of this that recently came under my observation.

A modern multivane fan was installed at a mine to pass 110,000 cu.ft. of air per minute at a 2-in. water gage. It was speeded to run 240 r.p.m. and was belt-driven from a 50-hp. motor. It was a drift mine, and the fan was placed about 60 ft. from the first timbers in the coal. The duct connecting the fan with the mine was of wood. When the fan was running at full speed, only 81,000 cu.ft. of air per minute passed through the mine. The motor was carrying a load of 83 hp. The motor would heat if continually run with a load so much exceeding its rating, and it had to be stopped frequently to cool down.

The duct was then covered with concrete, and as a result measurements in the mine showed a current of 109,000 cu.ft. per minute at 2 in. water gage. The motor was using 46 hp. The power in the air =

$$\frac{109{,}000 \times 2 \times 5.2}{33{,}000} = 34.3 \text{ hp.}$$

and the horsepower in the motor is 46. The mechanical efficiency therefore is

$$\frac{34.3}{46} = 74.57 \text{ per cent,}$$

which is a good figure for a belted unit.

The power saved was the difference between 83 and 46, or 37 hp. This power at 1.5c. per horsepower-hour for a full year—the mine was running full time with its fan at full speed—would be

$$37 \times 0.015 \times 24 \times 365 = \$4{,}761.80$$

Nearly five thousand dollars a year was going to waste in leaks.

British Government Will Hold Contest of Mine Locomotive Manufacturers

ANNOUNCEMENT has been made by the Secretary for Mines of Great Britain that Charles Markham, colliery director, of Ringwood Hall, Chesterfield, has placed at his disposal a sum of £1,000 to be offered as a prize for the best type of electric storage-battery locomotive for use in deep and hot coal mines in place of "pit ponies." The condition to govern the competition are now being drawn up by a panel of judges representing the coal-mining industry, the Institution of Electrical and Mining Engineers and the Mines Department of Great Britain.

The competition will be open to manufacturers of any nationality, but the locomotives selected for trial will be tested in Great Britain. Several types of locomotives of this description are, of course, already being made in Great Britain, but it cannot be said that they are in extensive use in British mines. It would appear, says *The Engineer*, of London, England, to which we are indebted for this information, that the battery is the principal item requiring improvement.

The need for a suitable battery, it would seem, could be satisfactorily met by the manufacturers of storage batteries in America, but it is likely some redesign of American locomotives might be necessary to meet the needs of the lighter cars in use in Great Britain and the correspondingly lighter track. Until the formal announcement has been received, speculation is premature, but it is quite probable that a locomotive to meet English conditions should be designed along slightly different lines from one intended to satisfy the American market.

"Most wage earners," says Roger Babson, "spend all they get." It wouldn't be so bad if they earned all they get.—*American Lumberman.*

How Steam Production Costs Were Reduced in a Hand-Fired Return-Tubular Boiler Plant

Changes Made in Boilers Were Small and Inexpensive—Modifications of Firing Methods Require Slightly Less Work on Part of Firemen—Cost of Operation Greatly Reduced

By A. R. Mumford
Assistant Fuel Engineer, U. S. Bureau of Mines

THAT greater economies and higher efficiencies are possible with a large number of boiler installations needs little argument. The methods for obtaining these results are varied, due to the many different factors involved. There are certain elements about every boiler plant and its operation, however, which when neglected or improperly directed or arranged have a marked affect upon the efficiency of the plant.

Investigation conducted on a hand-fired return-tubular boiler plant showed that before making some simple changes to the furnaces and method of control of the boilers the average cost of fuel to produce 1,000 lb. of steam was $0.5287, while after the changes had been made the cost was $0.3540, or a saving of more than 30 per cent.

The boiler upon which the investigation was made was a rather common type set up in quite the usual way; it was 18 ft. long, 56 in. in diameter, set 27 in. above the grates, 6 ft. deep and 5 ft. wide. The bridge wall rose to within 5 in. of the shell of the boiler. The space behind the bridge wall had been filled in so that the floor of this space was only 20 in. below the shell of the boiler. This form of setting is common and results in smoky and incomplete combustion when bituminous coal is used for fuel.

In the original installation the combustion space was small, and the gases were exposed to the cooling action of the boiler during all of their passage through the setting and, what is perhaps more important, were not subjected to any thorough mixing action. These conditions made it impossible to burn bituminous coal without producing more smoke than was permitted under the local regulations governing the emission of smoke. For this reason, pea-size anthracite was burned during the greater part of the day, and the plant was able to burn bituminous coal only at night, when the demand for steam was somewhat less than during the day and when the smoke could not be seen.

The presence of black smoke in the gases issuing from a stack indicates that the gaseous products formed during the combustion of the coal are not completely burned. In order to burn gases completely it is necessary to mix them with a certain proportion of air while they are so hot that the resulting mixture will be above its ignition temperature. There are limits to the amount of air that can be mixed with a certain amount of any combustible gas to form an inflammable mixture, and increasing or decreasing this amount of air above or below these limits renders the mixture non-inflammable, so that it may be impossible to ignite it. The rate of combustion of the inflammable mixture will vary with the proportions of gas and air, and it is desirable to mix the gases rapidly with air in such proportions that they may burn quickly in the furnace and combustion chamber. Thus the problem to be solved before the use of anthracite could be discontinued and bituminous coal used at all times without violating the regulations governing the emission of smoke, was to burn completely the gases formed during the combustion of bituminous coal before they left the setting.

The principal difficulties presented by the original setting were the small volume of the combustion chamber, which shortened the time allowed for the combustion of the gases, and the absence of any mixing device in the path of the gases which would have caused mixing of the combustible gases and air by changing the direction of flow of the gas stream and by changing its velocity at some point or points in its path. The first obstacle to overcome was the small volume allowed for the combustion of the gases. On account of mechanical difficulties involving excessive cost, it was not feasible to alter the relative position of the grates. The combustion chamber beyond the bridge wall, however, had been built up from a concrete floor with filling and a layer of loosely laid brick, and by removing this filling the distance of the floor from the shell of the boiler was increased from 20 to 30 in. This increase in combustion-chamber volume permitted the gases to move at a slower speed for a given rate of combustion and mixture with air, and therefore allowed them more time to burn completely.

Overcome Second Obstacle to Combustion

The second obstacle to complete combustion was the absence of any mixing device in the path of the gases. This was easily overcome by the installation of two semi-obstructing arches, one over the bridge wall and one in the combustion chamber. The vertical distance between the shell of the boiler and the top of the bridge wall was only 5 in. in the original installation, and this distance had to be increased to 10 in. before an arch could be placed over the bridge wall. This arch over the bridge wall closed off the former opening around the shell of the boiler and reduced the area available for gas passage from 5.6 sq.ft. to 1.7 sq.ft. The arch was extended for 3 ft. from the front edge of the bridge wall in the direction of gas flow, to provide hot firebrick surface for the ignition of any combustible gas-air mixture not previously ignited. The reduction in area caused a temporary increase in velocity, which resulted in a turbulent flow, so that mixing was greatly assisted. The increase in velocity and the mixing action were accomplished at the expense of the available draft, and this is the determining factor that governs the extent to which such obstructions may be employed.

Just beyond the bridge wall the area available for gas passage is 12 sq.ft., an increase of 10.3 sq.ft. over that available above the bridge wall. This increase in area considerably reduces the velocity of the mixture

of gases which have come through the restricted area and so gives them a longer time to burn. The deflection arch in the combustion chamber was of single-span construction, extending from the floor to the boiler, and leaving only a semicircular opening 4.15 sq.ft. in area next to the floor of the combustion chamber. This deflection arch caused the gas stream to turn toward the floor of the combustion chamber and further assisted in mixing by causing a second contraction, increase in velocity, and expansion of the gas stream. These changes in furnace arrangement in connection with the introduction of an improved method of firing permitted the substitution of bituminous coal for anthracite at a reduction of approximately $3 per ton in delivered price.

Observations made upon the furnaces and method of firing before changes were made showed that the operation of the boilers was left entirely to the firemen as long as sufficient steam pressure was maintained. This method resulted in irregular firing and high fuel losses because the firemen added fuel or worked the fires only with a view to maintaining the steam pressure between 100 and 110 lb. The dampers on all the boilers usually were wide open and when the steam pressure showed any indication of too closely approaching the blow-off point the firemen reduced the rate of combustion by closing the ashpit doors, and if the steam pressure continued to rise the rate of combustion was further reduced by opening the fire doors.

Evils of Closing Ashpit Doors

Closing the ashpit doors to reduce the combustion rate is an old and generally recognized inefficient practice, and usually results in detrimental affects such as overheated grate bars, increased clinker formation and increased flue-gas losses. Opening the fire doors to reduce further the rate of combustion not only produces the same evils that result from the closing of the ashpit doors but in addition cools the boiler unequally and puts a local stress on the boiler which, especially with fire-tube boilers, increases the wear and repairs necessary on boiler and brick work.

The evils resulting from the closing of the ashpit doors are caused by the changes in the draft throughout the boiler. When the ashpit doors are open the draft available at the damper of each boiler is used to draw air into the ashpit and through the grates and fuel bed, thereby burning the coal; to move the products of combustion through the boilers and to draw air into the setting through any openings in the fire doors or cracks in the brickwork or boiler casing. This influx of air through cracks in the brick work or boiler casing is objectionable and should be prevented by keeping the brick work and casing airtight. When the ashpit doors are closed the amount of air entering under the grates is greatly decreased, thereby decreasing the rate of combustion and the quantity of the products of combustion flowing through the boiler. Closing the ashpit door also increases the draft throughout the setting and thereby increases the infiltration of cold air into the setting through cracks in the brick work or openings in the furnace doors, and thus cools the products of combustion and increases the flue-gas losses. When the amount of air pressing up through the grates and fuel bed is reduced, the grate bars and the ash resting on them become overheated by conduction of heat from the fuel bed. This overheating melts the ash, forming clinker, and causes the grate bars to burn.

In Fig. 1 the flue-gas losses and excess air are plotted against boiler rating for two methods of boiler control. The solid curves show the variation in gas losses and excess air when the boiler was controlled by the ashpit doors, and the dotted curves show the variation in gas loosses and excess air when the boiler was controlled by the damper. The difference in heat loss due to the presence of carbon monoxide in the flue gases, shown in the bottom set of curves, is not wholly due to the method of control of the boilers but to a combination of the method of control, the furnace modifications and the method of firing. The effect of the increased mixing action is perhaps most important in the reduction of this loss due to carbon monoxide. The trend of both curves is similar, but the solid curve is higher at all ratings and the loss increases far more rapidly as the rating increases under the original conditions than it does under the modified conditions.

The difference in heat loss due to the temperature and composition of the dry flue gases, shown in the middle section of the chart, is due almost entirely to the method of control of the boilers. The curves are similar in only one respect, and that is they tend to become parallel to the baseline as the rating increases. The solid curve, showing the dry-gas loss when the boiler was controlled by the ashpit doors, rises rapidly with a decrease in rating; whereas the dotted curve, showing the dry-gas loss when the boiler was controlled by the damper, is more nearly level and descends as the rating decreases. The probable reason for the separation of the curves at higher ratings is in the improvements made in the method of firing, which was more regular under the improved conditions and consequently reduced the fluctuations in the proportion of air to combustible gas.

The curves showing the variation in the per cent excess of air for the two methods of control are similar to the corresponding curves of dry-gas loss. The solid curve rises rapidly as the rating decreases, whereas the dotted curve descends as the rating decreases.

In general, with ashpit door control practically the same draft at the breeching is available at all rates of combustion, but that part of the available draft utilized for actual combustion decreases with the rate of working the boiler. The excess of draft over that utilized for combustion draws air into the furnace and setting above the grates, thus increasing the excess of air and dry-gas losses as shown. With damper control the available draft is reduced by shutting the damper so that the draft available to the boiler is enough for the desired rate of combustion only, and no excess exists to increase the stack losses.

The Fireman's Criterion of Practicability

Perhaps the best criterion that can be used to judge the practicability of a firing method, from the standpoint of the firemen, is the amount of work he must do to produce a given amount of steam. If a new method requires more actual work on the part of a fireman, it is quite likely that the method will be opposed, but if the fireman can be convinced that the new method requires no more work, and perhaps less work, it will be more readily acceptable.

In order to determine whether a fireman had to perform more actual work per 1,000 lb. of steam produced when he fired according to an improved method than when he fired without any attempt at regularity and without care, a record of the work done by the fireman on a test with anthracite under the original operating

conditions and with bituminous coal both under original operating conditions and improved operating conditions was made. The results showed that the average work in minutes required of a fireman per 1,000 lb. of steam produced with anthracite was 2.69 minutes; with bituminous coal 1.98 minutes under former plant operation, and with bituminous coal 1.94 minutes under the new firing method. To produce steam with anthracite requires more work on the part of the fireman than with bituminous coal, because the anthracite contains more ash and has a lower heating value per pound than bituminous coal. Consequently, the higher ash content of anthracite necessitates more frequent cleaning and, on account of the lower heating value, a larger quantity must be fired to produce 1,000 lb. of steam.

The new method of firing requires approximately the same actual work per 1,000 lb. of steam produced as did the former method with bituminous coal as a fuel. However, the new method also requires supervision until the firemen become accustomed to firing small amounts regularly and to keeping their fires in good condition at all times. This supervision is the price to be paid for more complete combustion without objectionable smoke, and is equivalent to a saving of $0.0685. or 16 per cent, in the cost of fuel per 1,000 lb. of steam.

Leveling of Fire Insures Even Combustion

The time spent on leveling the fires is at least as much as that spent on firing, because this work is essential to efficiency. It is the leveling of a fire which insures even combustion, for in this operation holes in the fire bed are covered and the coke bed is loosened so that combustion takes place more evenly. In one test the fires were barred only after cleaning, when the fuel bed consisted almost entirely of freshly fired green fuel. The observations of the smoke produced showed that barring a fire generally produced objectionable smoke, whereas leveling a fire from the top with a rake did not produce objectionable smoke. Even with a rake, however, smoke can be produced if the fireman is allowed to force the rake too deeply into the fuel bed. A safe method of operation as regards smoke abatement is to use the rake for breaking and leveling the top of the fire without disturbing that portion resting on the grates. The grates themselves should be kept free from ash obstruction by running a flat hook over them at intervals of four hours. This hooking of the fires does not disturb the fuel bed to any great extent but does keep the air passages in the grate bars open.

The improved firing method utilized the alternate system of firing. Thus only one-half of the grate surface is charged with green fuel at any one time and the remaining half is left covered with a bed of freely burning incandescent coke from the preceding firing. In this way the fluctuation in furnace temperature is reduced and a temperature high enough to ignite the mixture of combustible gases and air in the furnace is maintained. The procedure followed was to charge with fuel that portion of the fire reached through one of the firedoors and to break and level the other half as part of the same operation.

In order to determine the performance of the plant both before and after the modifications in the setting and control were introduced, a series of tests at different rates of evaporation per hour mere made. Six tests, three with anthracite and three with bituminous coal, were made under the original conditions. After the conditions had been modified three more tests were run

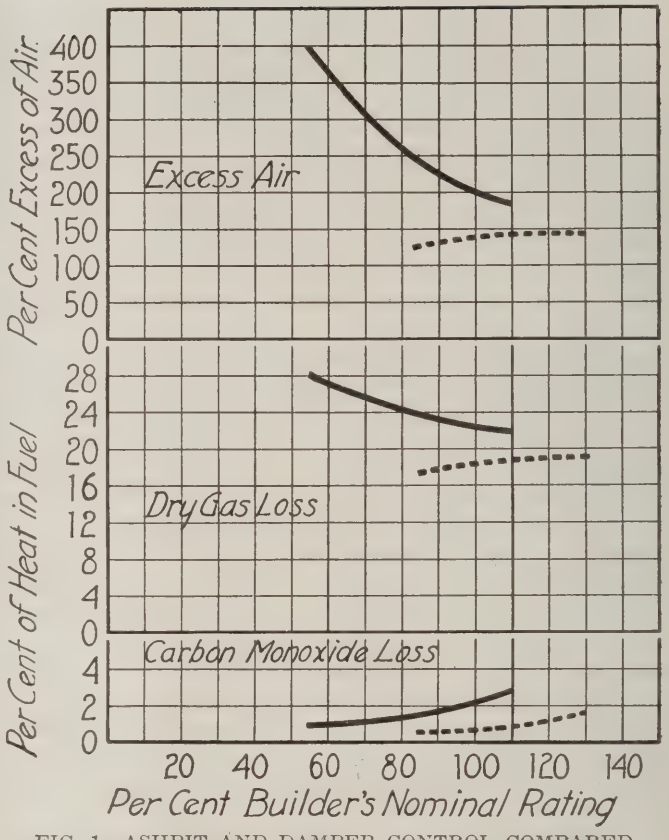


FIG. 1—ASHPIT AND DAMPER CONTROL COMPARED AT DIFFERENT RATINGS

It will be noticed that with the damper method of control the losses are less than with the ashpit method of control for all ratings. Such test curves give conclusive evidence in favor of the damper control.

with bituminous coal, to determine the actual improvement in efficiency.

The principal feature of the results obtained with anthracite are interesting. The efficiency and dry-gas losses decrease as the rating increases, while the loss in the ashpit refuse tends to increase with the rating. The large ashpit losses are due to the high ash content in the original coal which necessitated frequent cleaning of fires. It was found that steam could not be supplied in sufficient quantities if the fires were permitted to burn more than four hours without cleaning, so that the high ashpit loss was part of the cost chargeable to smoke abatement under the original operating conditions. The decrease in dry-gas losses with increase in rating further discredits control of boilers by ashpit doors instead of by dampers, for the decreasing loss indicates that the available draft was more completely utilized for combustion as the rate of burning coal increased.

Under the original operating conditions with bituminous coal the efficiency increased with the increase of rating. This increase in efficiency with increase in rating is accompanied by a reduction in dry-gas losses, and a reduction in the losses unaccounted for. The CO loss increases, as would be expected, as the rate of burning coal increases. The decrease in dry-gas loss with increase in rating is again due to the more efficient utilization of the available draft at higher ratings.

Under the modified operating conditions with bituminous coal the efficiency increases with a decrease in rating. The increase in efficiency is accompanied by a decrease in dry-gas losses and a decrease in loss due to carbon monoxide in the flue gases. The decrease in dry-gas losses with decrease in rating, just the reverse

of the trend of the dry-gas losses under the original conditions, is brought about by the decrease in pressure difference between the inside and the outside of the setting as the damper is closed. This decrease in pressure differences decreases the influx of cold air through leaks in the setting, and consequently results in less dilution and cooling of the products of combustion, and therefore less waste of heat.

The fact that the efficiency increases with a decrease in rating under the modified operating conditions is an especially desirable condition because of the low average rate of working the boilers in the plant under consideration. The average rate of working the boilers was estimated to be 75 per cent of builder's nominal rating. Thus the gain in efficiency due to modifying the conditions was 13.2 per cent over the original conditions with anthracite and approximately 9 per cent over the original conditions with bituminous coal. Thus from each 175 heat units in the anthracite, 100 heat units were given to the steam; and from each 176 heat units in the bituminous coal, 104 heat units were given to the steam before the modifications, and 123 heat units were given to the steam after the modifications.

The cost of coal per 1,000 lb. of steam under the original operating conditions at the average rate of boiler working was $0.7050 with anthracite and $0.4225 with bituminous coal. After modifying the conditions the cost of bituminous coal per 1,000 lb. of steam was $0.3540. These figures were obtained from the costs of coal obtained from the delivery records for the eleven month period from July 1, 1921, to June 1, 1922. During that period 2,653 gross tons of bituminous coal were delivered at a total cost of $19,535.16, or $7.36 per ton, and 1,957 gross tons of pea-size anthracite at a total cost of $20,121.31, or $10.28 per ton. These figures were used because present prices are not stabilized.

The total savings shown possible by the modifications introduced are approximately 900 tons of coal in an eleven-month period and approximately $12,500 in total fuel cost.

Discuss Engineer in Public Affairs

ENGINEERS are more and more coming to feel a greater sense of responsibility as citizens, said Gano Dunn, president of the J. G. White Engineering Corporation, at a meeting of the F.A.E.S. in New York on May 8.

"A discussion of 'The Engineer in Public Affairs,'" said Mr. Dunn, "necessarily turns our attention rather more toward the side of engineering that has received more attention in late years than ever before, the side of the engineer's generalship, the side of the engineer's organizing capacity, the side of the engineer's human contacts.

"There has never been a time when the demand for the education of engineers in the humanities as well as in the sciences and the technologies has been as great as it is today. There never has been a time when the demand for the education of engineers in English, in literature, in the fine arts, has been as great as it is today. The reason is an appreciation, not only on the part of engineers themselves but on the part of those with whom they work, that an engineer must be an all-around man before he can reach the heights of engineering.

"The groping and straining toward a larger part in national affairs that have been concomitant with the development of the national and other engineering societies in the last twenty years has been due to the feeling within engineers themselves that their places as citizens are more and more responsible as every day goes on.

"For my own part I think there has been a waning of opinion in engineering circles that has overemphasized the desirability, if not the appropriateness, of a certain extreme degree of participation of engineers in public affairs. On the other hand, the increasingly essential relation of engineering works and structures, engineering operations, engineering conceptions, and even engineering terms and habits in the daily life of the people of the United States, has been so marked that engineering of itself has been taking a greater and greater part in public affairs, and if the engineer cannot keep pace with his subject, then he certainly is unworthy of the name."

Admiral Robison told of the growing influence of the Navy as a moral factor in the progress of civilization. Engineering science in the Navy was making rapid progress, he said. Citing illustrations of increased efficiency, he continued: "Two years ago we spent considerably more than twice as much money in engineering as we have got today. We spent then about $3.75 per horsepower year for repairs and supplies and maintenance; this year we are spending $1.35 by the development of a method of self-maintenance in the fleet that has got the men on the job to do their own work. We have bought more material and put more material on the ships of the fighting fleet this year with $14,000,000 than we did two years ago with $31,000,000."

Admiral Robison said that the spirit of service is not peculiarly naval and that the engineers in the navy are but "representatives of the noblest profession in the world."

Utilities Consume 3,349,978 Tons of Coal In March; Power Production Declines

Electric public-utility plants consumed 3,349,978 net tons of coal during March, according to a report just issued by the U. S. Geological Survey. This compares with 3,249,927 tons consumed during February, according to corrected returns.

Fuel oil consumed by public-utility plants in March totaled 1,190,495 barrels, compared with 1,161,359 barrels in February.

The average daily production of electricity by public-utility power plants during March was 152,000,000 kw.-hr., or 1.6 per cent less than the average daily output in February. The revised figure for the daily output in February is 154,400,000 kw.-hr., which now stands as the record rate of daily production of electricity by public-utility power plants in the United States.

The slight decrease in rate of production of electricity in March probably was due to the usual seasonal decrease in demand for electricity. It is not expected, however, that the seasonal decrease this year will be at all marked. On account of the pronounced activity in practically all lines of industry at the present time with every indication that this activity will continue, it is believed that the present rate of demand for electricity will continue through the spring and summer and that there will be an increase in demand in the fall months as usual.

The average daily production of electricity for the first three months of 1923 and the proportion produced by water power were as follows: January, 153,300,000 kw.-hr., 34 per cent; February, 154,400,000 kw.-hr., 33.9 per cent; and March, 152,000,000 kw.-hr., 36 per cent.

Iron and Steel Electric Engineers Discuss Applications of Mine Hoists

FACTORS entering into the proper selection of mine hoists, covering a study of the various types of motors used, the method of control and the effects of these factors upon the hoisting cycle and the power bill were treated in a paper presented before the Association of Iron & Steel Electric Engineers at Pittsburgh, Pa., April 27, by F. W. Cramer and A. W. MacDonald, of the Cambria Steel Co., which owns and operates bituminous-coal mines in the Pittsburgh district.

The cost of the hoisting equipment bears heavily upon the selection of the hoist mechanism, gearing, type of motor and control, as these points all affect the first cost, maintenance and expenditure for power.

Complete electrification of a mine has many advantages which materially cut down the power cost of the main shaft hoist because the continuous load permits higher momentary hoist peaks without undue penalty. The main consideration in selecting hoist control from the standpoint of the power bill, however, is to have as low momentary peaks as possible.

The discussion in the paper dealt primarily on a comparison of the straight induction motor with magnetic contactor control, water-rheostat control, and the Ward-Leonard motor-generator system control.

Graphs and curves were used to illustrate the hoisting cycle of the induction motor with water-rheostat control and the hoisting cycle with the Ward-Leonard system. The curves showed how the momentary peaks were appreciably cut down by the latter system, the energy for the peaks being derived from the flywheel of the motor-generator set.

The cost of power, it was asserted, was low with the induction motor where the hoisting was irregular; but the power cost was relatively high for the Ward-Leonard system under these conditions, due to the considerable amount of energy taken up by the motor-generator set when the hoist was not operating. A continued regular operation of the hoist on the Ward-Leonard system greatly reduced the hoisting cost per ton.

Graham Bright, general engineer of the Westinghouse Electric & Manufacturing Co., gave an interesting discussion of the paper. He pointed out that considerable weight should be given to the consideration of the capacity of the power system when selecting the hoist control. Cost of power, when compared with old steam equipment hoists, is not of great importance because some electric hoists are operated at mines where there is required only 2 kw.-hr. per ton mined. Under favorable conditions the flywheel equipment may cut the demand to one-sixth of the value that would be required with the induction motor hoist.

L. C. Mosley, of the General Electric Co., formerly of the Hudson Coal Co., of Scranton, brought out in his discussion the importance of the drum shape upon the hoisting cycle.

The remainder of the meeting was then opened to discussion of the paper and general points of interest.

G. W. Quentin, Duquesne Light Co., spoke on the subject of continuity of service as rendered by the public utilities compared with power made by individual coal companies.

H. Goodwin, of the Sanderson & Porter Co., stated that custom power is most desirable for the coal operator. He also said he believed that in future there would be fewer installations of 25-cycle equipment.

E. J. Gealy, electrical engineer, with *Coal Age*, compared the electrical problems of the bituminous coal field and the anthracite field. He pointed out the advantages of complete electrification over piecemeal changing over to electricity. Continuous loads, he said, would improve the electrical operation by filling in the valleys of the demand.

Early Anthracite Operators Created a Market Only with Difficulty

IN THE early history of anthracite the coal operators' great desire was to push hard coal as an industrial fuel. Today the domestic market during most of the year will take all that is offered. The aggressive work, in promoting the sale of anthracite, of those pioneer days is reflected in some remarks by W. H. Williams, the present vice-president of the Delaware & Hudson Co. He says:

"In 1812 Colonel Shoemaker, of Pottsville, hauled nine wagonloads of anthracite to Philadelphia, and could sell only two, giving away the rest. He narrowly escaped arrest on the charge of attempting to sell for fuel something entirely worthless. The coal cost him as delivered about $28 per ton, but the enterprise was an important step in obtaining recognition of the fuel value of anthracite, principally because a wagonload was sold to White & Hazard, who operated a wire-works at the Falls of the Schuylkill. A whole night was consumed in efforts to make the coal burn and, in final despair, the workmen abandoned the endeavor but chanced to leave the door of the furnace shut. One workman forget his jacket and, returning to recover it, found an excellent fire and the furnace red hot.

"On May 20, 1829, the Board of Managers authorized the president of the D. & H. Co. to have cooking apparatus installed in its banking house,* in order to show that the company's coal could be burned therein. During the next year they investigated the Boston market; sent samples to Providence and even shipped several hogsheads containing anthracite to New Orleans. In 1831 it was arranged to furnish the Ulster Iron Co. with coal for experimentation in steam production and the steamboat 'Experiment' with enough for a trip to Newburgh and return. During the same year coal was supplied for the steamboat 'Victory' and for the use of the Walnut Street ferryboat, and employment was given to Nathan Smith 'to introduce the use of coal in manufactories and all establishments using steam engines,' and to R. Spencer 'for introducing the use of coal to blacksmiths, etc.'

"Efforts to extend the use by boats continued, and in 1836 anthracite was first used for a round trip to Albany. On June 23 of that year the 'Novelty,' with the the managers of the D. & H. Co. and distinguished guests, left her wharf at six in the morning and arrived at Albany twelve hours later, the first steamboat propelled by anthracite to achieve that voyage. In 1848 experiments were made in the use of anthracite for the manufacture of salt at Syracuse and Salina, and as a result of these experiments an expenditure of $10,000 to promote the adoption of this fuel was authorized."

* The D. & H. Co. in its early days was a mine operator, a canal owner and a banker.—EDITOR.

NOTICE HOW POLITE the coal man is getting.—*Wall Street Journal.*

NO REPARATIONS PLAN will work until the Hun does.—*Wall Street Journal.*

Problems When Selecting Type of Motor Drive for Large Mine Hoisting Plants

Limitations of Induction Motor—Maximum Momentary Peaks Seriously Affect Power Bill—Inertia of Driving Equipment and Hoist Drum Important Factors—Flywheel Motor Generator Set with Two Generators Provides Continuity of Operation

By Graham Bright
General Engineer,
Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.

During the past few years there has been a marked tendency to develop mines of very large output. At many of these mines it has been found desirable that the entire output be brought up one shaft. This immediately means high rope speeds or large hoisting loads; in some cases it is necessary to have both high rope speeds and large loads to obtain the desired output. In any event, these factors introduce many important problems, among them being the proper selection of the type of drive, exacting precautions to provide continuity of operation and low cost of upkeep.

Where rapid hoisting cycles are required the power necessary to overcome the inertia of the load and rotating parts represents a large part of the total power required. A steam engine is inherently fitted for this type of hoisting because the inertia of the engine parts is low and the engine can safely be used for retarding the hoist, leaving the brakes for emergency use only. In a large majority of cases, however, steam operation cannot, from a cost standpoint, successfully compete with electric operation. Where electric power is available new installations of steam hoists are becoming more rare each year.

Where power conditions are favorable, the loads small and the hoisting cycles are not too frequent the alternating-current wound-rotor induction motor with magnetic-contactor type of control will prove the most satisfactory.

In regard to the power system there are two factors that influence the selection of the proper type of hoist motor. The first is the capacity of the power system, including transmission lines. There are many central-station systems in this country that will not permit an induction-motor hoist of over 200 hp. to be connected to their lines. Only the larger systems can permit induction motors of over 500 hp. for hoist service to be used on their circuits. In many cases inadequate capacity of transmission lines prevents large induction motors being used for hoists—because of the poor regulation that would result.

A second condition is the form of contract under which power is purchased. Where momentary peaks are penalized it is necessary to make a careful analysis before determining the proper type of hoist motor to be used. This is best accomplished by determining the cost of power under different outputs, as the mine will operate at full capacity only a small percentage of the time. After the cost of power for different outputs has been determined a further analysis will show whether it will pay to install the more expensive direct-current hoisting system.

Where the power conditions are unfavorable it is necessary to go to the direct-current hoist motor using field control and in most cases a flywheel-motor generator set. There are cases, however, that bar the use of the induction motor even with favorable power conditions; these are cases where rapid cycles with high rope speeds are required or the extra safety and superiority of the control of the direct-current system is desired.

Where extremely fast cycles are required the inherent high inertia of the alternating-current motor produces abnormal peak loads and losses during acceleration, and in addition, the braking loads are too large to be absorbed by mechanical brakes. The direct-current motor of the same capacity has a lower inertia than the corresponding alternating-current motor; in extreme cases it is necessary to go to a direct-connected motor, thus resulting in much lower inertia than with the geared motor. The direct-connected alternating-current motor is out of the question in practically all cases because of the poor electrical performance of a slow-speed induction motor.

Fig. 1 illustrates a set of conditions which can be met best with the direct-current geared motor using a flywheel motor generator set. This hoist was originally equipped with a 350-hp. wound-rotor induction motor geared to the hoist drum through double reduction gears. This motor was used during the development

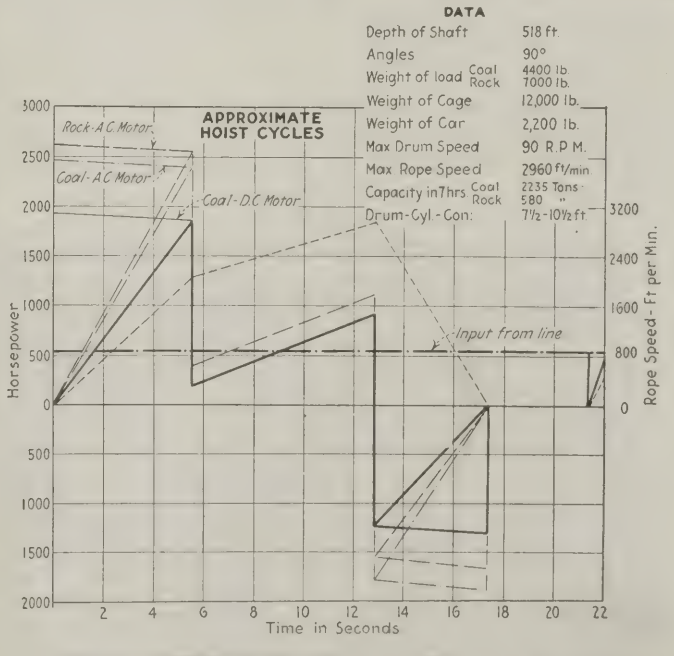


FIG. 1—COMPARISON OF A.-C. AND D.-C. MOTOR HOISTING CYCLES

These curves show the relative values of the peak loads which result when the alternating-current induction motor or the direct-current motor is used. The energy for the high points of the peaks is drawn from the flywheel when the direct-current motor is used on such a hoisting problem.

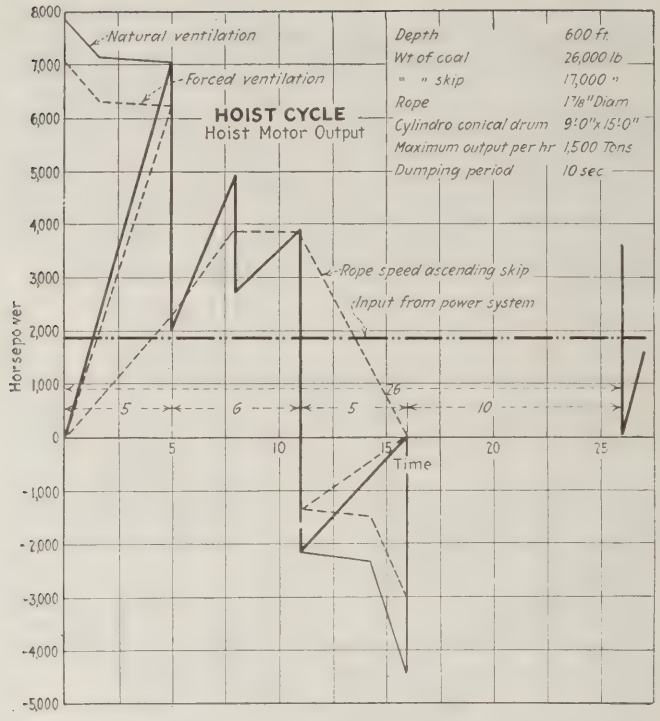


FIG. 2—HOISTING CYCLE WITH FORCED AND NATURAL VENTILATED MOTORS

The size of the motor may be greatly reduced when forced ventilation is used. This in turn reduces the peak loads of the hoisting cycle in that the inertia of the smaller motor is appreciably less.

stage and the momentary peak loads produced were between 400 and 500 kw. When it became time to replace the small motor with a larger motor to produce full capacity, as shown on the curve, it was found that there were two good reasons for substituting the direct-current system instead of continuing the alternating-current system. The curves show that with an alternating-current motor of approximately 1,500 hp. capacity the peak loads when handling coal would be about 2,500 hp. and a little higher when handling rock. During the braking period the power required will be over 1,500 hp., which is entirely too great to be absorbed by mechanical brakes.

In estimating the capacity of the hoist motor it was found that due to the extra capacity required while plugging the motor during the braking period the motor would have to have a capacity of at least 1,800 hp., which would overload the 1,500-hp. motor. Upon selecting a larger motor it was found that the increased inertia of the rotor of the larger motor would build up the peak load during acceleration and retardation to such an extent that the increased capacity was more than absorbed by the increased loads. This results in a pyramiding effect, which means that the alternating-current motor is not adapted to this type of cycle unless a special design is developed.

The capacity of the direct-current motor to meet this cycle was 1,350 hp. After this equipment was installed the mine was operated at about one-half capacity with the maximum momentary peak load from the power system of only 175 kw. This resulted in a marked saving in the power, due to the fact that momentary peak loads are penalized in the contract and the other load about the mine plant did not average over 200 kw.

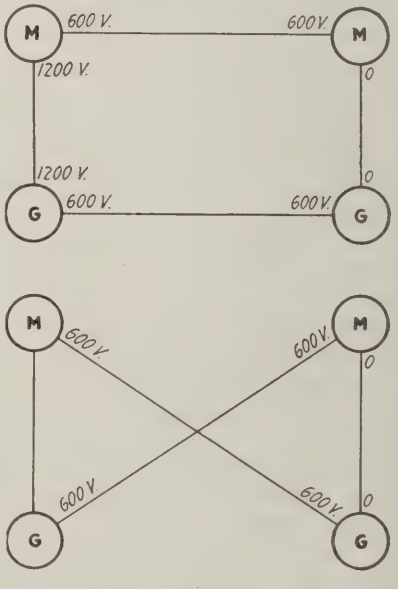
The above value of 175 kw. seems low when compared to the capacity of the hoist motor, but this brings out the advantages of the flywheel motor generator set. The flywheel supplied most of the energy for the half-capacity hoisting cycle in this case. It is important to bear in mind that sufficient time must be allowed between hoists to permit the flywheel to be brought back to speed, where the maximum input from the line is to be held as low as possible.

Where a large output is required from a shaft mine it usually is impracticable and undesirable from an engineering point of view to attempt to obtain the output by hoisting a single car at a time. To overcome this difficulty a number of mines have installed skips ranging in capacity from 6 to 20 tons. Under this system the coal is dumped into skip pockets at the foot of the shaft and the rope speed of the hoist system may be greatly reduced and larger quantities of coal brought up at each trip.

Fig. 2 illustrates a rather exceptional condition but shows the trend of high-speed and high-capacity hoisting in some of the coal fields where conditions for such capacity are favorable. This cycle requires direct-connected motors using a flywheel motor generator set. For a large system of this type it will be found best to install two hoist motors, one at each end of the shaft. Where such large capacities are involved a forced ventilated motor will show a considerable advantage. The capacity of an electric motor depends upon its ability to get rid of the heat losses without attaining a temperature of over 40-deg. C. rise. The ventilation of the motor when it is running greatly assists in carrying away these heat losses.

When the motor is at rest it is capable of taking care of about one-half of the losses that would be the case when in operation at full speed. For this reason a hoist motor with fairly long rest periods will have to have considerable more capacity with natural ventilation than would be the case with forced ventilation. This is illustrated in the curve shown on Fig. 2, where the total capacity required with natural ventilated motors is 4,400 hp. and with forced ventilated motors 3,400 hp.

The forced ventilated motors can be built with a smaller diamater armature, resulting in less weight and lower inertia, as shown by the power curves during acceleration and retardation. The heavy lines in the figures show the actual power delivered by the motor, while the light lines show the apparent power or torque. The high peaks at the beginning and end of the retarding period are due to the fact that the upper skip has partly overturned and a certain percentage of the weight is taken off the cable. These peaks, however, are torque only and do not represent real power. They have a



FIGS. 3 AND 4—CONNECTIONS WHEN TWO HOIST MOTORS AND TWO GENERATORS ARE USED

The connections of Fig. 3 add the two generator voltages, requiring heavier insulation and increasing the danger. In Fig. 4 the connection is such that the voltages are not additive, thus reducing the liability to breakdown or other dangers.

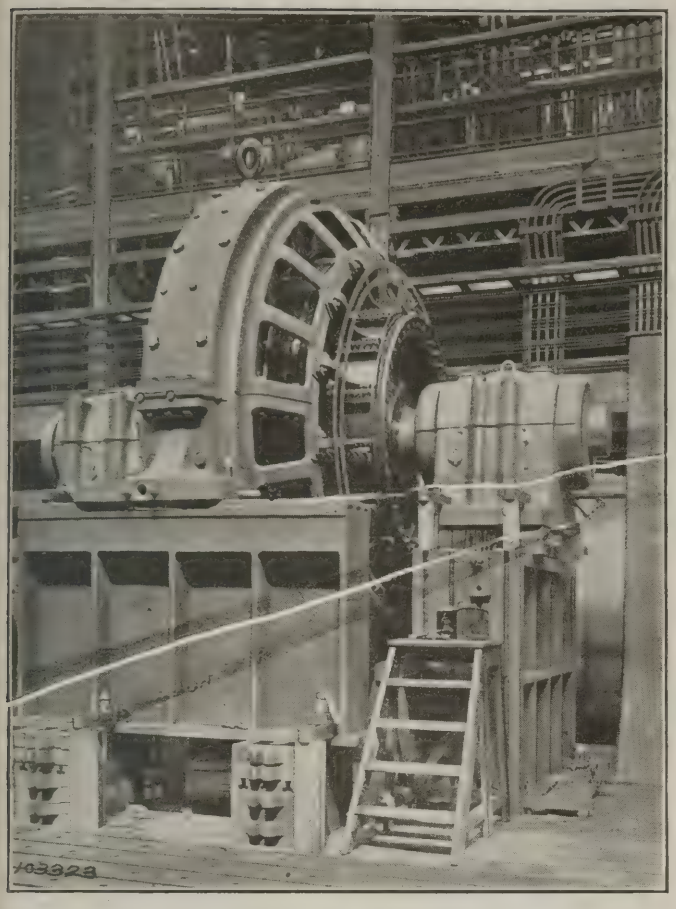


FIG. 5—TYPICAL D.-C. HOIST MOTOR

There is a tendency to think that all large motors are without question operated on alternating current, but when it comes to exceptionally large hoisting problems the direct-current motor again comes into its own.

considerable influence, however, in the heating of the hoist motors and generators, since it requires heavy currents to produce these torques.

It will be noted that the maximum variation in load is approximately from 7,000 hp. at the end of the accelerating period to —2,000 hp. at the beginning of the retarding period; the total variation is 9,000 hp. at the hoist, while the variation in power from the system will not be greater than 5 per cent on either side of the average input of 1,850 hp. The input to the alternating-current motor is kept constant by means of a liquid slip regulator.

The amount of power required during the braking period could not be taken care of satisfactorily by mechanical brakes. This braking is produced by the generators acting as motors and returning this power to the flywheel helping to bring it back to normal speed.

The equipment for such a hoist could be built with one large hoist motor and a motor-generator set consisting of an induction-motor flywheel and one generator. There would be considerable advantage, however, in using two hoist motors, one at each end of the drum shaft, and two generators on the flywheel set. The two hoist motors would have less inertia than a single-hoist motor and would have the advantage that in case of trouble one of the hoist motors could be disconnected and the other used with a reduced capacity of hoisting.

With a single generator on the motor-generator set the speed would have to be restricted to about 350 r.p.m., which would mean a large and expensive generator and induction motor. The flywheel also would have to be much heavier than with a higher speed set. By selecting two generators a much higher speed set can be used, which means a considerable saving in the cost of the generators. Incidentally, the induction motor and the flywheel will weigh considerably less, due to the fact that it can be operated at a much higher peripheral speed. In case of trouble with one of the generators it can be disconnected and the other generator used with a reduced hoisting capacity. The over-all efficiencies of flywheel sets run from 50 to 60 per cent.

For most fast hoist cycles the cylindro-conical drum is used. In general a drum of this type is so designed that the loaded rope travels on the small cylindrical portion of the drum during acceleration while the empty rope travels on the large cylindrical diameter. At the end of the accelerating period the loaded rope starts to climb the conical portion of the drum. This part of the drum generally is made as steep as possible so that the rope reaches the larger diameter in three or four turns. By this means as much as possible of the travel takes place on the large diameter of the drum.

The best size and shape of the drum depends on a great many conditions, one of the most important of which is the inertia of the drum parts. A comparison of the various sizes and shapes of drums will be of little value unless accurate information is available regarding the inertia values.

One of the most important parts of a flywheel hoist equipment is the control. The magnetic type has proved much superior to the hand-operated drum type especially in regard to automatic acceleration, retardation and the application of safety devices. Automatic acceleration and retardation can be obtained in a manner much more satisfactory than any mechanical scheme that restricts the movement of the control lever during acceleration and forces the control lever to the "off" position during retardation.

The scheme of using two motors and two generators with a flywheel motor-generator set system has not been applied in this country to hoisting equipment, though it has had considerable application for reversing rolling-mill equipments. In order to divide the load equally it has been found best to connect the armatures of all machines in series. The ordinary scheme for doing this is illustrated in Fig. 3, which shows the two generators connected in series and the two motors connected in series. This, however, produces a total voltage of 1.200 when 600-volt generators are in use.

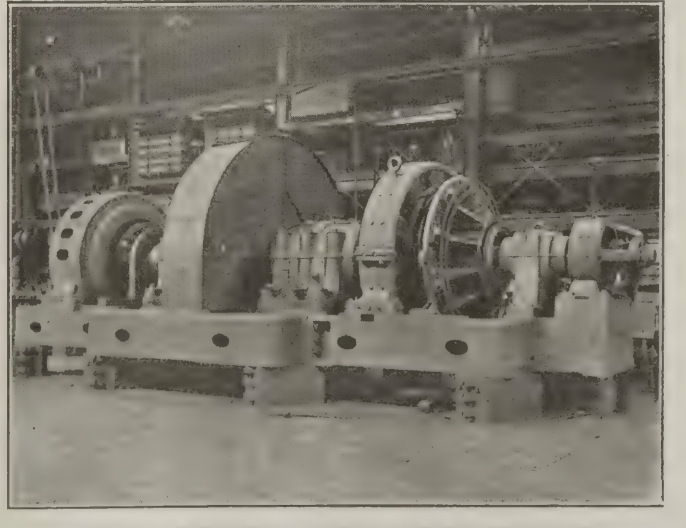


FIG. 6—FLYWHEEL MOTOR-GENERATOR SET

This motor-generator set feeds the direct-current motor in Fig. 5, which is used on heavy shaft duty at Butte, Mont.

Where large machines are involved best engineering practice shows that 600 volts is the most economical for a single generator. With the generators in series, however, it is necessary to insulate the machines for 1,200 volts and there is added a considerable danger to the operators due to such high voltage on commutator types of machines. A much better arrangement of circuits is shown in Fig. 4, where the motors and generators are alternated. This keeps the maximum voltage down to 600 and permits the use of standard and well-tried equipment. The advantage of the arrangement shown in Fig. 4 is so great over that as shown in Fig. 3 that it is doubtful if the safety committee at any mine would permit the installation of the equipment wired up as shown in Fig. 3.

Most of the large electric hoists in this country have been installed in metal mines but it is probable that in the near future the capacity of the equipment of coal-mine hoists will not only approach but probably will exceed the largest capacity installed in the metal mines. Fig. 5 illustrates a 2,000-hp. 72-r.p.m. 600-volt direct-current hoist motor which was installed at the North Butte Mining Co., at Butte, Mont., in 1915. It would require two such motors to meet the cycle illustrated in Fig. 3. Fig. 6 illustrates the flywheel-motor generator set which supplies power for the hoist motor illustrated in Fig. 5. The capacity of the generator is 1,500 kw. and the capacity of the alternating-current induction motor is 1,400 hp. The flywheel weighs 100,000 lb.

Fig. 7 illustrates a liquid slip regulator which keeps the power input to the induction motor at a constant value; this regulator is entirely automatic.

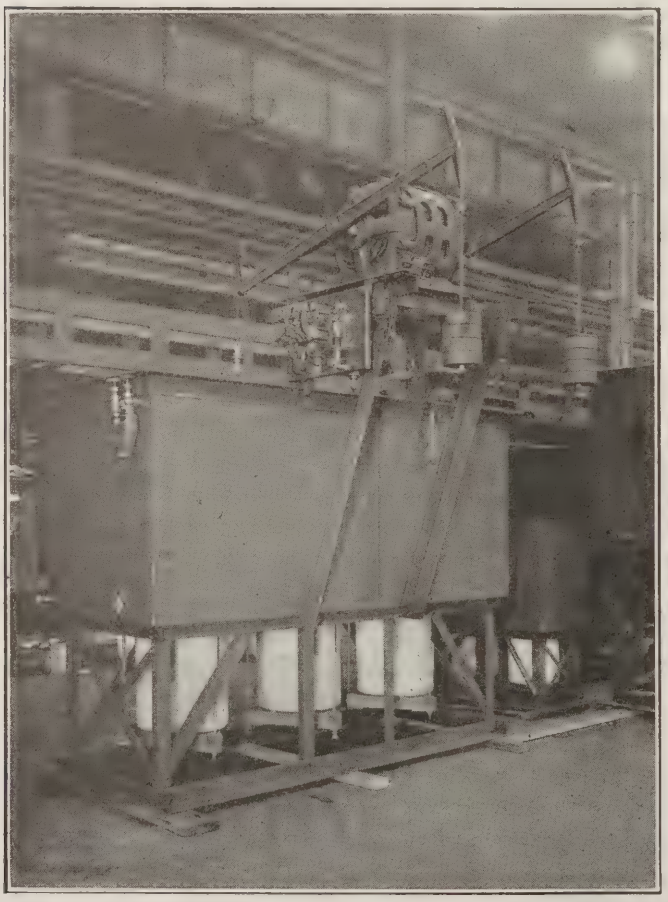


FIG. 7—LIQUID SLIP REGULATOR

The function of the regulator is to automatically control the input to the motor of the motor-generator set. Its operation maintains a constant input from the power system.

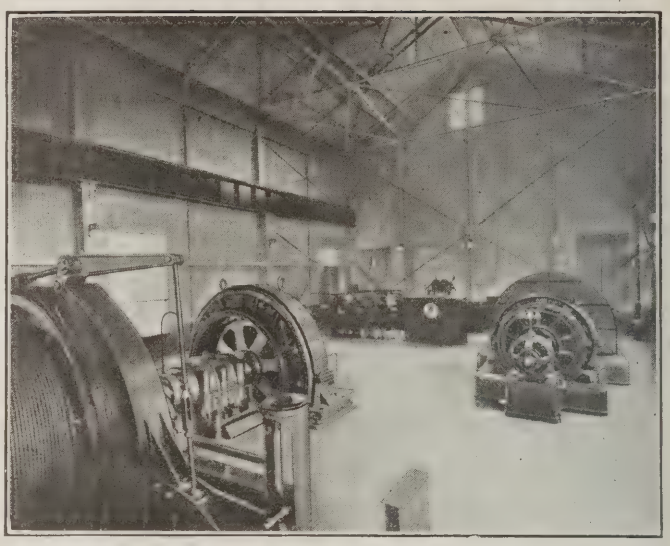


FIG. 8—COMPLETE HOISTING EQUIPMENT

All the parts of a large hoist installation are shown here. Problems of the coal field are daily being solved by installations of flywheel hoisting equipment.

The hoist room of the North Butte Mining Co. is depicted in Fig. 8, which shows the hoist motor, flywheel, motor-generator set, slip regulator and control.

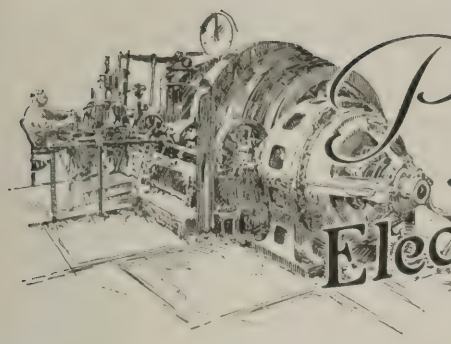
I have had the pleasure of directing the application of the above installation at the North Butte Mining Co. as well as two other installations of the same capacity, one at the Butte & Superior Mining Co. at Butte, Mont., and the other at the International Nickel Co.'s mines at Copper Cliff, Ont. The equipment at the Butte & Superior company's plant was originally laid out to add a second hoist motor and a second generator and flywheel to the motor-generator set at some later time.

For such large and important installations as that required in the cycle shown in Fig. 2 it will be readily seen that the application and construction of such equipment should be undertaken only by those who have not only a thorough understanding of such problems but who have actually installed equipment of somewhat similar size and capacity.

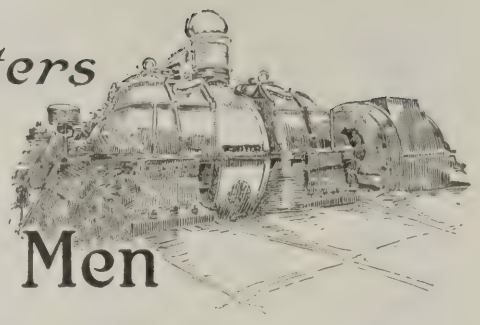
Mining the Parent of Almost All Other Branches of Engineering

SPEAKING in Scranton, Pa., at the one hundredth anniversary of the founding of the Delaware & Hudson Co., April 24, W. H. Williams, vice-president of that organization, remarked as follows: "Coal was to the Delaware and Hudson Co. and its railway as cause to effect. It was that, also, to that earliest locomotive of which we boast and to the steam engine, in which every locomotive had its genesis. The first uses of the inventions of Newcomen and Watt were in pumping English coal mines. And railed roads were known to the mining practice of Newcastle-on-Tyne for two hundred years before the first common-carrier railroad came into being with the opening of the Stockton and Darlington on Sept. 27, 1825.

"Regular use of locomotives in English colliery practice antedated the Rainhill competition by not less than seventeen years. Precisely as the railway, the steam engine and the locomotive were developed as incidents of English colliery practice, just so the Delaware & Hudson's railway system was evolved to make possible the mining and marketing of the 'black stones,' 'stone coal' or 'anthracite' of the northern anthracite region."



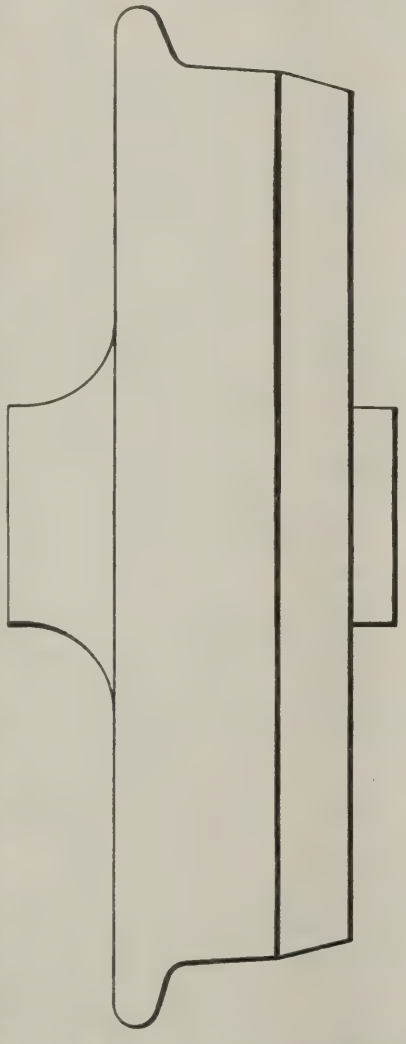
Practical Pointers for Electrical and Mechanical Men



Prevention of False Flange on Locomotive Wheels

VARIOUS methods for preventing the formation of false flanges on electric mine locomotives have been suggested and used with some success. The method most generally resorted to is the use of a shoe with abrasive material inserts. Frequently this insert material does not seem to be properly placed or the brake shoe gets out of alignment and therefore does not cut where the false flange has a tendency to form.

Some locomotives continually work on certain curves year in and year out and the false flange invariably forms on one side of the locomotive and not on the other. Under these conditions a little study of the characteristic formation of the false flange will be found most interesting and probably will suggest possible remedies. In one such place a study was made at one of our collieries and when the wheels and axles were sent to the repair shop to have the false flange turned off, we suggested to the shop superintendent that the tire be turned down as shown in the illustration. The sketch shows how the tire was reduced in diameter where the false flange had a tendency to form. The result obtained was most satisfactory. As usual the tire wore close to the flange and eventually the tread became straight and the false flange did not form before the life of the tire was ended when the reduction in tire thickness reached the limit of safety.



WHEEL WITH TAPERED TREAD

False flanges are the cause of many derailments and high cost of track maintenance. The above shaped wheel prevented the formation of false flanges on the locomotive equipped with these wheels.

Recommended Rail Weights for Haulage Systems at Coal Mines

A POINT frequently discussed by some of the mining men of our company is on the subject of the standardization of track gages and proper size rails for different locomotives. It seems to me a very regrettable fact that track gages have not been standardized. With our company the track gages run from 24 in. to 48 in. including seven different gages, and a great amount of hardship and difficulty frequently results due to the almost utter impossibility of transferring equipment in the event of breakdowns. Then again, the differences in weights of rails is just as great and for the most part the rails are too light for the locomotives used.

Suggestions for standardization in these two lines, I believe, would result in much benefit to the mining companies. Perhaps a great deal of progress cannot be made on present installations, but for the benefit of new companies and mines which will be opened in the future I believe a presentation of the subject in your columns would be most interesting. ELECTRICAL OPERATOR.

In conformity with the most recent recommendations of the American Mining Congress, all coal-mining operators are urged to install in all new work a track gage of 42 in. and curves having a minimum radius of 28 ft. Recognition of the wisdom of these recommendations will, for obvious reasons, react to the mutual benefit of both purchaser and manufacturer of equipment. If for any reason deviations from the standard is absolutely necessary, such deviations should be made in 6-in. steps over or under the standard of 42 in., but where possible the standard gage should be most rigidly adhered to.

Recommendations for rail installations for various sizes of locomotives may easily be derived from a rule to allow 200 lb. on a driving wheel for each pound weight of rail per yard. For example, a four-wheeled locomotive weighing 30,000 lb. should therefore run on a 40-lb. rail. For a six-wheel locomotive of the same weight, a 25-lb. rail would be used. From the rule the following table may be constructed and should be interpreted as the absolute minimum size rail which should be used for four-wheel locomotives:

Weight of Locomotive in Tons	Weight of Rails in Pounds per Yard	Weight of Locomotive in Tons	Weight of Rai in Pounds per Yard
4 to 6	16	13 to 15	40
6 to 8	20	15 to 20	50
8 to 10	25	20 to 25	60
10 to 13	30		

When practicable, however, it is desirable to use rails of a heavier weight than in the above table, to avoid possible deflection of the rails over loose ties and earth, which would increase the resistance and thereby reduce

the hauling capacity of the locomotive. Another advantage for the heavier rail is the increased contact the wheel has on the wider rail, which greatly increases the adhesion and materially cuts down slippage, formation of false flanges and promotes better maintenance of locomotive and track.

Six Requirements of a Well-Designed Machine Foundation

FOR foundations for modern rotative and reciprocating machines it usually develops that a foundation of sufficient horizontal plane area to encompass the base and anchor bolts of the machine and of sufficient depth to reach good bottom or to go below the frost line will automatically have ample weight, proper proportions and sufficient base area to satisfy all the necessary requirements for a good foundation.

Unfortunately, this is not always true, and for this reason it is necessary to check the foundation to see if it meets the several requirements of what constitutes a satisfactory foundation.

These requirements may be briefly grouped into six rules, as follows: (1) The foundation must have sufficient properly disposed base area so that the pressure imposed by it on the supporting soil will not at any point exceed the safe foundation soil pressure for that kind of soil.

(2) The foundation should have sufficient base area and should be so disposed that there is not too great a difference between the loads imposed by the foundation on different equal areas of the supporting soil.

(3) The foundation must have sufficient weight and be of such proportions that the line of action of the resultant of the total vertical load with any non-vertical force which may be occasioned by the operation of the machine will always fall within the base area of the foundation.

(4) The foundation must have sufficient weight to prevent its sliding horizontally on the supporting soil.

(5) The foundation must have sufficient weight to prevent the supported machine from being lifted upward.

(6) The foundation must have sufficient properly disposed weight to prevent its being rotated horizontally around a vertical axis.

Renewal Costs High When Incandescent Lamps Are Not of Proper Voltage

I UNDERSTAND that the life of incandescent lamps decreases when the lamps are used on a circuit of higher voltage than their normal rating. As to just how serious a matter this may be I am not exactly clear.

I would be pleased if you would give me some information on this subject in your columns, because there is considerable argument among our men on this question, and no doubt it is a problem in the minds of many mine foremen who are trying to hold their maintenance costs as low as possible. MINE FOREMAN.

Various pieces of electrical equipment are made with a generous overload capacity. Most every motor manufacturer has designed his motors for half-hour and two-hour overload ratings. Then, again, most electrical equipment will operate satisfactorily on overvoltage or undervoltage of 10 per cent.

The wide voltage fluctuations on some of the more remote lines in the coal mines and also some of the heavily loaded lines near the generating or transforming equipment present a real question of proper voltage for lamps. The desire to standardize and keep in stock as few a number of different voltage lamps as possible is very necessary owing to the liability of the wrong voltage lamp being used when there is a large stock of variously rated lamps.

The table below very clearly shows the variation of amperes, volts, life and lumens for the average mazda lamp:

Per Cent Amp.	Per Cent Volts	Per Cent Life	Per Cent Lumens
100	100	100	100
101	101.5	82.75	105
102	103.5	64	113
103	105	53.40	119
104	107	42.75	126
105	109	33	135

Note that as low an overvoltage as 5 per cent increases the current 3 per cent and decreases the life to 53.4 per cent and increases the lumens only 19 per cent.

This means that the renewal cost for lamps will be doubled, especially when consideration is given to the cost of labor in renewing the lamp and handling the extra orders.

In the selection of a lamp consideration should be given to the above facts and a choice should be made of a lamp commercially popular so as to be able to get quick deliveries and advantage of a lower unit production cost.

Rebabbitting Bearings for Mine Equipment

THE old babbitt should first be melted out and a suitable mandrel prepared. Split bearings should be babbitted one-half at a time, and the mandrel should consist of a half-cylinder with shoulders running along its length, on which the sides of the bearings may rest so as to form a close fit when the bearing housing is in position for babbitting.

Pieces of felt should be placed between the ends to prevent the babbitt from running into the oil well in the spaces back of the bearing shell. Use only the best babbitt metal. The melted babbitt should be poured in the gate until it begins to overflow and a few moments should elapse before it is removed from the mandrel, in order that the bearing may become quite hard.

The bearing housing should then be placed in a suitable chuck or dog and the inside turned to the proper bore. The holes for inspecting the working of the oil rings should then be drilled and the oil ring slots melted to the proper depth. The finishing can be done with a file. If the mandrel is a smooth half-cylinder the oil grooves may be shaped out, but the grooves may be cast by properly designing the mandrel.

Town Saved by Little Pump

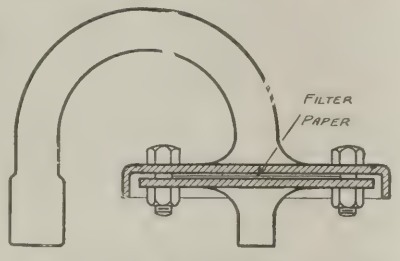
CENTRAL LAKES, Minn., a village of 150 inhabitants, located in the timber country, recently was threatened by a large forest fire. Just when the fire was moving toward the main section of the town an Evinrude centrifugal pump was brought to the assistance of the bucket brigade. The pump had been hurriedly brought by two National Guardsmen a distance of three miles through a flaming roadway. The pump was installed in a cistern under the parlor floor of one of the Central Lakes homes and proved itself a little giant in the work of halting the progress of the flames.

New Equipment

Transformer Breather Maintains High Dielectric Strength of Oil

MORE attention is being given of late to the necessity of maintaining the high dielectric strength of transformer oil. It has long been asserted by many electrical workmen and engineers that many fires and breakdowns classed as having resulted from "unknown causes" were the result of a gradual depreciation of the insulating oil, caused either by dirt or moisture.

In the operation of transformers the oil contracts or expands, due to variations in temperature as a result of varying loads, which causes the taking in or expelling of air, commonly called "breathing." This breathing process carries air into the transformer, and moisture in the air is deposited in the transformer oil, reducing its insulating value. To prevent moisture entering the transformer due to breathing, and lowering the dielectric strength of the oil, devices called "breathers" have been used.



ASSEMBLED BREATHER READY FOR MOUNTING

This cross-section shows the "Pittsburgh Breather" with filter paper between two steel flanges. The opening is enlarged for the passage of air and the filter paper is reinforced on the outside by copper screening.

The principle of the "Pittsburgh Breather," manufactured by the Pittsburgh Transformer Co., for taking moisture out of the air before entering the transformer is the same as the well-known filter press principle for taking moisture out of oil.

On air entering the transformer, moisture is deposited on the outside surface of the breather, where it is dried off. The drying process is still further accelerated by the warm air being expelled from the transformer.

Detachable Bits for Drilling Augers Eliminate Blacksmithing Edges

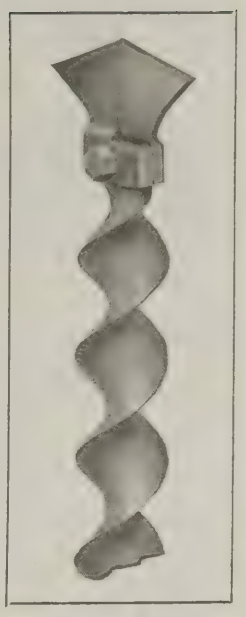
TO THE coal miner a drill is the most important article in his equipment. The importance of a good drill with a suitable cutting edge is evidenced by the fact that all miners carefully guard a new drill and are frequently noticed carrying a drill home at the end of the day.

The shape and sharpness of the cutting edges of a drill are a very direct indication of the value of a drill to the miner. A poor cutting edge on an otherwise good drill makes the drill of little value.

Several schemes have been employed to improve the utility of the miners' drill, one of the latest developments along these lines being the "Diamond" detachable bit patented and manufactured by the Jos. McGlaughlin Co., Joliet, Ill. This eliminates the old method of blacksmithing the cutting edges on a drill and then laboriously filing them into shape. Instead there is supplied a detachable bit made of chrome nickel steel.

The advantages claimed for a detachable bit of this nature are that the design is mechanically correct, the bit is made of special material best suited for cutting, it will cut a straight, even hole under any condition without undue strain or binding, it can be readily transported with the miners' tools without the danger attending the carrying of long drills near electric conductors in the mines, it readily provides an extra set of cutters and affords ease of replacement.

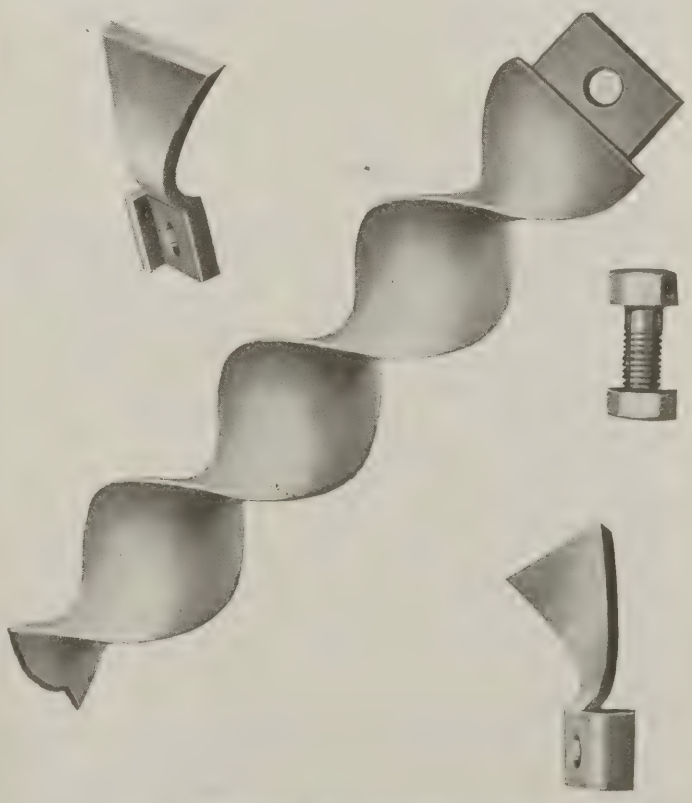
The bits are made up of two interchangeable parts, both fishtail and diamond point type, readily applied to almost any type and make of coal or breast drill—either old or new, thus making readily available an unlimited supply of bits for a few drills. The bits are made in all the common sizes used in mining work and are said to be durable, simple, convenient and economical.



BIT OF MANY CUTTERS

Cutters are small and easily attached to drill. New cutting edges can be kept on hand thus eliminating the necessity of transporting long drills.

The illustrations show the diamond-shaped cutters, which are the most popular type. The inclination and angles of its cutting edges have been determined and recommended as most practical by mining men. These points are of primary importance for fast cutting augers and easy running drilling machines. Several patents already have been granted and applications are pending in foreign countries.



DRILL CONSISTS OF FEW SMALL PARTS

The two cutting edges and one bolt constitute all the detachable parts. Two new cutting edges make a new drill.



Problems of Operating Men

Edited by James T. Beard



Point of Ignition Disputed in the Wakesiah Explosion

No Evidence to Support Conclusion That Ignition Took Place Near Pumpman—Mine Regulation Act Revised—Blowing Out Gas Forbidden

I HAVE read with interest the letter of "Mining Engineer," *Coal Age*, March 22, p. 493, in which he argues that the ignition of the gas, in the Wakesiah explosion of Nov. 24, 1922, must have taken place at some point near the pumpman, or outby from the point assumed in the report of that explosion, given by W. H. Moore.

Kindly permit me to correct that impression, which is based on a seeming lack of an intimate knowledge of the condition of affairs, as found after the explosion. Besides reading the account of the disaster given by Manager Moore, which appeared in an earlier issue of *Coal Age* (Jan. 25, p. 184) I have been afforded the opportunity of making a close study of the situation in that mine.

After carefully considering all the facts in the case, I have been unable to find any evidence in support of the conclusion of "Mining Engineer." Obviously, had this explosion originated outby from the point mentioned in the report, as that writer contends, the unfortunate fireboss would not have sought to escape by running in that direction. The facts show that the fireboss had run a distance of 84 ft. down the return airway, before he fell overcome with the gas.

Fireboss' Cap Burned to a Cinder

My observation convinces me that this disaster was more in the nature of an inflammation than an explosion in its initial stage. Then, as the flame traveled the entry it gained heat and energy. I believe mention has not been made of the fact that the fireboss' cap, which was picked up close to his lamp, 21 ft. from the nozzle of the compressed-air hose, was burned to a cinder. This fact appears to me to have an important bearing on determining what actually took place.

As has already been stated, the shotfiring cable was found where the fireboss had placed it on the floor close to the valve, together with the detonators or electric fuses, which were still intact and showed no signs of scorching or flame. In his report, Mr. Moore says that the interior of the lamp gauzes showed signs of having been subjected to intense heat; but this is not to say that the gauze had been red hot, as "Mining Engineer" assumes.

Owing to the fact that the firedamp mixture was considerably diluted, by the blast of compressed air thrown against it in addition to the ventilating current, the situation appears to me that when the lamp, in its overheated condition, was exposed to this high velocity, its flame passed through the gauze and ignited the gas outside, with the result that the fireboss' cap was burned while he, perhaps, made an ineffectual effort to smother his lamp.

In concluding his letter, "Mining Engineer" suggests that, "a safety lamp is safer when the wick flame is at its full height, provided it does not smoke." To my mind, this is a pernicious doctrine, since the principle of a safety lamp depends on the cooling effect of the gauze. Certainly, the lamp gauze would be hotter when the flame was at its full height and its cooling effect would then be proportionately lessened.

When a lamp with its flame burning at full height is exposed to an atmosphere containing a small percentage of gas the height of the flame is considerably lengthened; and it is possible that this fireboss was not aware of the danger until too late and his lamp had filled with flame. My belief is that it is safer to carry a smaller flame, which will give out less heat and provide a wider margin of safety.

Mines Regulation Act Amended

It is worthy of mention that this disaster has drawn the attention of the Mines Department of British Columbia to the danger of the practice of blowing out the gas with compressed air. As a result, the Coal Mines Regulation Act has since been amended, forbidding that practice. Without doubt, the lesson to be learned is that relating to human fallibility and the need of absolute caution and care in the use of flame safety lamps. No amount of knowledge can safeguard us if that knowledge is not applied.

In closing, let me say that the human factor is always present. We are prone to omit to take the precautions that our better judgment should tell us are needed to insure safety. Why does not the present inventive age produce a universal means of detecting gas that will eliminate the present hazard? The fact that we are still using the modified devices of 100 years ago for this purpose would seem to reflect on the ingenuity of the mining world.

J. Hynd.

Nanaimo, B. C.

ANOTHER LETTER

More information needed—Position of pumpman and motor driving pump should be stated.

IN THE discussion of the probable cause of the Wakesiah explosion, it is quite noticeable that no one, not even the report first given by the manager, has stated the exact position of the pumpman when found, following the explosion. All that has been said is that he was working on the return airway, at a point about 250 ft. distant from the fireboss where it was assumed the explosion started.

It would be interesting as well as important to know the position of the motor driving the pump. It has

been stated that the pumpman was working with an electric lamp. That being the case, he had no means of knowing the highly explosive condition of the air current bearing down upon him, the ignition of which a few moments later killed him.

In my opinion, it is a waste of time to discuss the possibilities of the failure of the safety lamp carried by the fireboss. It is not probable that he exposed his lamp to any such pressure as 90 lb. per sq.in., which was said to be the pressure in the compressed-air line. This pressure, of course, would be quickly reduced when the air left the nozzle of the pipe.

That the Lamp Failed Is Improbable

The failure of this double-gauze bonneted lamp of approved pattern is quite unlikely in the hands of a competent fireboss. As has been proved by many experimenters, a safety lamp if tilted from a vertical position becomes dangerous, because the circulation does not then pass up the chimney and out through the top, but escapes through the gauze just above the glass.

In that position of the lamp, it is possible for an explosive mixture to form and almost fill the lamp, before reaching and being ignited at the wick. In this respect I consider the old Stephenson ("Geodie") lamp was dangerous. In that lamp, the air holes below the flame were too small to admit the air required for the combustion and air entered the lamp above the glass even when the lamp was in a vertical position.

Mining Engineer, No. 2.

————, Alberta, Canada.

Reconstruction in Coal Mining

Aftermath of the war—Conditions much changed in the mining of coal—To get efficiency in production the real problem.

SPEAKING of efficiency in the management of mines, many suggestions have been made as to how this is to be obtained in the present state of affairs. It will be generally agreed that we have not, as yet, recovered from the effects of the war. At that time, it was necessary to try any expedient that would count and the slogan was, "Anything to win the war."

Now, conditions are changed and mine officials are beginning to look about them to ascertain what is needful to improve the situation, which has come as a result of the trying ordeal through which this and other countries have passed during the last few years. In my opinion, most mining men are in a dilemma as to where and how to begin to secure efficiency in the operation of their mines.

Inefficiency Resulting from the War

It cannot be denied that the war situation has created a vast army of raw recruits in the mining of coal. This is true, not only in respect to the class of miners now employed in many of our mines; but there have been opened and many attempts made to operate new mines, most of which must prove, sooner or later, financial failures. Even in the older mines, conditions are such, today, that the problem of producing clean merchantable coal is no joke.

Careful study of the situation should cause many investors in mining property to make a searching inquiry into the manner in which their capital is being employed, not to say squandered; and to ascertain what means and methods of reconstruction are under way that will insure increased efficiency in the various operations and management of the mines in which their capital is invested.

Competition is the life of trade, it is true; but that does not warrant the throwing away of thousands of dollars of invested capital where the prospective returns do not warrant the outlay. In making this statement, it is not my wish to offend any of our able mine managers. It is my desire, only, to put the case as one should view it from an economic as well as a practical standpoint and without prejudice.

Foresight and Thrift Now Needed

There are instances where the mine management have not displayed the foresight they should. It reminds me of the mother of a large family, who, in attempting to supply the needs of John, Sarah and a dozen others, found, too late, that the loaf would not go round. Sending to the store failed to get more, as the supply was exhausted, and some of the children had to go without.

Let us remember that war conditions are now obsolete and we must display foresight and thrift in the management of our mines, in our efforts to make the payroll bear a margin of profit and that one and all may be satisfied. To accomplish this in the various departments of the larger coal companies will require careful inspection and a systematic weeding out of what is not required. In other words, the slogan in mining today should be "reconstruction." System is needed in every branch of the work, which must be co-ordinated. At the same time, each department must stand on its own footing. In other words, as the old saying puts it, "Every tub must stand on its own bottom," here as elsewhere.

Gans, Pa. R. W. Lightburn.

Gobbing Slate in Room-and-Pillar System

Two systems of working, advancing and retreating—Rooms widened and gobbed according to two rules, affording protection for track.

BEING familiar with the methods in common use in the mining of coal is Kentucky, I take the liberty of offering a few additional comments and suggestion in reply to the inquiry of A. L. Trimble, Big Shoal, Ky., which appeared in *Coal Age*, Apr. 12, p. 608, asking for the best method of gobbing the slate taken down in rooms driven to right and left of a pair of entries.

Two systems of working are commonly employed, the advancing and retreating methods, depending largely on the character of the roof, floor and coal of the seam. In the advancing method, the rooms are turned and driven to the limit as the entries are advanced. In the retreating method, no rooms are turned till the entries have reached the boundary or limit, and room turning starts at that point and proceeds outby.

In the advancing system, the pillars may be drawn back as quickly as each room reaches the limit; or the robbing of pillars may be delayed until all the rooms in a section are furnished. In the retreating system, however, the robbing follows closely the extraction in the rooms.

Now, with this explanation, all that remains to be said, in respect to the gobbing of slate in the rooms, is included in two rules, as follows:

1. If pillars are to be drawn as soon as rooms reach the limit, all rooms turned to the right must be widened and gobbed on the left; and all rooms turned to the

left must be widened and gobbed on the right. In each case pillarwork must then start in the second room.

2. If the work of drawing pillars is to be delayed and pillars are to be taken out on the retreating system, all rooms turned to the right (advancing) or to the left (retreating) must be widened and gobbed on the right; and, *vice versa*, rooms to the left (advancing) or to the right (retreating) must be widened and gobbed on the left. The work of drawing pillars must then start on the track of the next-to-the-last room inby.

By following these two rules, the track on which the coal is to be hauled out will always be protected from the falls in the waste left behind.

Pikeville, Ky. GEORGE EDWARDS.

Inquiries Of General Interest

Planning Working a Coal Property, Two Steeply Pitching Seams

Two Anthracite Seams, Pitching 45 Deg., Separated by 125 ft. of Sandstone—Physical Conditions Require Approach on Hanging-Wall Side

WE ARE trying to work out the best possible plan of opening and developing an anthracite property and would greatly appreciate seeing the proposition discussed by the many practical readers of *Coal Age*. With this idea in view I am taking the liberty of presenting for their consideration the condition and requirements as they exist:

There are two seams lying at angle of about 45 deg. and outcropping on the surface. The two seams are separated by 125 ft. of solid strata and both the hanging wall and the footwall in each seam are massive sandstone beds of about 20 ft. in thickness. The coal is 5 ft. thick in one seam and 6 ft. in the other.

To make clear the situation, let me state a few points as requirements and outline our general ideas in regard to the proposition. The physical conditions are such as to require approaching these seams from the hanging-wall side. Study of the situation in all its bearings has determined us to start by driving a 2,000-ft. crosscut tunnel to reach the coal on the side of the hanging wall. We contemplate the probable total extraction of one of the seams, before starting development in the other.

When the crosscut has reached the coal in the upper seam we plan to drive a level each way in that seam, extending it to the property lines on either side. From this level raises will be driven on the full pitch of the seam at distances of 400 ft. apart, and extended up the pitch to the outcrop on the surface, a distance that will approximate 2,000 ft. One advantage gained by this plan is that it affords means of ample natural ventilation.

Having finished these raises, we may then undertake to extract all the coal on some retreating plan that seems to be practicable, possibly a modified longwall applied to limited sections. Another method would be to crosscut each panel, between successive raises, at short intervals adapted to driving chutes and working out each section, in turn, starting from the top and proceeding downward, drawing back the pillars as the chutes are finished.

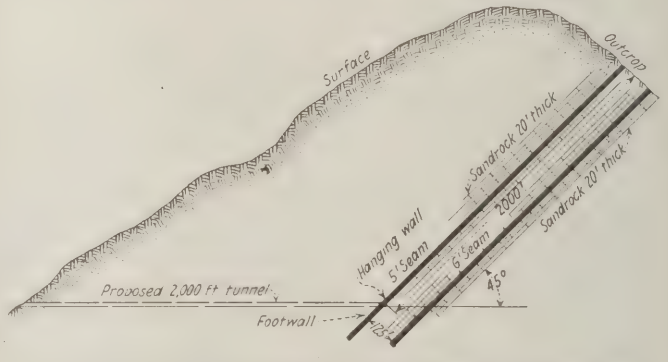
Our first thought, in reference to the longwall plan, was to employ retarding conveyors for lowering the coal to the gangway level. In the chute method, there should be no difficulty experienced in keeping the coal moving on this inclination, especially with the use of sheet iron on the floor of each chute. Someone has suggested the use of endless traveling cables, in each raise, the portion of the cable moving downward along the floor, as a means of keeping the coal moving. While it is claimed that the operation of the cables would require little power, the plan does not appeal to me as practicable.

We hope this outline will draw forth a good discussion and result in many valuable suggestions coming from the experiences of others working under similar conditions. L. L. TRAVIS.

Ophir, Utah.

Had this correspondent favored us with a sketch or profile it would have assisted in making clearer the exact situation. It would also be both interesting and helpful to know what are the "physical conditions" that make it necessary to approach these seams from the side of the hanging wall. We will assume that they relate solely to the location of shipping facilities and surface plant and in no way affect the mining of the coal.

Since these two seams are said to outcrop and have an inclination of about 45 deg., the fact that they



ASSUMED PROFILE SHOWING PROBABLE SITUATION

must be approached from the hanging-wall side would suggest a situation somewhat similar to that we have outlined in the accompanying figure, showing the proposed 2,000-ft. tunnel driven on the side of the hanging wall, and the two seams 125 ft. apart and inclined at an angle of 45 deg.

The plan of driving a gangway level, right and left in the seam where it is intersected by the cross-tunnel and extending these levels to the property lines on either side cannot be improved. Also, the laying out of the seam above the gangway in panels, by driving rise headings on the full pitch of the seam is good. In the further development of the seam, the retreating longwall face with the employment of a face conveyor will probably give good results under this sandstone roof. There is no difficulty to be expected in the sliding of the coal on this steep pitch. The hardness of the anthracite will favor the use of retarding conveyors, requiring little or no power in their operation.

This is an excellent problem for discussion by practical mining men, who will be able to offer many valuable suggestions from their varied experiences and we hope for a good response to this appeal.

Examination Questions Answered

Examination for Mine Managers, Springfield, Ill., Mar. 19, 1923

(Selected Questions)

QUESTION—*Two drill holes one mile apart are put down to a coal seam; the depth of the first is 634 ft. and that of the second is 850 ft.; the surface at the former is 25 ft. above the latter. What is the inclination of the coal seam between the two points measured in inches per yard?*

ANSWER—The bottom of the second hole below that of the first is 25 + 850 — 634 = 241 ft. One mile is 5,280 ft. or 1,760 yd. The inclination of the seam, therefore, is (241 × 12) ÷ 1,760 = 1.643 in. per yd.

QUESTION—*What is the proportion of marsh gas and air in a firedamp mixture that will develop a maximum explosive mixture?*

ANSWER—The proportion of gas to air at the maximum explosive point of the mixture (methane and air) is 1:9.57, or approximately 1:9½.

QUESTION—*What are the limiting proportions that determine an explosive mixture of pure methane and gas?*

ANSWER—The limiting proportions forming an explosive mixture of these gases are, lower limit 1:13; upper limit 1:5. Actual explosion of the mixture, however, depends largely on the purity of the gas, the normal state of the air and the intensity of the flame causing ignition.

QUESTION—*How many cubic feet of marsh gas will be required to be generated in a mine per minute to render dangerous a current of 30,000 cu.ft. of air per minute?*

ANSWER—Much depends on the character of the coal in respect to its hardness and inflammability, also the condition of the mine with respect to dust. In an anthracite mine 3 per cent of gas would not be considered dangerous, while in a bituminous mine and a highly inflammable coal 1 per cent of gas in the current will often be dangerous. In this case, assuming the danger point is reached when the proportion of gas to air is 1:40 (2½ per cent) the volume of marsh gas required to render dangerous an air current of 30,000 cu.ft. is 30,000 ÷ 40 = 750 cu.ft. per min.

QUESTION—*What causes the variation of the temperature of the air when it is passing through the mine? Does such change of temperature affect the volume of air passing? Explain fully.*

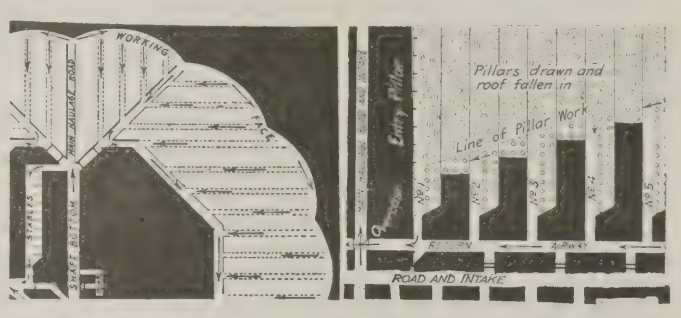
ANSWER—The temperature of a mine is quite uniform as compared with that of the outer atmosphere, summer and winter. While in summer the air entering the mine may be warmer than the mine air and give up some of its heat in passing through the mine, a more general condition is that when the outside air enters the mine at a lower temperature than that of the mine and absorbs heat in passing through the workings. The heat of the mine is the natural heat of the strata, which increases with the depth below the surface after the first twenty yards of depth.

In shaft mines the change of temperature in the air in circulation produces an air column that assists the circulation of the air in the winter season and often retards the circulation produced by a fan in the summer time. The action assisting or retarding the circulation, in fan ventilation, will depend on the position of the fan in respect to the mine openings and whether it is blowing or exhausting the air.

QUESTION—*Show clearly by means of sketches the two common methods of working a coal field, giving the conditions favorable to the application of these methods.*

ANSWER—In the accompanying figure are shown the longwall method of mining on the left and the room-and-pillar system of mining on the right. These are the two common methods employed in the mining of coal. The longwall method is particularly adapted to working thin seams of coal and when mining at great depths where the roof pressure is excessive. This method is also favorable to the complete extraction of the coal where conditions will permit of its adoption.

The room-and-pillar method shown on the right of the



SHOWING TWO COMMON METHODS OF WORKING

figure is applicable to the mining of coal under ordinary conditions and where the roof conditions will not permit of the use of the longwall method. The advancing system shown in the figure permits of quick returns on the capital invested in the development of the mine.

QUESTION—*In a certain mine there are two sections ventilated by separate air currents. The combined length of the intake and return in one of these sections is 6,000 ft.; the number of men employed is 110 and the number of mules, 10. In the other division, the length of the airway is 3,000 ft.; the number of men is 110; and the number of the mules 7. What will be the proper distribution of the air sent into the mine and what steps must be taken to secure such a distribution?*

ANSWER—The Illinois Mining Law requires an air volume of 100 cu.ft. per man and 500 cu.ft. per mule employed underground in a non-gaseous mine. To comply with this law will require 16,000 cu.ft. per min. as the circulation in the first mine where the length of the air-course is 6 000 ft.; and 14 500 cu.ft. per min. in the second mine where the length of the air-course is 3,000 ft. Other things being equal, the volume of air circulated in natural division, varies inversely as the square root of the length of the airway. The natural division of air between these two airways is, therefore, in the ratio $\sqrt{3}:\sqrt{6}$; or $1:\sqrt{2} = 1:1.4$, in favor of the shorter air-course. That is to say for every 100 cu.ft. of air passing in the first airway (6,000 ft. long), there will be 140 cu.ft. per min. passing in the second airway (3,000 ft. long). Therefore, in order to reduce the air volume in the shorter section and increase the circulation in the longer section where the larger qantity of air is required it will be necessary to install a regulator in the shorter air-course.

To Confer on Reduction of Freight Waste

Reduction of waste in freight transportation will be considered at a conference on June 13 at the Department of Commerce. F. R. Wadleigh, who is making the arrangements for the conference, states that he believes savings which will run into huge sums can be made if more attention is given to prompt loading and unloading of freight cars, to obtaining a higher average day's mileage, to the loading of cars to capacity, and to a large number of opportunities which are offered shippers and transportation companies to eliminate waste.

Call Strike at Railroad Brotherhood Mine

Union miners of the Coal River Collieries Co., West Virginia, are on strike, according to Secretary Fred Mooney, of District 17, United Mine Workers. The company's board of directors is headed by Warren S. Stone, president of the Brotherhood of Locomotive Engineers, and although the Brotherhood organization is not directly connected with the company, the latter is made up mainly of Brotherhood members.

The issue, according to Mooney, is unionization of the mine. He declared nearly all the employees had quit work because the company announced it would be run on an open-shop basis, and refused to recognize a local union.

Between sixty-five and seventy-five men are out and non-union miners are being employed to take their places.

At a conference between Mooney and Warren S. Stone, Brotherhood President and Chairman of the Board of Directors of the mining company last year, Mooney said Stone told him that the mines would operate on the union basis as soon as they were opened. On this understanding union miners on strike at other mines were given permits to work at the mines.

Mooney also declared that William Blizzard, president of sub-district No. 2, in whose territory the alleged strike has occurred, went to the mine to attempt to arrange a settlement, but that the management declined to see him.

At his office in Cleveland, May 29, Mr. Stone admitted that the mines were not fully unionized, but asserted that the men had his permission to join the union if they desired. He said he had received no reports on any strikes.

"We are paying the union scale in West Virginia," he said. "In east Kentucky, where the Coal River Collieries also have mines, the miners have not been organized for twenty years, but we are paying the going rate in eastern Kentucky."

Coal-Mine Fatalities in April Higher In Number and Ratio to Output

Accidents at coal mines during April, 1923, caused the death of 175 men, according to reports received by the Bureau of Mines from state mine inspectors throughout the country. This number cannot be compared with the 78 fatalities in April, 1922, because half of the mining industry was idle in April last year on account of the miners' strike. The fatality rates per million tons, however, are comparable; and the figures show a rate of 3.49 for April, 1923, as against 4.87 for April, 1922. In March, 1923, there were 168 fatalities, or 2.99 per million tons produced.

The figures for April have brought the total number of fatalities for 1923 to 851, indicating a death rate of 3.96 per million tons, as compared with 671 fatalities during the first four months last year, representing a rate of 4.04 per million tons.

The year's record to date for all fatalities from all causes shows that the fatality rate per million tons has been slightly reduced as regards haulage and falls of roof and coal, but that it is still above last year's record as regards explosions of gas and dust. These facts are indicated by the following figures showing the death-rates per million tons during the first four months of each year:

	1922	1923
Falls of roof and coal	1.902	1.753
Haulage	0.794	0.618
Gas and dust explosions	0.554	0.785
Explosives	0.180	0.168
Electricity	0.102	0.107

COAL-MINE FATALITIES DURING APRIL, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground													Shaft					Surface							Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	3		1					2					6										2		2	8	7
Alaska																										0	0
Arkansas	1												1													1	0
Colorado	1		2			1						1	5											2	2	7	1
Illinois	5		6							1			12													12	4
Indiana			2			4							6											1	1	7	0
Iowa																										0	0
Kansas																										0	0
Kentucky		2	5			1						1	9													9	13
Maryland																										0	0
Michigan																										0	0
Missouri	2												2													2	0
Montana																										0	1
New Mexico	2							1					3													3	2
North Dakota																										0	0
Ohio	6		2					1					9													9	1
Oklahoma																										0	2
Pennsylvania (bituminous)	16	9	1			1						1	28	1				1	1					1	2	31	18
South Dakota																										0	0
Tennessee																										0	1
Texas																1		1								1	0
Utah	1												1											1	1	2	1
Virginia	6		1										7													7	1
Washington	1												1													1	1
West Virginia	14	2	12			2		2		1			33						2					2	4	37	25
Wyoming	2												2													2	0
Total (bituminous)	60	13	32			9		6		2		3	125	1		1		2	3				2	7	12	139	78
Pennsylvania (anthracite)	10	5	5	2		7						2	31	1		1		2	2					1	3	36	0
Total, April, 1923	70	18	37	2		16		6		2		5	156	2		2		4	5				2	8	15	175	
Total, April, 1922	37	6	18		2	1		1		5		2	72						1		1		3	1	6		78

Howatism Is Rising Again in United Mine Workers' Organization

With the slack summer season have come indications of sporadic radical activity among the miners of the Kansas field. The most recent, and the most pronounced, was a meeting of the "Progressive Miners' Organization," at Franklin, near Pittsburg, May 29. Approximately 500 members of the northern Crawford County section of District 14, United Mine Workers, are reported to have attended, in defiance of a threat by the district board that they would be expelled. August Dorchy, vice-president of the district under the deposed Alexander Howat, was chosen a delegate to the "Progressive Miners'" conference at Pittsburgh, Pa., June 2 and 3.

Caleb Harrison, of Chicago, member of the Chicago machinists' union and representative of the "Progressive Miners'" committee, was the imported speaker. He had out his little hammer for John L. Lewis, international president, and Van R. Bittner, special representative of the United Mine Workers, while speakers from among the local miners directed their knocks at the district board. All united in an effort to make the Howat ghost walk again. It was as the bearer of a personal message "direct from Howat" that Harrison was advertised.

"The 'Progressive Miners'" movement is designed to put the Lewises and the Bittners where they belong," Harrison informed his hearers, "and Howat where he belongs. If you are thrown out of the organization, just consider yourselves members and support this move and soon men like Alex Howat will be at the head of the United Mine Workers, guiding it to success. Howat is more a member of the United Mine Workers today than Lewis, and he is the bigger man of the two." Harrison added that Howat will attend the conference in Pittsburgh and is a stanch supporter of the "Progressive Miners" movement as a means of ending the Lewis régime. He advocated a national labor party, and distributed a booklet by William Z. Foster, recently tried on a charge of criminal syndicalism, on "The Bankruptcy of the American Labor Movement."

Harrison denied the "Progressive Miners' Organization" is a dual organization to the United Mine Workers, and emphasized the importance of the "Progressive Miners" working within the United Mine Workers organization.

Miners who attended the meeting at Franklin were suspended from the union June 2, by the district board, which declared the "Progressive Miners" a dual organization to the United Mine Workers.

Public Contracting in Kentucky Gives Good Idea of Prevailing Prices in That State

Some contract business which has been placed in Kentucky during the past few days gives an interesting line on contract prices. The State Board of Charities and Corrections at Frankfort has bought coal for the state institutions, contracts having been awarded.

The Cornett Lewis Coal Co., Louisville, received a contract for approximately 6,500 tons of Harlan nut and slack at $2.25 a ton at mine, carrying freight rate of $1.79 a ton to Lakeland. The Frankfort Elevator Coal Co., Frankfort, operating mines at Beattyville and shipping by its own barge lines to Frankfort, took two contracts on a delivered basis, at $3.40 for the State Reformatory and $3.25 f.o.b. Frankfort, for the Feeble Minded Institute. The Harlan Coal Co., Louisville, received the Greendale contract at $2.40 at mine for Harlan run of mine, carrying a freight rate of $1.62 to Greendale. The R. C. Tway Coal Sales Co., Louisville, received the Lexington contract at $2.25 a ton at the mine, carrying $1.62 freight rate to Lexington.

The Belle Union Coal Co., operating in western Kentucky, received contract for 3,750 tons of western Kentucky pea and slack, $1.50 a ton at mine, to be shipped to Eddyville, on a freight rate of $1.47 a ton. The Gordon Mining Co., Madisonville, received the Hopkinsville contract, of 6,250 tons, at $1.85 a ton at mine, carrying freight rate of 79c. to Hopkinsville.

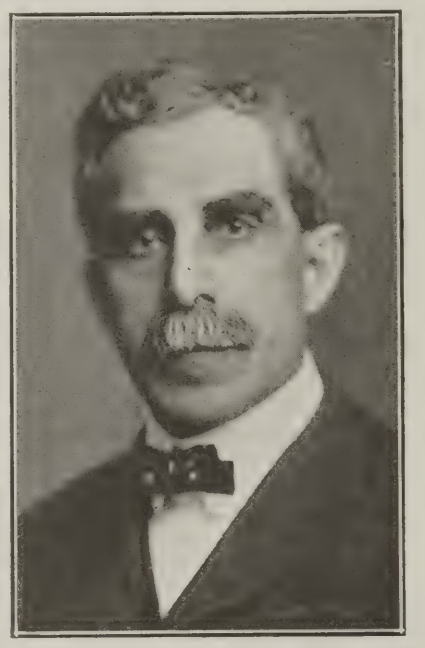
The Board of Education at Louisville also placed its contracts, which call for 4,106 tons of eastern Kentucky nut and slack at $1.96 a ton at mine, and 221 tons of eastern Kentucky lump at $3.06 a ton, carrying freight rate of $1.69 from mine to Louisville. The H. B. Jones Coal Co. received contract for 1,375 tons of eastern Kentucky nut and slack at $4.34 delivered and 228 tons of eastern Kentucky lump at $5.84 delivered.

Captain W. A. May Claimed by Death

Captain William A. May, president of the Pennsylvania Coal Co. and the Hillside Coal & Iron Co., died at his home in Scranton, Pa., June 1, after an illness of nearly three weeks. He was 72 years old.

Captain May was the son of Rev. Lewis and Louisa (Haine) May and was born in Hollidayburg, Blair County, Pa., Dec. 3, 1850. He received his early education in the public schools in the towns where his father's ministerial duties called the family. When he was but fourteen years of age his father died and three years later his mother was summoned by death.

He prepared for college at Dickinson Seminary, near Williamsport, where he was awarded the degree of bachelor of arts. While a seminary student he made a special study of civil and mining engineering and after leaving school he was given a position as rodman with the Hillside Coal & Iron Co.



WILLIAM A. MAY

Captain May matriculated at Lafayette College, graduating in 1876 as a civil engineer. He likewise received a degree of master of arts. After completing his education, Captain May returned to the Hillside Coal & Iron Co. as chief engineer.

Two years after rejoining the Hillside Coal & Iron Co. Captain May added to his duties those of chief engineer for the North Western Mining & Exchange Co. In 1883 he was made superintendent of the Hillside Coal & Iron Co. and served in that capacity until 1901, when he was made vice-president and general manager of the Pennsylvania Coal Co. and the New York, Susquehanna & Western Coal Co. In 1913 he became president of the Pennsylvania company and of the Hillside Coal & Iron Co.

Part of the training of Captain May as a handler of men was received as a member of the national guard of Pennsylvania. He enlisted as a private in the Thirteenth Regiment in February, 1878. Ten years later he was mustered out as captain of Company D. Captain May was the holder of a ten-year marksmanship medal and always retained an active interest in the regiment. He devoted much time and service to the erection of the Thirteenth Regiment Armory.

Besides his work in the coal industry, Captain May was identified with a number of the business industrial activities of Scranton. He was a director of the Third National Bank, a trustee of Lafayette College and of Dickinson Seminary; the Young Men's Christian Association and of Elm Park Church.

Captain May married Emma Louisa, daughter of Mr. and Mrs. B. L. Richards, of Williamsport. She survived together with one daughter, Mrs. Page, two brothers, George May of Williamsport, and L. H. May, of Forest City.

Navy Department Awards Coal Contracts

The Navy Department awarded contracts June 4 for more than 300,000 tons of bituminous and semi-bituminous coal required by navy yards and naval stations during the coming fiscal year, beginning July 1.

Awards made were: Boston, 30,000 tons, to W. A. Marshall & Co., New York, at $7.41 a ton; South Brooklyn, 9,000 tons, to George D. Harris, New York, $6.30; Iona Island, 2,000 tons, to George D. Harris, New York, $5.79; Lake Denmark, N. J., 1,800 tons, to George D. Harris, New York, $6.67; Lakehurst, N. J., 4,900 tons, to George D. Harris, New York, $6.15; Philadelphia, 45,000 tons, to Fidelity Coal Mining Co., Philadelphia, $5.83; Fort Mifflin, Pa., 450 tons, to George D. Harris & Co., New York, $5.41; Philadelphia, 20,000 tons, Morrisdale Coal Co., Philadelphia, $5.52 delivered at pier, $5.67 delivered at wharf.

Annapolis, Md., 35,100 tons, to Dexter & Carpenter, Inc., New York, $6.50; 1,650 tons to Hall Bros. & Co., Baltimore, $7.20; Annapolis, Md., 2,100 tons, to Hall Bros. & Co., Baltimore, $6; Washington, D. C., 300 tons, to Dexter & Carpenter, $5.92; Bellevue, 50 tons, Dexter & Carpenter, $5.92; Alexandria, 1,150 tons to Dexter & Carpenter, $6.32; Washington, D. C., 50,000 tons, Quemahoning Coal Co., Somerset, Pa., $6.29.

Indian Head, Md., 33,000 tons to Fidelity Mining Co., at $6.19 a ton; Indian Head, Md., 10,000 tons to Consolidation Coal Co., of Washington, at $7.30; Hampton Roads, 22,000 tons, to C. G. Blake Co., Cincinnati, $6.88; Norfolk Navy Yard, 45,000 tons to Fayette Smokeless Fuel Co., Mount Hope, W. Va., at $6.88.

Charleston, S. C., 10,000 tons to L. A. Snead Co., Washington, at $7.54; Pensacola, Fla., 8,700 tons to Adams, Rowe & Norman, Birmingham, at $3.03; Great Lakes, Ill., 2,000 tons at $2.65, and 30,000 tons soft screenings at $1.75 to Lake Export Coal Sales Corporation, Chicago; 400 tons screened lump coal over two inch screen to Cosgrove & Co., Johnstown, Pa., at $2.30.

Expect Big Turnout at Retail Convention

Reports from sub-committee chairmen throughout the country indicate a record attendance at the sixth annual convention of the National Retail Coal Merchants' Association, to be held at Scranton, Pa., June 25, 26 and 27, 1923. Reservations are now coming in as fast as they can be handled. They have been received from such wide separated points as Canada, Colorado and North Carolina.

Those who have accepted invitations to speak are F. R. Wadleigh, Federal Fuel Distributor; John Durkan, Mayor of Scranton; E. W. Parker, of the General Policies Committee, Anthracite Operators; George H. Cushing, editor of Cushing's Survey; and J. C. Bryden, chairman of the Bituminous Operators', Special Committee. Another speaker of national importance (to be announced later) is expected to address the meeting. A number of operators and newspaper men will be guests of the retailers.

Music is being arranged, a song leader has been engaged and novel entertaining features have been prepared.

Draft Tentative Plans for Certification Of Coal for Export

Coal exporters, railroad officials, representatives of testing laboratories and of the government had a conference with the Federal Fuel Distributor and the Bureau of Mines in Washington on May 24 to consider the possibility of working out a plan for the certification of coal for export.

It was tentatively agreed that a plan based upon the informal co-operation of the Bureau of Mines and the Department of Commerce might be worked out whereby the coal shipper and the railroad would note on the waybill the mine from which the coal originated. Inspectors would be provided at the various piers to record, from the notes thus provided on the waybills, a complete statement of the origin of the coal making up each cargo for export, which statement would be used as a government certificate showing the origin of the coal.

A pamphlet is to be prepared stating "in general terms the characteristics of the coal of each of the commercial districts exporting," which pamphlet, with more detailed information, is to be compiled by the Bureau of Mines and the Federal Fuel Distributor and is to serve as a guide to the buyer.

Participation is to be entirely voluntary, the cost to be paid by the exporters. The total cost to cover Norfolk, Baltimore, Philadelphia and Charleston is estimated at $24,680 per year.

Railroads Ask Chance to Solve Problems Without Fear of Confiscation

Adoption of a policy by the American people that will insure the railroads of this country fair treatment and enable them to work out their problems without fear of action "of a confiscatory nature" for a time at least was urged in a report filed June 4 with the U. S. Coal Commission by a special committee appointed by the American Railway Association to render such assistance as possible to the Fact-Finding Commission. The report supplements a preliminary one filed five months ago by the special committee of which J. E. Roberts, of Albany, N. Y., superintendent of transportation of the Delaware & Hudson Co., is chairman.

In concluding its report as to the causes of the fuel situation and possible remedies the report said:

"There can be no doubt that the railroads of the United States are vitally interested in the work of your commission. It has been said that the principal problem of the coal industry is the problem of distribution. Without committing ourselves to the absolute correctness of this statement, we are sensible of the fact that the coal industry cannot be put upon a sound basis acceptable to the American people unless coal is transported with reasonable promptness and in the most efficient manner. It is the task of the railroads to furnish this transportation. This task has been rendered difficult by certain features characterizing the production of coal which your commission thoroughly understands and which all students of the problem are endeavoring to eliminate.

"It is clear that if some method could be devised whereby the amount of coal which the country demands could be removed throughout the year in fairly constant quantities so that heavy seasonal movements would be avoided, the railroads of the country are sufficiently equipped to take care of the demands upon them in a satisfactory manner. Even if allowance is made for an increased demand for coal during the period of heaviest domestic consumption the railroads could meet the situation without serious cause for complaint. But the railroads do not feel that they are properly censurable for not being able to meet all the demands for transportation in years when strikes in the coal industry have stopped production for a considerable period, making it necessary to crowd a year's business into a few months and that too at a a time when there is the heaviest movement of other seasonal commodities.

"Of course the undertaking of the railroads to meet demands upon them must depend upon the ability of the railroads to increase their facilities as the business of the country increases. These facilities cannot be procured without the expenditure of new capital, which must come from the investing public. It is clear that capital will not be attracted to railroad securities unless there is a reasonable assurance that the investment is safe.

"These considerations lead us to suggest that there are two fundamental conditions which the public must establish before the problem of distributing coal will be solved. These are: First, fair treatment to the railroads under which they will be permitted to earn a fair return upon the value of their property fairly ascertained, and second, freedom from strikes, both in the coal and railroad industry, so that these two essential businesses may function without disturbing interruptions."

The report says that there has been a general increase in efficiency on the part of the railroads in freight transportation in recent years. In 1922, the report said, Class 1 railroads handled 19.2 per cent more revenue freight, measured in net ton miles, with 9½ per cent less freight-train miles than in 1914. In 1921 the performance was 7.7 per cent more freight traffic than in 1914 with 13½ per cent less train miles.

Coal Commission Hears Lewis on British Coal Situation; Data for July Report Nearly Complete

By Paul Wooton
Washington Correspondent of *Coal Age*

The coal industry in England is in a bad way, in the opinion of John L. Lewis, president of the United Mine Workers of America. The wage being paid mine workers in England, based as it is on the selling price of coal, is insufficient, Mr. Lewis told the President's Coal Commission, to allow the workers to live in other than a state of poverty. Mr. Lewis left the impression with the commission that the British producers are in no position to increase the price of coal. The situation, however, has been improved somewhat by the increased demand for British coal which has grown out of the occupation of the Ruhr.

Chairman Hammond and Dr. Smith, who represented the commission at the conference with the press Friday, would give little additional information as to what had been told them by the Mine Workers' president. They did state positively that there had been no discussion of the anthracite wage scale. One of the points which Mr. Lewis brought to the attention of the commission, Mr. Hammond revealed, was that of the relative productivity of the average mine worker in America as compared with the average mine worker abroad. Mr. Lewis declared that the American mine worker is several times as efficient as the foreign coal digger. He pointed out, however, that British coal mines are safer places to work in than are the mines in the United States. Mr. Lewis made the point that there must be closer co-operation between operators and their employees looking to the lowering of the accident hazard.

During his stay in Washington Mr. Lewis had no conference with the press. To the few newspapermen who were able to see him he made only perfunctory statements and indicated that he does not desire at this time to reply to the questions which naturally would be put to him by representatives of the press. He is to appear again, however, before the Coal Commission prior to the drafting of the anthracite report. It is known, however, that Mr. Lewis covered practically the entire ground covered by the anthracite operators and indicated the points of difference between the employers and the mine workers.

Anthracite Finances Elicit Interest

The commission now is busily engaged in digesting the important staff reports submitted on June 1. Particular care was taken with these reports, as they will furnish the basic information for the anthracite report. Much attention was given the report of Prof. J. H. Hollander, which deals with the financial aspects of the anthracite situation. In addition to the written report, Professor Hollander and members of his staff discussed the subject matter orally with the members of the commission.

The statistical data necessary for the July report are being tabulated rapidly and will be in final form within the next few days. The commission was in no position to make any deductions from the statistics on Friday. They still "point in all directions," Dr. Smith said.

Whether or not the separate branches of the coal industry are through throwing mud at each other, the commission is confident that it is to receive the constructive suggestions which each interest has promised. The railroads have submitted a statement which Chairman Hammond described as "constructive." At the press conference there was some discussion of a suggestion by Commissioner Potter of the Interstate Commerce Commission that the railroads be prepared at any time to furnish the cars necessary to transport 15,000,000 tons a week. Apparently Commissioners Hammond and Smith were not prepared to accept the practicability of such a plan.

Chairman Hammond reiterated his former statement that the commission probably will recommend a reduction in the freight rates on anthracite, but coupled with it a warning that a long period necessarily must ensue before any reduction could be put into effect, and even then the recommendation might not be followed. For these reasons he expressed the hope that the public would not be influenced to delay purchases of coal on the prospect of benefiting from a lower freight rate. Dr. Smith called attention to the fact that those who withheld purchases of coal when the bituminous rate reduction was under consideration were penalized heavily for so doing, since they had to pay much more for their coal after the reduction went into effect than would have been the case had they bought earlier. The man who fails to buy his coal early is likely to find himself in a predicament similar to that described in a Mother Goose rhyme which Dr. Smith paraphrases as follows:

This little pig went to market,
This little pig stayed at home,
This little pig got his winter's fuel.
This little pig got none.

Midwestern Retailers Disapprove of Trade Commission's Sanction of "Snowbirding"

Certain Middle Western retail coal interests are not at all hesitant about telling Herbert Hoover why the people of that region are not storing coal, as Secretary Hoover has urged. One of the reasons is interference in industry by the Federal Trade Commission, especially the commission's efforts to compel wholesale coal concerns like the Northwest docks to sell coal to "snowbirds." The Midwest Retail Coal Association, comprising many dealers in Missouri and Iowa, expresses itself to Mr. Hoover thus in a letter from E. J. Wallace, commissioner of the association:

"Acknowledging your circular letter of the 11th and your further letter of the 17th, will say that this association is doing everything possible to encourage dealers in the early storage and delivery of coal to their customers. Our efforts, however, are being stopped, our business is being ruined, by the unfair activities of the Federal Trade Commission.

"The commission insists that everyone has a right to buy coal and if people with no equipment and no bins can buy coal at the same price that merchants can who are put to the expense of storing coal, what encouragement is there to these dealers to store? The Federal Trade Commission tells us that we have no right to do anything to prevent anyone from buying coal and our dealers feel that the so-called clubbing together of coal is unfair competition, and the encouragement of this unfair competition by the Federal Trade Commission is going to cause the retail coal business to break down.

"I refer you in particular to some of the points filed in complaints by the Federal Trade Commission against the Northwestern Dock Shippers Association of Minneapolis. However, we are doing our best to get our dealers to stock, but when dealers won't store for the reasons given above, the ultimate consumer feels that he should not be in a hurry to do it."

Wadleigh Plans Encyclopedia of Standards And Specifications for Commodities

Specifications and standards to apply to all commodities moving in interstate or foreign commerce will be discussed at a conference to be held at the Department of Commerce on June 11. F. R. Wadleigh is in charge of the arrangements being made for the conference. Mr. Wadleigh is planning the issuance of an encyclopedia of specifications and standards. He believes it is possible to apply to most commodities the same principle which is working out so well in the simplification of specifications and standards for the commodities purchased by the government.

Shipping Board Opens Bunker Bids

Bids opened on May 31 by the U. S. Shipping Board at New York for furnishing bunker coal in quantities as required alongside vessels operated by the United States Lines at the Port of New York resulted in tenders ranging on a basis of $3.08@$4.55 per net at the mine.

The specifications called for coal from mine or mines heretofore classified as Pool 1, Pennsylvania or West Virginia, or coal under Navy Acceptable and supplementary lists, to be delivered alongside vessels in New York harbor as required. Bids were asked for six months and for one year. No specific tonnage was named but the successful bidder will not be required except with his consent to deliver in any one month in excess of 15,000 gross tons, the estimated maximum requirements. Bidders and prices received were as follows:

Cosgrove & Co., first six months, $6.50 per gross ton, f.a.s.; second six months, $7.06 per gross ton, f.a.s.

H. B. W. Haff, 75,000 gross tons, six months or one year, $7.35.

Penn Fuel Co., six months, $6.74; one year, $6.99.

W. A. Marshall & Co., 7,700 gross tons monthly for six months, $8.13; 6,000 gross tons monthly for year, $8.13, and 8,000 gross tons monthly for six months or one year, $7.40.

J. H. Weaver & Co., six months or one year, $7.20.

Steamship Fuel Corp., Pool 71, for one year, $7.34.

Seiler Coal Co., Pool 1, for six months or one year, $6.92.

Berwind-White Coal Mining Co., for six months or one year, $7.25.

Coleman & Co., 30,000 gross tons, for six months delivery, $7.52.

Roads Tell Governor Davis They Will Not Make Low Summer Rates on Kansas Coal

After the failure of Governor Davis' recent conference with coal operators, dealers, miners and railroads, dedicated to reopening the Kansas mines, some optimists maintained that the railroads still might be induced to establish emergency summer rates that would make possible a reduction in the price of coal, and thus encourage an increase in demand. The Governor put the question to the railroads. And the other day they answered him with a most emphatic no.

The railroad's statement was to the effect that "Kansas coal cannot be successfully stored; that to establish emergency freight rates in Kansas only would constitute undue tariff discrimination; that any reduction in freight rates would not cut the price of coal sufficiently to induce consumers to store coal during the summer, especially in view of the known fire hazard and the coal's inclination to slack, and finally that other fields are suffering as much as Kansas from an abnormally light summer demand."

Wadleigh Urges Householders to Lay in Coal Before Sept. 1

In a statement issued June 4, F. R. Wadleigh, Federal Distributor, reviews the efforts of national and state trade associations, public utilities and railroads to effect storage of coal for winter consumption between now and Sept. 1. The suggestion is made to the business man and the householder that they obtain their winter coal when it can be easily handled, and as an added precaution against transportation difficulties at a later date.

"Reports received," said Mr. Wadleigh, "indicate that many consumers are delaying their purchases of coal in the belief that the work of the U. S. Coal Commission will result in reductions in prices. While constructive recommendations based on an immense collection of data undoubtedly will be made in the report of the Coal Commission, it is pointed out that no legislative action can be taken until Congress meets in December.

"Considering the general situation today, and in view of the positive recommendations made by the Secretary of Commerce and the great national trade, transportation and public-utility bodies, it is difficult to see how the consumer with ordinary prudence and foresight can avoid following the advice given, that his winter supply of coal, whether for domestic or industrial use, be purchased and stored during the summer months."

Captain Samuel Hines Is Dead

Captain Samuel Hines, long and prominently identified with affairs in the anthracite industry, died at his home in Scranton, Pa., June 3, after a lingering illness. He was in his seventy-ninth year.

Captain Hines was born in Washington, D. C., July 21, 1843, and received his early education at the Washington Seminary and Union Academy.

During the Civil War he enlisted in the Union cause and was assigned to a position in the quartermaster's department as assistant to Captain H. B. Blood, with the armies operating against Richmond, Va.

Continuing in the service until the close of the war, Captain Hines accompanied Captain Blood to Mercer County, Pa., and located valuable deposits of coal in that section. Captain Hines supervised the construction of a breaker, built houses for miners and was the founder of the borough of Stoneboro, which he named after Amisa Stone. He organized and became the paymaster and general agent of the Mercer Coal & Iron Co.

In 1873 he went to Scranton to accept a position as general manager of the Hillside Coal & Iron Co. He figured prominently in the development of the coal industry of the section in and about what is now Forest City. The borough was named by Captain Hines.

After leaving the Hillside Coal & Iron Co. Captain Hines was associated with Dr. B. H. Throop and had charge of the development of the Borough of Throop. He also represented the firm of Price, Pancoast, Parker & Throop at Throop. He continued with these interests until falling health caused him to give up active work about five years ago.

Captain Hines married Miss Rose Nolan, of Hamilton, Canada, on Jan. 21, 1867. His wife died on May 21, 1921.

Supreme Court Rules in Coal Cases

In a decision read June 4 by Associate Justice McReynolds, the U. S. Supreme Court established the precedent that the federal government may be sued in a District Court for recovery of just compensation for commodities requisitioned under the war-time Lever Act in cases of direct requisition.

The case at issue was an appeal of the Houston Coal Co. from a decision of a District Court that it was without jurisdiction to try a suit for the recovery of additional compensation, under Section 10 of the Lever Act. The Navy Department had requisitioned coal from the Houston company, paying $4 per ton, the price fixed by the President under the Lever Act. The company filed suit in the District Court for the recovery of just compensation, which it alleged to be the difference between $4 per ton and the prevailing market price.

In a brief decision, the Supreme Court declared that the District Court did have such jurisdiction and that suit for direct requisition may be instituted in District Courts without the necessity of filing a claim with the Court of Claims.

In the case of Willard, Sutherland & Co. against the United States, appealed from the Court of Claims, the Supreme Court, in an opinion by Associate Justice Butler, affirmed the decision of the Court of Claims that the company has no cause for recovery from the United States. The company contended that the Navy Department in 1917 ordered it to deliver coal at $2.80 per ton in an amount exceeding its contract quality, and filed a claim for $3.65 per ton additional for this excess. The Supreme Court held that the contract was non-enforceable, because of lack of equity, but that because the company had complied with the department's demands, and delivered the coal, it could not recover. A similar decision was rendered in the case of Wm. C. Atwater & Co., Inc., against the United States, a claim caused by Navy coal orders on the same grounds as in the Willard case.

Sensational Testimony in West Virginia Injunction Case; Postponed to Oct. 1

The most startling development at the opening of the second week of the hearings before Judge George W. McClintic in connection with the twelve injunction suits brought against the United Mine Workers by approximately forty-five mine owners in West Virginia was the testimony of the Rev. J. E. Wilburn, mountaineer preacher of Blair, W. Va., now under sentence of eleven years in the penitentiary for his part in the slaying of John Gore, Logan County deputy sheriff, incidental to the armed march of 1921. The witness said on the stand that his lips had been sealed when he was on the witness stand at Charles Town last summer by the injunction of union officials not to "tell more than he had to" with an accompanying threat that "he would be killed on the witness stand."

Wilburn also testified that "when the armed men began to come to Blair, I saw Blizzard, Aug. 26, in an auto which stopped at the school house. There were 15 or 20 rifles in his car. Some 400 men were assembled. I saw him again Aug. 30 when he came in an auto. He had about 25 guns and ammunition. It was stored in my house, in my parlor. There were about 300 to 400 lb. of ammunition. It was distributed among the men."

Will Swanner, a son of J. W. Swanner, killed at Pomeroy, Ohio, told of the advice of a union official to union miners to get their "walking sticks" and he asserted that Fred Mooney, secretary of District 17, had given such advice in a speech at Clothier. The witness added that "walking sticks" were high-powered rifles.

H. W. Dawson, of Gallagher, in telling the story of the machine gun stolen from the railroad station at Pax during the trouble at Willis Branch and of its use in the fighting in Logan County, related a conversation he had with C. F. Keeney, president of District 17, in which the latter had said that the union had tried to settle the trouble in the industrial courts but had failed and now must settle it on the battlefield.

The plaintiffs in the injunction cases closed their presentation of evidence on May 29 after testifying that under the check-off system mine owners had to check-off the pay of non-union men as well as union men and also after introducing evidence of alleged union terrorism to support their contention that a permanent injunction should be granted in order to prevent further violence.

The last witness for the plaintiffs, D. H. Morton, of the American Eagle Collieries Co. and the Leevale Coal Co., stated that while he was associated with the Imperial Collieries Co. at Burnwell, the union had upon one occasion called a strike to prevent the union men from working with two non-union men. He also testified that it had been necessary to check-off for non-union men as well as union men and that if the non-union miners objected, they did not remain long in the locality.

After the miners' union had completed the introduction of testimony and had rested their case on May 31, it was decided by agreement between counsel to postpone arguments until Oct. 1, or until such a time as the record in the case might be printed. Although a number of witnesses were called upon to testify by the defense on May 31, including Samuel B. Montgomery, former Commissioner of Labor of West Virginia and the candidate of the United Mine Workers for Governor in 1920, such testimony was ruled out by Judge McClintic as irrelevant and improper. It will appear in the record as "avowal" testimony.

In ruling on the admissability of the testimony of Montgomery and others Judge McClintic said, "I don't think a judge is supposed to forget all he knows. I know that Mr. Montgomery was not in this armed march and I think it is going far afield to have him testify to the 'why' of it from what he has heard from his many friends in his extensive travels. I think though, it would be safe to say too, that the coal operators of Logan are hostile to the union and also that they have the right to say who shall or shall not come upon their property. We still hold in this state that a man has a right to guard his property and I hope that the law is never changed.

"This case comes under the heading of contracts. It is a question of outside influence. It is a question of taking a check-off to be spent for alleged illegal purposes. It is utterly out of the question to go into alleged illegal acts of officials to try and justify alleged acts of the United Mine Workers of America. In my opinion there was no justification in any form for these other illegal acts. The plaintiffs have alleged certain things. If the officers of the district, or those who knew what was in the minds of the officers, will testify, they may come up."

Brophy Alleges Violation of Civil Rights of Coal Miners in Pennsylvania

In a letter to the U. S. Coal Commission made public June 3 John Brophy, president of District 2, United Mine Workers, states that the civil liberties of coal miners have been violated in central and western Pennsylvania. Declaring he would give "typical cases of wrongs inflicted," Mr. Brophy asserted that the injuries suffered by miners and their families "are to be traced to the control exercised by a small group of coal operators not only over the work of their employees but also over the town where their properties are located, a monopolistic control over civic, political and human rights."

"The control exercised in non-union mining communities," said Mr. Brophy, "is not possible in any other kind of town. The company owns the houses and can throw you out if they disapprove of any of your actions. In some instances the company owns only the land upon which the miners erect their houses, of course the miners paying a ground rent. In case the owner of the building displeases the company in any way he is asked to remove his house."

"In many non-union towns the streets and roads and places of assembly are company owned and if the company disapproves of a person he is thrown out. . . . The company owns the doctor and the hospital, the store and the houses and the public road, the cemetery and the newspaper, and even the public post office.

"Operators of non-union mines not only reduce wages at any time they wish, but they even reduce wages without telling the men that they have done so. To illustrate—the wages of the miners of the Consolidated Coal Co., at Gray, Pa., were reduced in August, 1921, and they were not told that their wages had been cut. The company did not even post notices. The first the men knew about it was when they came to get their pay two weeks later. At this time instead of getting the pay they expected, they found their wages had been reduced from 34 to 50 per cent. Such examples could of course be multipled, but I cite this as a typical case of how miners are dealt with in non-union fields.

"We therefore ask that your body will recommend such action as will end the autocratic control now exercised by non-union coal operators to prevent their employees from joining labor unions and enjoying such other liberties as are guaranteed by the Constitution of the United States."

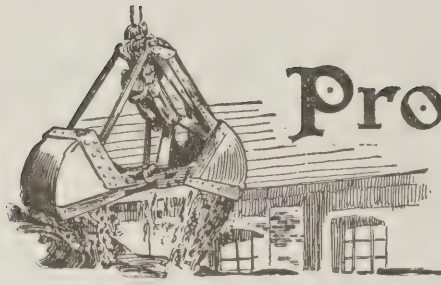
Open Bids on Coal for Ellis Island

For delivering alongside pier at Ellis Island during the year June 1, 1923, to May 31, 1924, from 12,000 to 15,000 gross tons of No. 1 buckwheat and 2,500 gross tons pea coal the following bids were received on May 31:

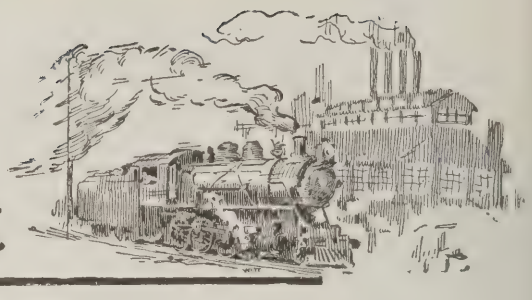
Martin F. Shea, buckwheat, $5.73; pea coal, $9.49. V. H. Youngman & Co., buckwheat, $5.70; pea coal, $8.95. Sealer Coal Co., buckwheat, $6.07; pea coal, $10.07. H. B. W. Haff, buckwheat, $5.87; pea coal, $8.82; Weston Dodson & Co., buckwheat, $7.05; pea coal, $10.05.

Based upon mine prices the bids for furnishing buckwheat coal ranged from $3.18 to $4.53 and the pea coal from $6.30 to $7.55 per gross ton.

THE INTERSTATE COMMERCE COMMISSION announces that further hearings on the proposed consolidation of railroads —Docket 12964—will be held before Commissioner Hall and Examiner Healey at Chicago, June 18; Buffalo, N. Y., June 21; Philadelphia, June 22; New York City, June 25.



Production and the Market



Weekly Review

Spot prices for soft coal continue to decline. Inquiries, however, are on the increase and a slightly better demand is found in some markets. Production in the week ended June 2 passed 11,000,000 tons, an increase of more than three-quarter million tons over the previous week. Anthracite production dropped below the current rate of 2,000,000 tons per week. Falling prices continue to force more soft-coal mines to close. Kentucky operators are cutting wages to meet the selling figures. Better car supply is reported from nearly all sections.

Production of soft coal for the first 125 days of 1923 was 221,048,000 net tons, larger than during any corresponding period of the past six years, with the exception of 1918, when it was 223,337,000 tons.

Pocahontas, Cambria, Somerset, southern Illinois, Standard and Hocking coals show advances in prices while there are decreases in Indiana, fourth and fifth veins, Pittsburgh, Kanawha and eastern Kentucky coals. *Coal Age* Index of spot prices of soft coal registered 215 on June 4, a decrease of two points, with an average price of $2.60.

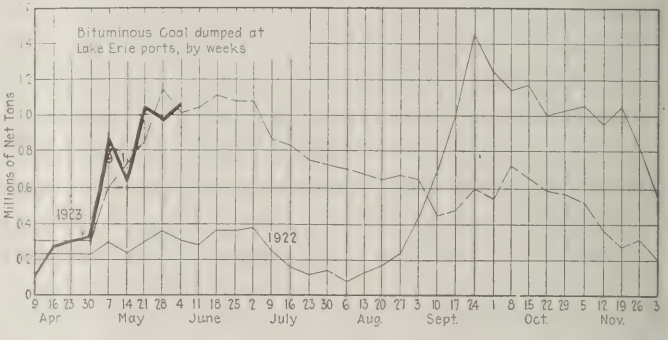
Shipping Board Bids Show Effort at Stiffening

Bids submitted to the U. S. Shipping Board at New York on May 31 for supplying Pool 1 or equivalent coal requirements of the Shipping Board vessels at that port for the year ended May 31, 1924, which ranged from $3.08 to $4.55 per net ton at the mine, indicate an effort to stiffen the market.

In the Middle West trade is quiet. A slight decrease in production followed the June 1 price schedule on domestic sizes in southern Illinois. The trade in New England has been affected by the quiet state of the textile industry. There are a few inquiries for coal for export, mostly for South America, and some chartering is reported. Baltimore reports heavy foreign shipments during the fourth week in May, loadings in the first twenty days of the last month having been 303,129 tons of cargo and bunker coal and 55,845 tons of coke.

Lake shipments are slowly increasing in volume. Up to May 28 approximately 1,400,000 tons of soft coal and 200,000 tons of anthracite had been unloaded at the Head-of-the-Lakes. Shipments of anthracite from Buffalo last week amounted to 72,600 net tons.

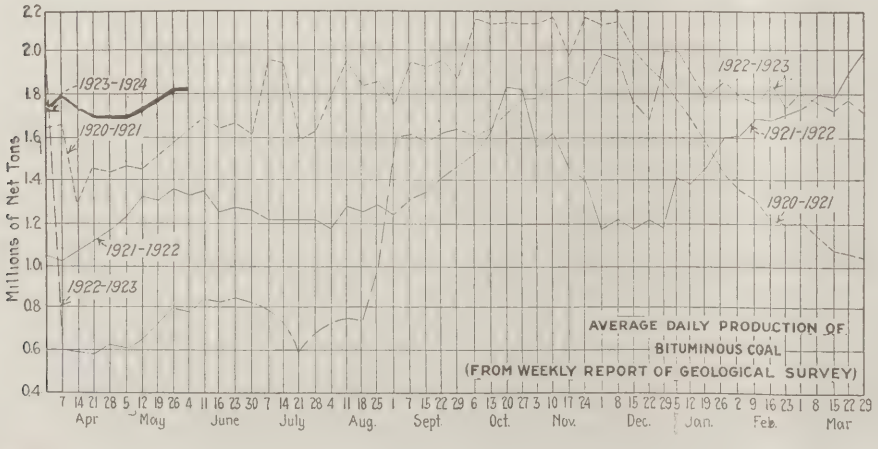
"The total soft coal raised during the week ended May 26 (including coal coked, lignite, and mine fuel), is estimated at 11,046,000 net tons," says the Geological Survey report. "This is a gain of 776,000 tons over the revised estimate for the week preceding. Early returns on car loadings during the week May 28-June 2 show 39,688 cars on Monday, and 33,826 cars on Tuesday, which are larger numbers than loaded on the same days



of the previous week. Loadings on Wednesday (Memorial Day) fell to 10,620 tons, and it appears that the holiday amounted to approximately one-third of a normal day. On this basis the average daily loadings for the present week are forecast at about the same level as last week. The present rate of soft-coal production is high and has been exceeded at this season only under war stimulation in 1918."

Dumpings at Hampton Roads for all accounts during the week ended May 31 was 331,725 net tons, as compared with 361,434 net tons the previous week.

Active demand for domestic sizes of anthracite con-



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
May 12	4,433,000	10,175,000
May 19 (*b*)	4,481,000	10,270,000
May 26 (*a*)	4,889,000	11,046,000
Daily average	815,000	1,841,000
Calendar year	162,496,000	221,048,000
Daily av. cal. year	1,305,000	1,772,000
ANTHRACITE		
May 12	7,000	1,903,000
May 19	8,000	2,045,000
May 26	10,000	1,956,000
Calendar year	21,834,000	31,519,000
COKE		
May 19 (*b*)	97,000	411,000
May 26 (*a*)	97,000	415,000
Calendar year	2,690,000	8,050,000

(*a*) Subject to revision. (*b*) Revised from last report.

tinues. Consumers are more concerned in the outlook for a continuation of operations after Aug. 31, when the present wage agreement expires. Because of this they are more anxious to obtain their winter coal than in previous summers. Quotations for independent stove and egg sizes are stronger in some sections than for chestnut.

No Midwest Awakening Yet

Coal trade in Chicago and throughout the Midwestern region remains quiet. The circular on Franklin County prepared coal has gone up from $4.10 to $4.35 and there is little buying. This naturally decreases the volume of screenings available, with a slight firming up of the price on those small sizes. Stocking is still confined to a few railroads and steam-coal consumption is only large enough to take the available screenings at low prices. Western Kentucky screenings are reaching Chicago at $1.40 and $1.50 and mine-run at less than $1.75. These coals cover a good deal of the immediate steam demand. Kentucky lump is going into the Northwest rail trade to a considerable extent, gaining business merely on a price basis.

A little better flow of smokeless into the middle West has been noticeable for a week or two. Dealers show some interest in getting it but there is no noticeable rise in price. Anthracite movement grows apace. Consumers are buying earlier this summer, for no further reductions in retail quotaions are expected. Stove is now bringing $16.25 in Chicago; chestnut, $16.10 and pea, $13.50.

In the southern Illinois fields railroad tonnage is light, helping to keep production down. Only three mines in the Du Quoin and Jackson County fields have been getting as much as three days a week.

A retail advance of 25c. a ton June 1 has reminded St. Louis people that the time to put in coal is now. A few are obeying the impulse and are putting in a little coal of the better grades. The country around St. Louis shows no demand for anything. It is noted that a good deal of coal from the St. Louis region is moving into the Northwest, taking some of the low-priced business to be had there.

Kentucky Trade Is Fair at Low Prices

While demand in western Kentucky is a little slow some of the operators admit that it is quite good for this season. But some operators are not quoting screenings in the

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

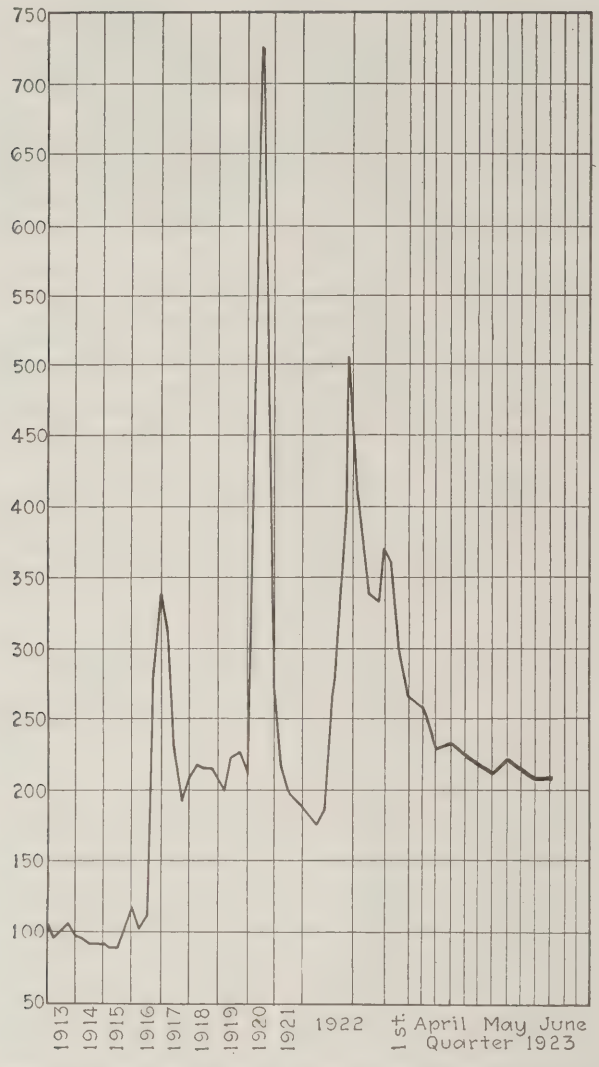
	Market Quoted	June 5 1922	May 21 1923	May 28 1923	June 4 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.35	$6.25	$6.25	$6.00@$6.50
Smokeless mine run	Columbus	3.00	4.05	4.15	**4.00@ 4.50**
Smokeless screenings	Columbus	2.85	3.70	3.60	3.35@ 3.85
Smokeless lump	Chicago	3.10	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	2.85	4.10	4.10	4.00@ 4.25
Smokeless lump	Cincinnati	3.40	6.25	6.25	6.00@ 6.50
Smokeless mine run	Cincinnati	2.85	4.25	4.25	*4.00@ 4.25*
Smokeless screenings	Cincinnati	2.75	4.25	4.25	*4.00*
*Smokeless mine run	Boston	6.05	6.85	6.35	6.25@ 6.50
Clearfield mine run	Boston	3.20	2.60	2.35	2.00@ 2.75
Cambria mine run	Boston	3.65	3.25	3.05	**2.75@ 3.50**
Somerset mine run	Boston	3.15	3.00	2.60	**2.50@ 3.25**
Pool 1 (Navy Standard)	New York	4.40	3.75	3.75	3.50@ 4.00
Pool 1 (Navy Standard)	Philadelphia	.....	3.80	3.75	*3.50@ 4.00*
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	3.90	2.90	2.90	2.75@ 3.00
Pool 9 (Super. Low Vol.)	Philadelphia	3.90	2.85	2.85	*2.50@ 3.20*
Pool 9 (Super. Low Vol.)	Baltimore	3.40	2.75	2.55	2.50@ 2.60
Pool 10 (H.Gr.Low Vol.)	New York	3.75	2.50	2.45	*2.25@ 2.50*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.70	2.35	2.35	*2.10@ 2.50*
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.35	2.30	2.15	2.15
Pool 11 (Low Vol.)	New York	3.60	2.05	2.05	*1.75@ 2.25*
Pool 11 (Low Vol.)	Philadelphia	3.25	2.05	2.00	*1.75@ 2.20*
Pool 11 (Low Vol.)	Baltimore	3.15	2.00	1.95	1.90@ 2.00
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.65	1.85	2.00	*1.75@ 2.00*
Pool 54-64 (Gas and St.)	Philadelphia	.....	2.05	2.05	2.00@ 2.15
Pool 54-64 (Gas and St.)	Baltimore	3.25	1.80	1.75	1.75
Pittsburgh sc'd gas	Pittsburgh	.....	2.85	2.85	2.75@ 3.00
Pittsburgh mine run (St.)	Pittsburgh	.....	2.00	2.25	*2.15@ 2.25*
Pittsburgh slack (Gas)	Pittsburgh	.....	1.85	1.65	*1.50@ 1.65*
Kanawha lump	Columbus	3.15	3.25	2.75	2.50@ 3.00
Kanawha mine run	Columbus	2.85	2.20	2.05	1.90@ 2.20
Kanawha screenings	Columbus	2.65	1.75	1.75	*1.50@ 1.75*
W. Va. lump	Cincinnati	3.25	3.10	4.00	*2.75@ 3.50*
W. Va. Gas mine run	Cincinnati	3.25	1.80	1.85	*1.40@ 2.00*
W. Va. Steam mine run	Cincinnati	2.75	1.80	1.85	*1.40@ 2.00*
W. Va. screenings	Cincinnati	2.60	1.65	1.50	*1.35@ 1.50*
Hocking lump	Columbus	3.10	2.75	2.55	**2.35@ 2.90**
Hocking mine run	Columbus	3.00	1.95	1.90	*1.75@ 2.00*
Hocking screenings	Columbus	2.85	1.45	1.35	1.25@ 1.50
Pitts. No. 8 lump	Cleveland	.....	2.95	2.95	*2.45@ 3.25*
Pitts. No. 8 mine run	Cleveland	.....	$2.15	$2.15	*$2.00@$2.10*
Pitts. No. 8 screenings	Cleveland	.....	1.65	1.50	*1.40@ 1.55*
Midwest					
Franklin, Ill. lump	Chicago	.....	3.80	3.80	**3.75@ 4.35**
Franklin, Ill. mine run	Chicago	.....	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	.....	1.80	1.80	1.75@ 1.90
Central, Ill. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.85	1.85	1.75@ 2.00
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.85	2.85	*2.50@ 2.75*
Ind. 4th Vein screenings	Chicago	.....	1.85	1.85	*1.75@ 1.85*
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.55	1.55	1.50@ 1.65
Standard lump	St. Louis	.....	2.25	2.25	**2.25@ 2.50**
Standard mine run	St. Louis	.....	1.80	1.80	1.75@ 1.90
Standard screenings	St. Louis	.....	1.50	1.50	1.50
West Ky. lump	Louisville	3.30	2.60	2.30	2.10@ 2.50
West Ky. mine run	Louisville	3.30	1.90	1.80	1.75@ 1.85
West Ky. screenings	Louisville	3.30	1.60	1.35	1.25@ 1.50
West Ky. lump	Chicago	3.40	2.60	2.35	2.25@ 2.50
West Ky. mine run	Chicago	3.40	1.80	1.35	**1.40@ 1.50**
South and Southwest					
Big Seam lump	Birmingham	2.20	2.70	2.70	**2.90@ 3.20**
Big Seam mine run	Birmingham	1.70	2.05	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	3.10	3.75	3.75	*3.00@ 3.50*
S. E. Ky. mine run	Chicago	3.10	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Louisville	2.85	3.75	3.75	*3.25@ 3.75*
S. E. Ky. mine run	Louisville	2.85	2.50	2.25	2.00@ 2.50
S. E. Ky. screenings	Louisville	2.85	1.90	1.65	**1.50@ 1.85**
S. E. Ky. lump	Cincinnati	3.25	3.35	3.75	*2.60@ 3.50*
S. E. Ky. mine run	Cincinnati	2.80	1.80	1.80	*1.40@ 1.85*
S. E. Ky. screenings	Cincinnati	2.75	1.60	1.55	1.25@ 1.85
Kansas lump	Kansas City	4.25	3.85	3.85	3.25@ 3.50
Kansas mine run	Kansas City	4.20	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.75	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Latest Pre-Strike Company	May 28, 1923 Independent	May 28, 1923 Company	June 4, 1923† Independent	June 4, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	..	$7.75@$8.35	.. ..	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.00@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.00	8.00@ 8.35	$8.50@$11.25	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	9.25@ 9.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	*8.50@11.50*	**8.00@ 8.50**
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.00	8.00@ 8.35	**8.50@11.25**	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	*8.50@11.50*	**8.00@ 8.50**
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	9.25@ 9.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	*8.50@11.50*	**8.00@ 8.50**
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.50	6.00@ 6.30	6.30@ 7.50	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	**6.00@ 6.50**
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	*2.50@ 3.25*	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	2.25@ 2.50	2.50	1.75@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	1.50@ 1.60	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 215, Week of June 4, 1923. Average spot price for same period $2.60. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Louisville and some other markets, asserting that they would rather close down than sell at $1.25@$1.50 a ton. It is admitted that the screenings market is weak, and will be still weaker when eastern Kentucky screenings reach the bottom, which is expected within the next six weeks, if there is a heavy movement of prepared sizes to the Lake regions.

It is reported that the Illinois Central R.R. is buying a considerable amount of big lump and block coal for storage, figuring that such coal will not slack as badly as mine-run. Practically all small or wagon mines in western Kentucky are down. Better and more uniform grades of coal are reaching the market as a result.

Northwest Has Plenty of Coal

The Northwest evidently is the place to sell coal just now. Rail shippers are all trying their best to get a strangle hold on the available business and the docks continue to receive a heavy stream of fuel by vessel and to vie for trade by making prices attractive. The result is more business is being done in Minnesota, upper Michigan and in Wisconsin than anywhere else. There is even a threat that coal will be shipped into that region from fields that never before sold much of their output there—Arkansas, notably.

West Still Marks Time

Around Kansas City there is little doing in coal. However, an advance of 50c. on Arkansas semi-anthracite served to remind the public that coal is about as low now as it ever will be. Kansas coals remained at the old circular.

In Salt Lake City business is poor. Summer is on in earnest with a consequent slump in all retail business. Even the little day-to-day business that kept the market alive during the past few weeks has disappeared. Operators deny that there will be any further drop in prices. Utah lump now retails at $9 and nut at $8. The busiest mines are getting only about two days running time a week.

In Colorado lignite advanced 25c. June 1, making lump $3@$4, mine-run, $2.50 and slack, $1.65@$1.80. Colorado bituminous lump sells for $5.25; nut, $4.75; mine-run, $4.25 and slack is in demand for steam purposes at $3. The coal business generally has shown a little sign of picking up.

Quietude Pervades Ohio Market

In Ohio the situation is quiet. The smokeless market at Cincinnati holds steady. Retail conditions are excellent, one estimate being that there was treble the business done last month as against May of last year and double that of May in the preceding year. At Columbus the steam trade is showing the biggest slump, while the domestic trade is not at all active. All steam grades are weak and low prices are often quoted in order to dispose of distress cargoes. Steam users whose contracts expired on April 1 have been slow to renew them, believing they will be able to buy in the open market at low figures. Domestic trade is active in the fancy grades of Pocahontas and other smokeless coals.

During the week ended May 26 production in the eastern Ohio district was 424,000 tons, 55,000 tons more than in the preceding week, and the high record tonnage for the present year. Railroad fuel and lake shipments provide the main outlet for eastern Ohio coal at this time. Steam consumers continue to supply their wants in the open market. The retail trade is quiet, although domestic consumers are laying in at least a part of their winter coal now.

Quotations at Cincinnati on June 4 for West Virginia 2-in. lump were $2.75@$3 and for southeastern Kentucky 2-in. lump $2.60@$3, as compared with $3@$3.50 for both coals last week.

Slightly increased output in the Pittsburgh district is attributed to heavier movement in the Lake trade, while the steel industry continues to run at record rate. There is sharp competition in Lake coal and close prices are being made, buyers being in the mood to drive bargains. Lake coal in prompt lots is generally quotable at $2.40@$2.60, this being for three-quarters steam.

Little Change in New England Market

In New England the market shows little change from a week ago. The Pennsylvania grades still have the call on what scattering purchases are made, and while firmer prices were anticipated they have not yet materialized. Apparently there is as much medium to good grade steam coal offering from central Pennsylvania as a month ago, although a few specialties are sold up for 30-day periods. Even in the few cases where operations are well supplied with spot business there are disappointing variations in output that make it difficult to forecast production a month ahead. In general the market is somewhat affected by the quiet state of the textile industry.

Due to transportation difficulties on certain of the routes all rail there is continued heavy movement of both high and low volatiles via the Philadelphia and New York piers. The Philadelphia & Reading Ry. is especially loaded with spot bituminous tonnage, and to such extent is this true that barges released by the light movement of anthracite are being diverted into the soft-coal trade. The tonnage dumped during June doubtless will run into unusually high figures.

At present quotations Cambria coals can be laid down at so many New England points at 50c.@$1 less than Pocahontas and New River that cargoes of the latter for distribution inland have been growing infrequent. Prices are

nominally $8@$8.25 per gross ton on cars Boston, Providence and Portland, but it is expected that when low-cost cargoes begin to arrive there will be a material reduction in this figure. A reasonably good tonnage that last year was obtained by the Southern agencies has this year been supplied from central Pennsylvania, and unless a marked reduction in asking prices of smokeless coals is made soon there will be only light business left for Hampton Roads shippers.

At Norfolk and Newport News spot coal continues to accumulate. Lack of market is now the acknowledged reason, and neither the export nor the New England market is counted upon for much assistance the next 30 days. Prices are nominal; while $6.25@$6.50 is the level quoted it is known that desirable coals can be bought at 25c.@50c. less. Car service has improved materially, and instances of less than 50 per cent output can no longer fairly be attributed wholly to transportation disability.

Slight Improvement at New York

Accumulations at the New York tidewater piers on June 1 were 2,171 cars, as compared with 2,297 cars the week previous. Demand was slow but some shippers were able to see a slight improvement. The better grades were scarce. At Philadelphia there were signs of betterment, the situation there as well as at New York having been helped materially by the Lake trade and larger shipments into New England. Open-market buying prevails at Baltimore. There is plenty of coal, due to heavy output and good car supply.

Western markets and the Lakes have been getting most of the coal produced in the Pocahontas and Tug River fields during the past few weeks, but with better car supply more of smokeless mine-run is now going to tidewater.

There is scarcely any demand for steam coal in the spot market at Birmingham. Bunker business is light. Domestic business is ample to absorb production of this class of coal.

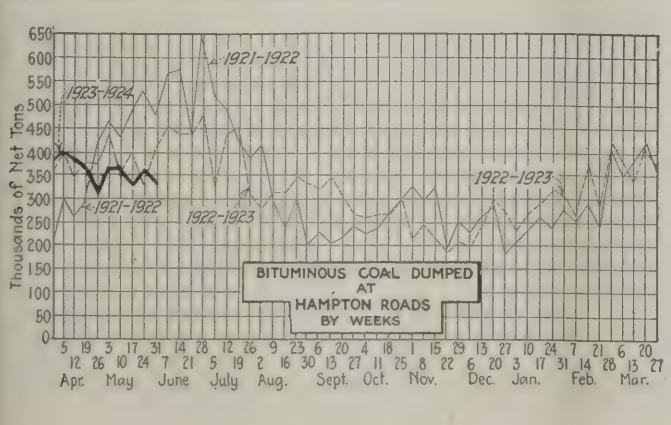
Lake Business Nears Full Speed

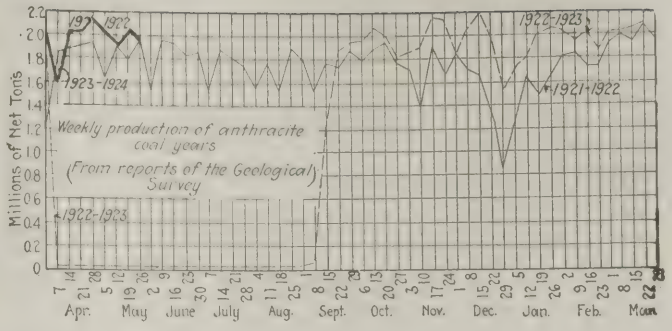
The lake season is nearly in full swing. Shipments are almost normal, 156 cargoes having been unloaded at the Head-of-the-Lakes up to May 28, fifty-six of these during the week ended May 26. Receipts at Milwaukee also have been heavy but outgo from the docks has been light, due to slow buying of dock fuel. Contracting for lake shipment in the Columbus market is not active, but loadings and movement is generally good.

Lake dumpings for the week ended June 4 was 1,049,763 net tons of cargo coal and 51,456 net tons of fuel coal, as compared with 884,538 net tons cargo coal and 45,661 net tons fuel coal the previous week. Total dumpings for the season is 5,299,364 net tons cargo coal and 237,466 net tons fuel coal.

Anthracite Consumers Ordering Early

Consumers for the most part are making every effort to put their winter supply of domestic anthracite coals in bins before the expiration of the miners' wage agreement, Aug. 31. So far as possible they do not propose to find it necessary to use substitutes, as some of them did last winter. Egg and stove are in heavier demand in the New York market than any of the other sizes. Philadelphia dealers have been unable as yet to make much headway in stocking their yards, except with an occasional accumulation of pea coal.





Shipments to Baltimore have been slow for a week or more and the small surplus in a few yards has been about wiped out. Heavy demand continues at Toronto, retail dealers having plenty of orders on hand to absorb receipts.

"Production of anthracite in the week ended May 26 was 3 per cent less than in the week preceding," says the Geological Survey. "The nine principal carriers of anthracite reported loading 37,394 cars, from which it is estimated that the total output, including mine fuel, local sales and the product of dredges and washeries, was 1,956,000 net tons. The decrease was chiefly due to a low rate of production on Monday, May 21. On the other days of the week the output averaged more than 6,200 cars daily.

"Preliminary reports of car-loadings in the week May 28-June 2 show 5,935 cars on Monday, 6,038 on Tuesday, and none on Wednesday (Memorial Day). On account of the holiday the total output for the week will be much lower than in recent weeks."

Coke Output Again Gains Slightly

Production of beehive coke for the week ended May 26 is estimated by the Geological Survey at 415,000 net tons. This is an increase of 4,000 tons when compared with the previous week's output. Cumulative output of beehive coke for the present year to date is 8,050,000 tons which is 5,360,000 tons ahead of 1922, 4,921,000 tons ahead of 1921, 892,000 tons ahead of 1922, 4,921,000 tons ahead of 1921, 892,000 tons behind 1920, and 332,000 behind 1919.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to May 19, 1923 Inclusive	Week Ended May 19, 1923
U. S. Total	55 7	....	....	....
Somerset County	74.9	36.3	36.6	59.4
Panhandle, W. Va.	51.3	57.3	56.7	57.7
Westmoreland	58.8	65.8	57.4	73.8
Virginia	59.9	55.7	57.1	59.8
Harlan	54.8	22.1	21.1	33.7
Hazard	58.4	16.4	25.0	38.0
Pocahontas	60.0	36.6	38.9	49.5
Tug River	63.7	28.8	36.4	45.1
Logan	61.1	26.2	31.5	31.0
Cumberland-Piedmont	50.6	31.7	49.2	47.7
Winding Gulf	64.3	30.4	36.1	42.3
Kenova-Thacker	54.3	42.4	37.3	47.1
N. E. Kentucky	47.7	28.4	29.8	29.8
New River	37.9	31.6	37.4	41.9
Oklahoma	59.6	59.1	45.2	41.1
Iowa	78.4	75.9	71.6	59.0
Ohio, Eastern	46.6	40.8	38.0	51.7
Missouri	66.8	76.3	70.1	64.4
Illinois	54.5	49.9	43.5	33.4
Kansas	54.9	55.9	45.8	40.3
Indiana	53.8	37.7	47.5	31.5
Pittsburgh†	39.8	41.2	38.9	56.3
Central Pennsylvania	50.2	53.4	49.7	59.3
Fairmont	44.0	35.5	40.2	69.3
Western Kentucky	37.7	32.4	31.9	28.4
Pittsburgh*	31.9	56.1	63.2	79.3
Kanawha	13.0	15.6	24.3	25.6
Ohio, Southern	24.3	38.1	30.6	26.4

* Rail and river mines combined.
† Rail mines.

Car Loadings, Surplusages and Shortages

	Cars All Cars	Loaded Coal Cars
Week ended May 19, 1923	991,797	181,599
Previous week	974,531	175,158
Same week in 1922	780,953	81,456

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	Car Shortage
May 21, 1923	22,700	2,775	20,585	14,620
Same date in 1922	329,634	208,691	....	....
May 14, 1923	18,419	2,776	23,761	15,653

Foreign Market And Export News

British Coal Output Nears High Record; Exports Continue Heavy

Coal production in Great Britain during the week ended May 19 was 5,797,000 tons, says a cable to *Coal Age*. This was an increase of 194,000 tons over the previous week's output, and but 28,000 tons below the output for the week of April 21, 5,825,000 tons the record for the post-war period.

Collieries in South Wales are heavily booked for this month and there have been inquiries for the last half of the year.

During the week ended June 2 coal exports were as follows, in tons:

From the Tyne district	7,104
From the Mersey district	6,392
From the South Wales district	19,609

Vice-Consul Albert W. Scott, at Hull, in a report to the Department of Commerce, at Washington, says that during March last, the coal exports from Hull totaled 404,303 tons, as against 174,639 tons in March last year; from Immingham the total was 230,056 tons, against 88,980 tons; from Goole, 153,912 tons, against 96,656 tons; from Grimsby, 56,703 tons, against 31,959 tons.

A newspaper dispatch states that Sir D. R. Llewellyn and H. H. Merritt, South Wales coal operators, are on their way to America to arrange contracts for supplying Welsh anthracite to American and Canadian buyers, and that they may consider the advisability of erecting plants for handling Welsh anthracite in New York, Montreal and Quebec.

Less Vigor at Hampton Roads

Activities at Hampton Roads lacked vigor last week, dumpings dropped and inquiries slackening. Prices held fairly firm, however, because of diminishing stocks at port.

Export business showed a decrease, while no new contracts for foreign shipments were in prospect. The outlook indicated a further reduction in movement to foreign ports. Coastwise business was slack, and bunkers held fairly regular.

Lack of demand for high volatile coals was one of the features of the market, the price dropping to the lowest level of the year. Heavy movement of the Norwalk & Western and Chesapeake & Ohio by rail to the West cut down the supplies here. The tone of the market was moderately strong.

United States April Coal Exports

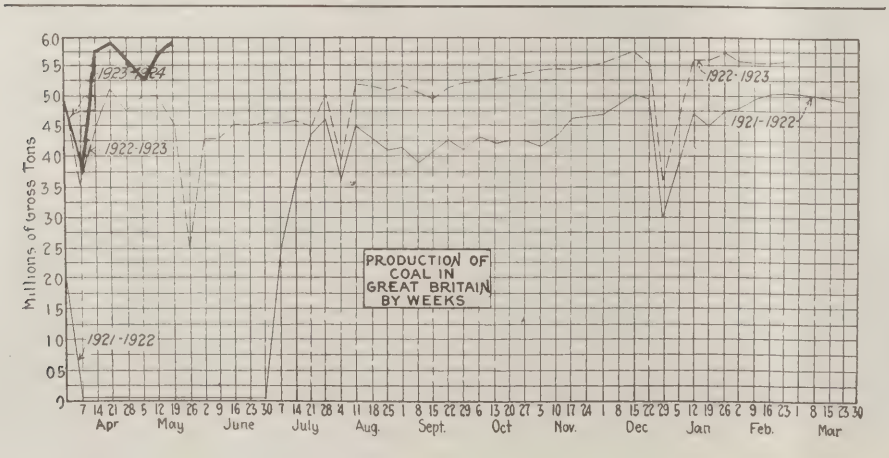
(In Gross Tons)

Coal	1922	1923
Anthracite	109,290	421,922
Bituminous	714,995	1,384,879
Exported to:		
France	.....	175,518
Italy	57,426	60,478
Netherlands	.....	19,239
Other Europe	9,931	96,415
Canada	453,406	889,900
Panama	9,390	9,800
Mexico	16,217	11,440
Br. W. Indies	15,643	11,811
Cuba	47,144	51,713
Other W. Indies	21,313	9,517
Argentina	.....	11,553
Brazil	38,864	16,107
Chile	14,908	.....
Egypt	11,246	2,569
French Africa	13,706	9,019
Other countries	5,821	9,800
Coke	28,413	201,788

United States April Exports by Custom Districts

(In Gross Tons)

	Anthracite	Bituminous	Coke
Maine and New Hampshire	1	.....	608
Vermont	2,343	997	1,469
St. Lawrence	160,276	206,573	2,265
Rochester	5,081	32,262	103
Buffalo	239,721	317,291	36,816
New York	5,913	211	726
Philadelphia	5,293	46,532	71,796
Maryland	.....	234,122	56,467
Virginia	2,678	189,594	.....
North Carolina	.....	8,006	.....
Florida	.....	6,161	1,879
Mobile	.....	1,051	988
New Orleans	1	542	1,197
San Antonio	469	27	4
El Paso	91	3,070	1,104
San Diego	.....	5,663	.....
Arizona	.....	.....	6,401
Los Angeles	45	.....	55
San Francisco	.....	.....	6
Washington	9	921	.....
Dakota	.....	4,286	405
Duluth and Superior	.....	2,951	65
Michigan	.....	189,640	18,473
Ohio	1	134,979	961
Totals	421,922	1,384,879	201,788



United States March Coal Imports

(In Gross Tons)

	1922	1923
Anthracite	25	33,252
Bituminous	118,564	free 151,005 / duriable 168,936
Imported from:		
United Kingdom	4,100	137,688
Canada	104,101	168,936
Japan	313	.....
Australia	10,010	13,311
Other countries	40	6

Export Clearances, Week Ended June 2, 1923

FROM BALTIMORE

	Net Tons
For Argentine:	
Br. SS. Beechpark, for Argentine	7,922
For France:	
Br. SS. Furkestan, for France	7,227
Bu. SS. Salawati, for France	9,099
Ital. SS. Robinia, for France	7,074
Gk. SS. Melpo, for France	7,511
Nor. SS. Louise Neilsen, for France (coke)	5,975
For Germany:	
Br. SS. Eastgate, for Germany	7,559
Br. SS. Asheworth, for Germany	7,373
For Greece:	
Ital. SS. Aussa, for Greece	8,535
For Holland:	
Nor. SS. Moldegaard, for Holland	5,321
For Italy:	
Ital. SS. Finme, for Italy	10,208
Ital. SS. Concordia, for Italy	10,345
For Venezuela:	
Am. Schr. Maud M. Morey, for Venezuela (coke)	962

FROM HAMPTON ROADS

For Brazil:	
Br. SS. Irish Monarch, for Rio de Janeiro	5,616
For Canada:	
Br. SS. Wyncote, for Three Rivers	4,207
For Cuba:	
Nor. SS. Jacob Christensen, for Havana	5,781
For France:	
Br. SS. Illingworth, for Dunkirk	8,469
For Italy:	
Ital. SS. Bagnolii, for Porto Ferrajo	8,315
Ital. SS. Cloutsham, for Porto Ferrajo	6,970

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	May 24	May 31
Cars on hand	1,037	1,218
Tons on hand	64,333	74,173
Tons dumped for week	102,909	103,538
Tonnage waiting	6,200	13,875
Virginian Ry. piers, Sewalls Pt:		
Cars on hand	1,699	974
Tons on hand	95,400	111,980
Tons dumped for week	125,080	111,375
Tonnage waiting	16,118	10,073
C. & O. piers, Newport News:		
Cars on hand	12,052	975
Tons on hand	68,135	55,235
Tons dumped for week	94,720	81,270
Tonnage waiting	5,300	23,110

Pier and Bunker Prices, Gross Tons

PIERS

	May 26	June 2†
Pool 9, New York	$5.35@$5.75	*$5.25@$5.75*
Pool 10, New York	4.35@ 5.25	**4.50@ 5.25**
Pool 11, New York	3.75@ 4.50	3.75@ 4.50
Pool 9, Philadelphia	5.85@ 6.15	*5.80@ 6.15*
Pool 10, Philadelphia	4.95@ 5.45	*4.90@ 5.45*
Pool 11, Philadelphia	4.00@ 4.55	*3.90@ 4.50*
Pool 1, Hamp. Roads	6.75@ 7.00	*6.50@ 6.75*
Pools 5-6-7, Hamp. Rds.	5.00@ 5.25	*4.85@ 5.00*
Pool 2, Hamp. Roads	6.50@ 6.75	*6.25@ 6.40*

BUNKERS

Pool 9, New York	5.65@ 6.05	*5.55@ 6.05*
Pool 10, New York	4.65@ 5.55	4.80@ 5.55
Pool 11, New York	4.05@ 4.80	4.05@ 4.80
Pool 9, Philadelphia	6.10@ 6.30	*6.05@ 6.25*
Pool 10, Philadelphia	5.10@ 5.85	*5.05@ 5.80*
Pool 11, Philadelphia	*4.25@ 5.00*	*4.20@ 4.90*
Pool 1, Hamp. Roads	6.75@ 7.00	*6.50@ 6.75*
Pool 2, Hamp. Roads	6.50@ 6.75	*6.25@ 6.40*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	May 26	June 2†
Admiralty, large	41s.@42s.6d.	**42s.6d.**
Steam smalls	30s.@32s.6d.	**32s.6d.**
Newcastle:		
Best steams	32s.6d.@34s.	*30s.@32s.*
Best gas	32s.6d.@35s.	*32s.@34s.*
Best bunkers	33s.6d.@35s.6d.	*29s.@32s.*

†Advances over previous week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade

ALASKA

The Secretary of the Interior has authorized the **construction of a spur 4½ miles long from the Matanuska branch of the Alaska Railroad to what are known as the Moose Creek coal mines** in the Matanuska field. These mines are said to contain a good quality of steam coal suitable for export and for use on the government railroad.

COLORADO

Colorado produced more coal during the first quarter of this year than during a similar period of 1922. State Coal Mine Inspector Dalrymple's report up to April 1 showed 15 out of 20 coal counties had increased their outputs—notably Las Animas County, with an increase of 282,391 tons. The consolidated report follows:

Counties	Total Tonnage.	Inc.	Dec.
Boulder	247,812	.....	57,785
Delta	26,150	.....	2,093
Elbert	1,850	1,018	.....
El Paso	153,235	15,359	.....
Fremont	206,066	35,792	.....
Garfield	7,666	1,405	.....
Gunnison	167,859	37,179	.....
Huerfano	638,696	32,828	.....
Jackson	19,152	6,408	.....
Jefferson	67,802	7,947	.....
La Plata	39,027	7,094	.....
Las Animas	1,134,701	282,391	.....
Mesa	47,992	13,766	.....
Moffat	655	.....	12
Montezuma	1,175	.....	981
Montrose	298	.....	364
Pitkin	676	66	.....
Rio Blanco	1,911	183	.....
Routt	183,809	11,968	.....
Weld	590,656	162,343	.....
Totals	3,537,188		

Total production Jan. 1 to March 31, 1922	2,982,676
Increase, 1923	554,512
Average number of men employed in and about mines	13,710
Number of days worked per mine	57.5

ILLINOIS

An explosion of powder occurred on the surface of mine No. 14 of the Old Ben Coal Corporation at Buckner recently. The blast happened about 8:10 a.m. and while a number of men were working at different places on top, none was seriously injured. Construction work was going on at the mine at the time and a little damage was done to top buildings. The explosives were stored at the time in a temporary shed near the mouth of the shaft and as no caps or detonators of any kind were near the spot, the cause of the blast remains a mystery.

The U. S. Army made a few small contracts for Middle Western, Ohio, Kansas and Kentucky coal after an opening of bids in Chicago May 22 as follows: Thirteen thousand tons of central Illinois screenings for the Rock Island arsenal from the Penwell Coal Mining Co., of Pana, Ill., $1.75; 1,000 tons of Standard district lump for Fort Snelling, Minn., from the Egyptian Coal & Mining Co., of St. Louis, Mo., $2.42; 877 tons of Pittsburgh No. 8 mine-run for a point in Ohio from the East Coal Co., of Chicago, Ill., $2.25; 305 tons of western Kentucky No. 9 mine-run for Camp Knox, Ky., from the East Coal Co., of Chicago, Ill., $2.08; 400 tons of Hocking mine-run for Fort Hayes, Ohio, from the General Hocking Fuel Co., $2.30; 1,500 tons of Linn County, Kansas, mine-run for Fort Leavenworth, Kan., from the Superior Fuel Co., of Kansas City, Mo., $2.39; 560 tons of Linn County mine-run for Fort Riley, Kan., from the same concern at the same price; 3,000 tons of central Illinois mine-run for the Rock Island arsenal, from the Bickett Coal & Coke Co. of Chicago, $2.65.

George F. Getz, president of the Globe Coal Co., of Chicago, suffered a broken arm, severe scalp wounds and other cuts and bruises May 28 when a woman drove her car into a taxicab in which Mr. Getz was riding.

N. H. Kendall, secretary of the Chicago Coal Merchants Association for several years, has resigned and on June 1 became manager of domestic sales for the Rialto Coal Co., of Chicago.

INDIANA

Reviewing decisions of the Public Service Commission since 1903 to indicate a depressed character of exsting intrastate freight rates on coal in Indiana, **representatives of the railroads have brought the coal-rate fight to a close.** They attacked in every way the contention of the Indiana State Chamber of Commerce and manufacturers throughout the state that the rates from Indiana mines to points within the state are lower than interstate rates and therefore discriminatory. Members of the commission will review transcripts of the evidence on both sides of the question which has been presented during the four days and base their ruling on it. If all pleas of the State Chamber and the various industries for a statewide readjustment are granted, an average reduction of 10 per cent will be made. If the arguments of railroad attorneys are upheld the rates will remain unchanged. Guernsey Orcutt, of Pittsburgh, and L. P. Day, of Chicago, representing all the railroads serving Indiana, presented evidence at the close of the hearing to show that the railroads buy enormous quantities of coal and supplies in Indiana and that those roads whose traffic consists chiefly of coal transportation are operating at a deficit. They endeavored to show that intrastate rates are reasonable and that the advantage lies with the Indiana producers rather than with Illinois, Ohio, Kentucky and West Virginia mine operators, who the State Chamber declared profited by the difference in rates. "The carriers view with apprehension a demand at this time for reduced coal rates in Indiana because those rates did not bear the full measure of past advances applied to rates in other states," Mr. Orcutt said. "Also labor organizations are now agitating further advances in wages and the present rates cannot be said to be reasonably compensatory to the carriers." R. B. Coapstick, traffic manager and attorney for the State Chamber of Commerce, closed his evidence after introducing testimony of representative industries throughout the state to show the alleged discrimination. The witnesses for the carriers were L. T. Averitt, of the Chicago, Milwaukee & St. Paul; George H. Krummer, of the Chicago & Eastern Illinois; S. C. Matthews, of the Pennsylvania; W. B. Ferguson of the Big Four, and Albert Conner, of the Southern.

Several coal companies operating mines along the Wabash near Terre Haute **are expected soon to pay the State of Indiana for coal they have extracted from beneath the bed of the river.** When the state enjoined the Western Indiana Mining Co., of Terre Haute, a year ago, preventing it from pursuing the usual practice of the region, a controversy started between state and mining companies which is just now reaching a termination. The state has tentatively agreed to small reimbursements and it is expected the amounts will be determined harmoniously at a meeting scheduled to take place in the State Capitol June 12. This means that hereafter the state's right to the coal under the river is recognized. Mining companies interested in the dispute besides the Western Indiana are the Grasselli, Ferguson-Spears, Jackson Hill, Richards & Sons, Miami and Lower Vein.

KENTUCKY

Fire on May 26 at Baskett, eight miles from Henderson, **destroyed the commissary store of the Pittsburg Coal Co.,** a west Kentucky coal producer, the loss being reported at $15,000.

A report from Washington, on May 29, states that Henry Ford interests are planning to build a combination bridge and dam at Ironton, O., crossing the Ohio River into Kentucky, with the idea of carrying an extension of the Detroit, Toledo & Ironton R.R. to Ford's coal lands in eastern Kentucky. It is planned to put in a big power dam, and electrify the D. T. & I., and probably furnish power to company mines as well.

MICHIGAN

Sealed proposals will be opened by the Superintendent of Lighthouses, 340 Post Office Building, Detroit, Mich., 2 p.m., June 12, 1923, **for furnishing coal as required by light vessels and light stations** for the fiscal year ending June 30, 1924, to be delivered at Detroit, Sheboygan, Sault Ste. Marie, Houghton, Hancock and Marquette, Mich., and Duluth, Minn. Information on application.

The Board of Education of Detroit will receive bids until noon, Monday, June 25, for furnishing about 600 tons of stove size anthracite for use during the fiscal year from July 1, 1923, to June 30, 1924.

MINNESOTA

The insurance adjustment on coal belonging to the Pittsburgh & Ashland Coal & Dock Co., which was burned on the docks of the Inland Coal & Dock Co. last winter, has been submitted to the Western Adjustment & Inspection Co. for arbitration and appraisal. The amount claimed is in the neighborhood of $200,000. H. J. Grannis, W. E. Greene and C. C. McElwin have been appointed appraisers. An effort will be made to settle out of court.

NEW JERSEY

Joseph S. Frelinghuysen, former U. S. Senator from New Jersey, announced just before sailing for Europe that upon his return he would devote much time and thought to forwarding the interests of a coal consumers' league, and to "make it a constructive machine by which consumers of coal will be assured a sufficient supply at reasonable prices."

NEW YORK

Burns Brothers reports total income of $1,140,028 available for the various issues of capital stock for the year ended March 31, 1923. After allowing for dividends on both classes of preferred stock, the balance available for the Class A and B common stock was equal to $9.18 a share on the former and $1.18 a share on the latter. In the previous fiscal year the company earned equal to $10.16 a share on the Class A stock and $2.16 a share on the Class B stock. The general balance sheet shows a profit and loss surplus of $9,451,239 on March 31, 1923, against $9,532,553 at the close of the previous fiscal year.

John F. Hylan, Mayor of New York City, on May 28 issued a proclamation advising the public to begin laying in its next winter's coal supply. "There will be no escape from another coal shortage with the approach of winter," he said, "though there may be no coal strike. There is talk of a strike on Aug. 1."

Governor Smith has signed the Downing bill which had passed both houses of the Legislature, appropriating $10,500 for plans and specifications for constructing tipples for coal at Ithaca and Watkins. This measure became chapter 581 of the laws of 1923.

The Socialist Party of America in its convention held in New York City recently, **adopted resolutions demanding the nationalization of coal mines.**

Lehigh Valley Coal Sales Co. has declared a dividend of **$2 per share,** payable July 2 to those stockholders who are holders of full-share certificates of stock registered on the company's books at the close of business on June 14.

OHIO

Charles A. Albright, of the Albright Coal Co., Cleveland, Ohio, has been appointed as the representative of the retail coal trade to serve as a member of Federal Fuel Distributor Wadleigh's advisory committee in connection with the investigation of community storage, distribution, etc.

The Southern Ohio Coal Exchange reports that there were **198,862 tons of coal mined in the southern Ohio field during the week ending May 19** out of a full-time capacity of 751,992 tons. Of the shortage of 553,130 tons, car shortage caused a loss

of 171,068 tons; labor shortage, 7,290 tons; mine disability, 25,795 tons; no market, 348,677 tons. In the eastern Ohio field during the same week a total of about 10,000 cars were loaded as compared with 18,000 ordered, making a production of about 60 per cent.

PENNSYLVANIA

There is not sufficient money to the credit of the State Department of Mines to pay the salaries of the bituminous coal inspectors for the period from May 15 to May 31, the end of the present appropriation period. Joseph J. Walsh, Chief of the Department of Mines, recently asked the Attorney General's Department whether or not any part of the appropriation for the two years beginning June 1, 1923, can be applied to these salary payments. Sterling G. McNees, a special Deputy Attorney General, said it is impossible to answer this question finally at present, as the 1923 appropriation bill has not been passed by the Legislature. If this bill should be passed in the form in which it now is, or even in the form in which it has been passed by other Legislatures, Mr. McNees is of the opinion that no part of the money so appropriated for the next biennium could be used for salaries for inspectors, liability for which was incurred during the present biennium. "Whatever salaries are due until the end of the present biennium must be met from funds appropriated for their payment during this biennium," the opinion read. "If there are not sufficient funds in the appropriation for this biennium the result will be a deficiency, which it seems to me can only be met by the deficiency appropriation."

The Pennsylvania Coal & Coke Corporation and subsidiaries for the four months ended April 30, 1923, **shows net income of $469,612,** after interest, depreciation, etc., but before federal taxes, against $43,176 in the same period of the preceding year. Net income for April was $75,394 against a deficit of $89,797 in the same month of 1922. Gross income for the four months period was $509,394 as compared with $47,559 in the preceding year, while April gross stood at $87,732 against a deficit of $92,514 in April, 1922.

Two of the series of Bidelspacher mine bills were approved by **Governor Pinchot on May 28.** One of these, an amendment to the act of 1903, **increases the fees paid by applicants for certificates of qualifications as mine foremen** and assistant mine foremen in the anthracite mines. The bill as presented included provisions for first- and second-grade certificates for mine foremen in the bituminous mines, but these provisions were eliminated. The law, as amended now provides that before the examination of the applicants for certificates of qualification each applicant shall pay a fee of $2 and each successful applicant shall pay an additional fee of $3 before receiving a certificate. The other Bidelspacher act amends a law of 1911 and it **provides that mine operators shall pay to the Department of Mines the actual cost to the state of the assistant mine foreman's report book,** the mine foreman's daily and weekly record book and the fireboss' daily record book. These books have been furnished at state expense. The new law provides that money received for these books shall be deposited in the State Treasury and added to the funds appropriated for the payment of the salaries and other expenses of the inspectors of coal mines.

Glenbrook colliery, an independent operation, near Shamokin, **was idle ten days** because the company refused to employ two of four men whose services were not needed because of the installation of labor-saving machinery on refuse banks. The four men were notified that their services would not be needed, but the company union officials contended that at least two of the men should be retained. The company officials refused to accede to the demands of the union.

Alexander Howat, of Pittsburg, Kan., deposed president of District No. 14, United Mine Workers, and **Thomas Meyerscough,** of Pittsburgh, Pa., who admits being affiliated with the executive committee of the Workers' Party of America, **were barred recently from addressing an audience** of approximately 500 mine workers in Spencer's field, Dunmore, by Burgess, William G. Payton. The meeting, however, was allowed to go on with Rinaldo Cappelini, deposed Pittston organizer, filling the role of principal speaker. There was no disorder of any kind.

W. L. Connell, of Scranton, chairman of the Anthracite Board of Conciliation, and **George F. Lee,** of the George F. Lee Coal Co., of Wilkes-Barre, sailed for Europe Saturday, June 2.

Governor Pinchot has signed a bill requiring anthracite operators to furnish coal to schools, institutions, churches and municipal buildings at the prevailing market price.

Under the **direction of Chief of Mines Walsh, conferences are now being held in the anthracite region** between the mine inspectors and mine officials. A series of similar conferences will be held in the bituminous region as soon as the anthracite conferences are completed, **for the purpose of lessening casualties and increasing the comfort of the employees.**

Dr. Royal Meeker, Commissioner of Labor and Industry, has stated that **an undetermined number of inspectors will be dropped soon.** While the exact number is being withheld, Dr. Meeker volunteered the information that the cut will result in an annual payroll saving of approximately $80,000. Five inspectors have already been dropped, while others are due for severance from the payroll within the near future, Mr. Meeker said.

Fire of unknown origin May 29 **destroyed the No. 3 breaker of the C. Pardee Brothers & Co.** between Lattimer and Milnesville with a loss estimated at $50,000. The breaker had been ordered torn down with the completion of a new breaker nearby and work had already been started. Material was to have been used in other buildings. The fire threatened other buildings for a time and the Hazleton fire department was called to assist in fighting the blaze.

Governor Pinchot has approved the bill of Representative Post, Washington County, relieving life tenants of land from the payment of taxes on the underlying veins of coal which they have no right to operate. **The new law provides that such coal shall be assessed to and the taxes paid by the owner of the veins of coal.**

Alex Swinski, of Locust street, Scranton, **lost his semi-monthly pay amounting to $101.08** when he sat in with a few strangers recently in a card game in a drinking place, according to a story told the police.

Three thousand miners employed by the P. & R. Coal & Iron Co. near Shamokin, **quit work recently because retail coal sales clerks refused to join the United Mine Workers.** The clerks contended they were confidential employees and not entitled to membership. Colliery union officials have ruled to the contrary.

Application has been made to the U. S. Supreme Court by counsel representing the State of Pennsylvania and the City of Scranton **for a rehearing on the Kohler mine-cave law,** which was declared unconstitutional by that court in December last.

The net income of the Westinghouse Electric & Manufacturing Co. for the year ending March 31, 1923, was $12,263,485, as shown by the company's annual report. The dividend requirements were $6,033,428, so that over twice this amount was earned and more than six million dollars added to the surplus. Gross sales for the year were $125,000,000, which represents an increase of $25,000,000 over the sales of last year. The cash position of the company is a strong one, the current assets totaling over $106,000,000 and the current liabilities less than $17,000,000.

Judge Woolley, of the U. S. Circuit Court of Appeals, at Philadelphia in an opinion May 29 sustained the judgment of Judge C. B. Witmer, of the Middle District Court in the case of the Graff Furnace Co. against the Scranton Coal Co. in which the plaintiff was awarded a verdict of $12,000 for damages alleged to have been caused by the removal of lateral support from the property of the plaintiff.

Two more research fellows will be added next year to the staff of the Mining Department at Carnegie Institute of Technology, Pittsburgh, to continue the important coal-mine investigations now being conducted in co-operation with the U. S. Bureau of Mines. At a meeting of the Advisory Board of coal-mine operators held recently in Pittsburgh, various problems were suggested for research, and two companies agreed to finance the employment of additional research fellows. The Hillman Coal & Coke Co., which will finance the employment of one of the investigators, has recommended work on this problem: "The shooting of coal to produce a larger percentage of lump." The Mine Safety Appliance Co., which also will finance a fellowship, recommended that "the adaptability of gas masks in fighting mine fires" be investigated. The employment of two more investigators increases the staff to six, to be selected by the Co-operative Department of Mining Engineering at Carnegie Tech, and to work under the joint auspices of Carnegie Tech, the Bureau of Mines and the Advisory Board of operators. In June of this year the second year of research work on coal-mining problems will be completed. The investigations at Pittsburgh already have attracted much attention. Among the problems suggested by the operators for attack next year are: continuation of the study of the correlation of coal beds of western Pennsylvania through their microscopic constituents; extension of the study of acid mine waters to the actual tests of various experimental machinery parts in the mines, and mine-car gear and lubrication.

The following coal companies were incorporated recently at Harrisburg: **Maxton Coal Co.,** Philadelphia; mining, manufacturing, buying and selling coal and coal products; capital, $50,000; incorporators, Robert W. Wigton, Philadelphia, treasurer; F. H. Wigton, Philadelphia, and Charles B. Maxwell, Morrisdale. **Tiega Track Coal Co.,** Philadelphia; acquiring coal and coal lands; capital, $25,000; incorporators, Harry F. Foote, Jr., 3311 North 20th street, Philadelphia, treasurer; Edward S. Bureau, Philadelphia, and Edmond W. Bureau, Philadelphia. **Listie-Quemahoning Coal Co.,** Listie, Somerset County; mining coal and manufacturing coke; capital, $200,000; treasurer, E. T. Norton, Connellsville; incorporators, J. L. Kendall, Pittsburgh; W. F. Stauffer and F. L. Brown, Scottdale.

Announcement has been made that **the People's Fuel & Supply Co. and the Foster Coal & Lumber Co.,** both of Red Lion, **will be merged.** The combined coal-land holdings in Huntington, Fulton and Bedford Counties will be more than 1,500 acres. The new company will be capitalized at $150,000. Thirty-nine new steel coal cars were purchased recently.

The C. A. Hughes Coal Co., of Altoona, **has purchased the Mountain Quality Coal Co. mine at Twin Rocks,** and already has been started to make improvements. The new owners will erect a modern tipple and arrangements are now being made to have a siding placed to the mine from the Cambria & Indiana Ry. Homes for the employees will be erected within a short time in the vicinity of Seldersville.

After being associated with the Cambria Steel Co. in Johnstown since 1901 as an expert chemist, **H. A. Hosmer** has announced his retirement from the position **to enter the wholesale coal business.** He will be associated with John Tredennick of Boston, Mass., distributor of large coal tonnages from the coal fields of central Pennsylvania. The Johnstown company will be known as the Standish Coal Co. Mr. Hosmer is a native of Massachusetts.

B. H. Cannon, chairman of the executive committee of the Pittsburgh Coal Operators' Association, announced May 31 that **Richard W. Gardiner has resigned as commissioner of the association.** The committee accepted the resignation and it will go into effect immediately. Mr. Gardiner had been commissioner of the association since 1917, when he succeeded Mr. Morrow.

A coal deal involving $100,000 whereby the **Cosgrove & Meehan Coal Co., of Johnstown, becomes part owner of the Gahagen coal lands** near Cairnbrooke, Somerset County, became effective last week. By this deal the Johnstown company increases its possessions by several hundred acres of coal land, 50 tenement houses and a general store. The former owners were William and Clarence Gahagen, who control the Huskin Run Coal Co. The Cosgrove company owns 300 acres adjoining and expects to increase the output to 5,000 tons daily.

UTAH

Articles of incorporation of the **Utah Central Coal Co.** have been filed with County Clerk L. A. Van Dyke. The capital is $500,000, with shares of the par value of $100 each. The officers and directors are M. S. Browning, president; E. S. Rolapp, vice president; John Browning, secretary and treasurer. The foregoing, with Ribert Y. Gibson and Neil M. Madson, comprise the board of directors. The property of the company is located in Carbon County.

VIRGINIA

Trial of the fifteen suits of the Norfolk & Western Ry. against coal companies with agencies, at Norfolk, for amounts aggregating nearly $500,000 for demurrage charges alleged to be due, **opened last week.** The case of the Pan Handle Coal Co. was

heard in the City Circuit Court, and on its outcome will be based the decision on the fourteen other cases. Judge A. R. Hanckel has taken the argument in this case under advisement. It is the first time in the history of the business at Norfolk that this procedure has been followed, and coal men are deeply interested in the outcome.

WEST VIRGINIA

The Wheeling Coal Co. is about to open a mine in a 400-acre tract in Ohio County near Wheeling, on the Pennsylvania R.R. The tipple will be equipped with a 40-in. conveyor and automatic drop-bottom cars will be used. The organizers and operators of the company are Frank Costanzo, president and general manager; Louis Costanzo, vice-president and assistant manager; T. G. Costanzo, treasurer, and E. J. Arnald, secretary.

Differences between the government and the Orr Mining Co. as to the amount of federal taxes it should pay figured in a suit tried in the U. S. Court for the northern District of West Virginia at Parkersburg late in May, **the government contending that the Orr Coal Mining Co. owed $150,000 on income tax and excess profits** for 1917 and 1918. The coal company contends that it was purchased by the Hudson Coal Co.

WASHINGTON D. C.

Within the next few days **the U. S. Civil Service will announce the opening of a new examination for valuation engineers** for entrance into the civil service and to be assigned to the coal valuation section of the Income Tax Unit in Washington, D. C. Papers may be obtained upon request from the Civil Service Commission, Washington, D. C.

The U. S. Geological Survey announces that during April reports were rendered upon 43 applications for coal-prospecting permits and 24 applications for coal leases in Western states.

Federal Fuel Distributor Wadleigh has addressed a letter to H. R. Heyden, Secretary, National Association of Purchasing Agents, strongly **urging the association and its individual members to store coal to capacty during the next three months**, in order, as he expresses it, that "the country may have on Sept. 1 stocks of coal sufficiently large to assist the transportation interests in handling the greatest volume of traffic in their history," this fall. Such action, Mr. Wadleigh points out, will be not only a help to the railroads, by enabling them to move coal before the peak of their general traffic load arrives, but it will also be a protection and insurance to coal consumers.

WISCONSIN

The City Purchasing Board of Milwaukee has awarded contracts for the delivery of coal to the various city departments as follows: Wisconsin Great Lakes Coal & Dock Co., lump $6.75, screenings $5.60; Youghiogheny & Ohio Coal Co., lump $6.90, screenings $5.22; United Coal & Dock Co., screenings $5.73; Callaway Fuel Co., screenings $5.60.

A joint resolution memoralizing Congress to enact legislation protecting coal consumers by **requiring mine operators to furnish proof of the quality of coal sold** has been introduced in the Legislature of Wisconsin. The resolution sets forth that "during the last year coal operators have sold to the people vast quantities of refuse material claiming the same to be coal."

The Milwaukee-Western Fuel Co. suffered a heavy loss on Sunday, May 20, 1923, when the steel **steamer Edward U. Demmer**, bound from Toledo for Milwaukee with a cargo of 7,200 tons of soft coal **went to the bottom of Lake Huron**, following a collision with the steamer Saturn. Fortunately no lives were lost. The vessel and cargo represent an insurance loss of about $400,000.

CANADA

James McGregor, who has been chief inspector of mines for British Columbia since May 10, 1920, has resigned the position because of ill health. He had been in the service of the department for about 25 years. **The duties of the office were taken over June 1 by George Wilkinson**, who was chief inspector from 1917 to 1920 and resigned to become general superintendent of the Pacific Coast Coal Mines, Ltd. Mr. Wilkinson, has had many years experience as a mine operator and engineer in that province. Prior to becoming chief inspector in 1917 he was manager of the Western Fuel Co.'s reserve mine at Nanaimo. Born in Cumberland, England, May 27, 1875, he was at work in the mines five years before coming to Vancouver Island in 1896. Since then he has been engaged, practically without cessation, in and around the coal and metalliferous mines. His technical qualifications are the highest, as



GEORGE WILKINSON

he holds a first class manager's certificate both in British Columbia and Alberta and is a member of the British Columbia Institute of Engineers. He conducted investigations into the two recent explosions in the No. 4 mine of the Canadian Collieries Co.

It was announced in the House of Commons at Ottawa a few days ago that the **Hoppe coal leases in Alberta had been cancelled.**

The Dominion Fuel Board, appointed last November, with Charles Carnsell, Deputy Minister of Mines, as chairman, to investigate the fuel problem, have issued an interim report making the following recommendations: Wider range of utilization of the coals of British Columbia, Alberta and the Maritime Province; investigation into the feasibility of establishing by-product recovery coking plants in the larger centers of population; utilization of peat to supply a portion of the fuel needs of central Canada, with further encouragement of the industry by the governments concerned, if necessary; utilization of wood resources under proper management to a greater degree than at present. Electric house heating on a large scale is considered impracticable, but it is pointed out that the use of electrictiy for industrial and transportation purposes will set free a large amount of coal for heating. The report concludes with a warning that with the anthracite fields nearing exhaustion the public must look to other sources for fuel.

Obituary

John H. Scott, manager of the Wilkeson Coal & Coke Co. of Tacoma, Wash., died of heart failure in New York City early in May. Mr. Scott was a veteran of the Civil War and had been a coal operator for many years before his death.

William J. McClain, secretary-treasurer of Waldo, Egbert & McClain, Buffalo, N. Y., extensive jobbers in steel, coal and coke, died on May 22, aged 39. He was for several years connected with the Carnegie Steel Co. at Youngstown and later with the Republic Iron & Steel Co., which latter he left to become a member of the present company. He was popular socially and a member of many local organizations. He leaves a wife and child.

Harry P. Mahaffey, aged 45 years, assistant superintendent of the Wilmore Coal Co. and one of the most prominent citizens of Windber, Somerset County, Pa., died May 23 in the Windber hospital. His death was due to influenza and bronchial pneumonia. He was born at McGees Mills, Clearfield County, and received his education at Pennsylvania State College. He was located in Windber for eleven years.

John W. Spickelmier, 67 years old, a pioneer coal dealer and cement block manufacturer of Indianapolis, died recently at his home in that city. Mr. Spickelmier was born Jan. 10, 1856, in Hendricks County, Indiana, and went to Lebanon to live when a young man. He moved to Indianapolis to engage in business many years ago and was founder of the Boulevard Cement Block Co. and the Spickelmier Fuel & Supply Co. The widow, Mrs. Martha Spickelmier, and three daughters survive.

After a brief illness, **Colonel Stuart W. Walker**, of New York and Martinsburg, W. Va., general counsel for the Consolidation Coal Co., expired at his home at Martinsburg on Wednesday, May 23. He had suffered a stroke of paralysis early Monday morning, May 21. Colonel Walker entered the service of the Consolidation Coal Co. two years ago, upon retiring as U. S. Attorney for the Northern District of West Virginia, in which office he had served for two terms under President Wilson. He was a graduate of the law school of Washington and Lee and had been a practicing attorney in Martinsburg until his appointment as counsel for the Consolidation. He had always been active in Democratic politics, at one time opposing the late Judge A. G. Dayton as a candidate for Congress and twice being elected delegate at large to national conventions of his party. He served as assistant district attorney from 1895 until 1897. Colonel Walker is survived by a widow, formerly Miss Annette Thayer of Charleston, and by one brother, Hunter Walker, of Berkeley County. Funeral services were held at his home, "The Pillars," near Martinsburg, on Saturday, May 26, interment being at Martinsburg. The Circuit Court of Berkeley County, in session at Martinsburg, adjourned on May 24 out of respect to his memory.

Association Activities

Pittsburgh Wholesale Coal Associations

M. H. Jacobs, assistant general freight agent of the Western Maryland R.R., addressed the members of the Pittsburgh Wholesale Coal Association at their weekly meeting May 28 on the subject: "The Western Maryland R.R. and Its Relation to the Coal Industry," dealing with the history of the Western Maryland and statistics relative to equipment and tonnage movement as well as describing the coal-producing territory touched by this railroad and reached directly or in conjunction with other railroads. A speakers' committee composed of W. C. MacQuown, Keister-MacQuown Fuel Co.; J. A. Collette, Farrell Fuel Co., and I. W. Brison, Poland Coal Co., was recently appointed by President Frank Howard of the Bellebridge Coal Co. for the purpose of making the meeting more interesting to the members. All attendance records have been broken, and at the present rate it looks as if larger quarters will be necessary to take care of the large number of members and friends attending the meetings.

Traffic News

The Norfolk & Western, it is reported, will undertake further electrification of its lines during June between Farm and Iaeger. When the work is completed it will be possible to use electric motors for a distance of about 60 miles, covering the heaviest grades of the entire system and on that part of the road where much of the coal traffic handled by the road originates. The N. & W. already has about 40 miles of track under electrification, excluding the Bluefield yards and the trackage on Tug River fork.

Announcement has been made of an order recently made by the Mobile & Ohio Railroad Co., for new equipment costing approximately $2,400,000, all to be delivered in time for the heavy traffic rush next fall. Included in the order were 200 50-ton all steel coal cars and they will be built by the American Car & Foundry Co. at St Louis and Memphis. Ten Mikado type freight locomotives were in the order and will be built at Lima, Ohio.

W. H. Truesdale, president of the **D., L. & W. R.R., cites in the annual report of the company a decrease in surplus** for 1922 of $5,304,830.67 when compared with 1921. The loss from revenues amounted to $11,355,471.17 and from expenses $4,200,410.78. The company received $4,699,063.93 from the U. S. Railroad Administration. Due to the strike, earnings of the coal department

show a loss of $6,582,558.23 when compared with 1921, the net income during 1922 amounting to $43,847.21. Dividends declared totaled $10,132,932, or $3,377,644 less than during the previous year. Mr. Truesdale says that during the strike of the hard-coal miners scarcely a ton of coal was produced, with the result that with the reduction in freight rates effective July 1, 1922, the revenues of the company from the transportation of anthracite decreased $12,312,107. The company transported over its lines 21,798,417 tons of freight, or 2,875,385 tons less than in 1921, although the loss in the transportation of anthracite alone was 4,391,721 tons. The cost of fuel for locomotives and floating equipment increased $1,163,391 over the previous year.

A large number of **Kewanee (Ill.) industries have applied for a reduction in freight rates on coal from Peoria and Fulton counties, Ill.**, to that city. It is claimed by Kewanee industries that there is an inequality of rates between Galesburg, Ill., and Kewanee.

As practically all embargoes, prohibiting the movement of coal and coke shipments on or via the **New York Central R.R.** have now been cancelled, the company announces that its **"Summary of Informal Embargo Notices" will be discontinued.**

The Muscatine (Iowa) Shippers Association is investigating freight rates on coal from Illinois mines to that city. It is estimated that 2,000 cars of coal are annually used in Muscatine from Illinois fields. Present rates to Muscatine are higher than to Davenport, Iowa, with the distance favorable to Muscatine.

Attorney-Examiner P. F. Gault, of the I.C.C. has reported, in the **case of the Indiana State Chamber of Commerce vs. The Baltimore & Ohio Railroad Co.** The conclusions are practically as asked for by the complainants—providing decreases of from 8 to 22c.—with the exception of the rates from West Virginia and Kentucky to "gas belt" points where a reduction of 17c. was recommended as against 32c. asked. Exceptions will be filed to this item.

The Coal and Coke Committee, Trunk Line Territory, announces hearings at 143 Liberty Street, New York, commencing on the morning of June 6, 1923, relative to the following subjects: Adjustment of rates on bituminous coal from all originating bituminous coal lines publishing rates to D., L. & W. R.R., Norwich, N. Y., and intermediate territory, Willards to Haynes, N. Y., inclusive, N. Y., O. & W. R.R., Norwich and Oxford, N. Y. The present rate on the Clearfield basis is $2.96 gross ton and the proposed rate $3.09. The usual arbitraries over Clearfield basis from other groups of origin to be maintained. Another subject is the carriers' proposal of cancellation of rates on bituminous and cannel coal as shown in tariff I.C.C. No. 3464 from mines on the Pittsburgh, Shawmut & Northern R.R. to Jamison City, Masten and Powell, Pa. The reason for this change is to remove obsolete rates from the tariff. Another subject for hearing is the cancellation of joint rates on coke from ovens on originating lines to destinations in Nova Scotia, New Brunswick, and northern Maine, except St. John, N. B., West St. John, N. B., Halifax and Sidney, N. S. The reason for this proposal is that the rates are obsolete and there is no movement to points other than those named above. Another subject is adjustment of rates on coke from ovens on the Pennsylvania System and lateral connections to various points on the West Shore R.R. For instance, the present rates from the Gallitzin group to various points such as Ridgeland and Churchville on the West Shore, and Phillipsburg on the Pennsylvania System, are as follows: $3.65 net ton to be increased to $3.76; $3.63 net ton to be increased to $3.76; $3.25 net ton to points on the Pennsylvania to be increased to $3.38, with the usual arbitraries over Gallitzin basis from other groups of origin. The reason for this proposal is to remove the fourth section departures. At the same time and place there will be hearings with reference to the movement on anthracite coal from mines on the N. Y., O. & W. R.R. to New York Central R.R. stations from Schenectady to Rensselaer, N. Y., and the rates on anthracite from the various originating lines to a number of points on the New York Central R.R. Anyone interested in any of these subjects should communicate with Joseph Weed, chairman of the Coal & Coke Committee, at 143 Liberty Street, New York.

The Kentucky Railroad Commission, has handed down a decision for the Elkhorn-Hazard Coal Co. against the Louisville & Nashville R.R. concerning freight rates on bituminous coal from certain mines in the Hazard coal field to destinations in the state. The complaining companies operate mines in the vicinity of Whitesburg and, because their rates were 10c. a ton higher than rates of other operators in the Hazard field, they have practically been excluded from doing business in Kentucky. In giving the complainants the same rates as other Hazard coal mines the commission puts them in position to reach Louisville and other Kentucky cities on a rate equally with Hazard group operators and also those in the Jellico field.

The Baltimore & Ohio R.R. has filed an application with the Interstate Commerce Commission asking authority to abandon a part of the line of that road in the State of Ohio 17 miles long, extending from a point near South Wooster, Wayne County, to Millersburg, Holmes County. The company says the earnings do not justify its continuance, and therefore the move is in the interest of economy.

E. J. Cleave, formerly connected with the Pennsylvania R.R., **has been appointed district manager of the Car Service Division of the American Railway Association n New York** with headquarters at 30 Vesey Street. He assumed his new duties on June 1. The appointment is in line with the policy recently announced by the Car Service Division of establishing district headquarters in certain cities for the purpose of bringing about closer co-operation between shippers and the carriers and to enable the railroads to anticipate as far as possible the transportation needs of the industrial and agricultural districts in various parts of the country. District headquarters have already ben established in Minneapolis, Birmingham, Dallas, St. Louis, Chicago, Cincinnati and Toledo. The territory making up the New York district includes all New York City terminals and practically all of the state, as well as the entire states of New Jersey and Delaware, the eastern shore of Maryland and Virginia and the eastern half of Pennsylvania.

On the ground that it has no jurisdiction, the **Interstate Commerce Commission has dismissed the complaint of the International Harvester Co.**, in which the rates on coal between Farmington and St. David, Ill., to Canton, Ill., were attacked as being unreasonable. Since the rates are not held to be unreasonable in their relation to interstate rates, the commission holds that it has had no jurisdiction over these rates since the termination of federal control.

Reparation has been awarded Tuffli Bros. Pig Iron & Coke Co. because of the application of an unreasonable rate on coke between Benham, Ky., and Abilene, Kan.

Continuance of operation on the part of the Federal Valley Railroad Co. in the Athens region of Ohio is essential to the public interest, it is contended by the United Mine Workers of America, the Black Diamond Co., the Jennings Coal Co., the Federal Creek Coal Co., the Schuler Coal Co. and the Athens Chamber of Commerce in briefs filed with the Interstate Commerce Commission. It is contended that this line serves an area from which large amounts of coal are recoverable. The potential tonnage of that portion of the Pittsburgh vein is said to be more than 200,000. In addition, it is claimed that there are large tonnages available in the Hocking and No. 7 beds. If sufficient equipment is furnished and definite assurance of the continuance of service is given, greatly increased production may be expected from the territory tributary to this line. The interests mentioned are taking no part in the controversy as to what may constitute proper divisions for the Federal Valley line. Their only claim is that the divisions be such as to continue, improve and promote the service now being rendered.

Railroads of the United States, according to the Car Service Division of the American Railway Association, on May 15 **had 50,587 serviceable locomotives**, an increase of 328 over the total number on May 1 this year, which had previously marked the peak. Locomotives in need of repair on May 15 totaled 13,495, or 21 per cent of the number on line. Compared with the number on May 1, this was a decrease of 636. During the semi-monthly period from May 1 to May 15, a total of 16,904 locomotives were repaired and turned out of the shops. This was an increase of 485 over the number repaired during the last half of April. Between May 1 and May 15 this year **the roads installed 5,633 new cars and 308 new locomotives.** This brought the total number of new freight cars installed since Jan. 1 to 55,784, while a total of 1,536 new locomotives have been placed in service during the same period. New freight cars on order on May 15 totaled 113,619. Of that number 45,742 were for coal cars. During the first 15 days in May the carriers placed orders calling for the delivery of 147 new locomotives which brought the total number on order on May 15 to 2,103.

Coming Meetings

Iron and Steel Exposition at Buffalo, N. Y., Sept. 24-28. Association of Iron and Steel Electrical Engineers, Empire Building, Pittsburgh, Pa.

The American Wholesale Coal Association will hold its annual convention June 12 and 13 at the Gibson Hotel, Cincinnati, Ohio. Secretary, G. H. Merryweather, Union Fuel Bldg., Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will hold its annual meeting June 12-14 at Delavan, Wisconsin. Secretary, I. L. Runyan, Great Northern Building, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 12 at Kansas City, Mo. General Commissioner, W. L. A. Johnson, Kansas City, Mo.

New England Coal Dealers' Association will hold its annual meeting at Providence, R. I., June 13-15. Secretary, C. R. Elder, Boston, Mass.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., June 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Coal Association will hold its sixth annual convention June 19-22, at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

Retail Coal Dealers' Association of Texas will hold its eighteenth annual convention at Galveston, June 11 and 12. Secretary, C. R. Goldman, Dallas.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting lill start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

West Virginia Coal Mining Institute has set June 12 and 13 for its annual meeting, to be held at Hotel Waldo, Clarksburg, W. Va. Secretary, R. E. Sherwood, Charleston, W. Va.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Ninth National Exposition of Chemical Industries at the Grand Central Palace, New York City, week of Sept. 17. Manager, Charles F. Roth, Grand Central Palace, New York City.

The Engineering Section of the **National Safety Council** will hold its second meeting of the year on June 12 in the Board of Commerce Building, Detroit, Mich., in co-operation with the Detroit Safety Council.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Meeting the Labor Question Nationally

SIX years ago coal operators from all over the country met for the first time in one assembly. In the autumn of 1917 the National Coal Association was organized and its first year was given wholeheartedly to winning the war. Next week its seventh annual convention will be celebrated at Atlantic City. Much has transpired since the end of the war.

Its war job done, the association early in 1919 turned to the assembly and dissemination of trade facts as one of its chief functions. A federation of local trade bureaus, the National organized a country-wide trade-reporting service that functioned well until the federal government put the ban on open price reporting. Since the strike of 1919 the National Coal Association has been mainly engaged in fighting for the maintenance of the coal business as a private enterprise. Its activities have been more political than economic and it may be said that it has been the recognition of Washington in the scheme of things affecting the coal man that has held the organization together through some trying periods. Incidentally it is apparent that this recognition and consequent interest in and support of the National Coal Association has varied almost directly as the distance from the national capital.

Last year, in the second month of the great strike, labor was boldly admitted as a subject that could be considered by the membership of this association. Distance from Washington—or from Indianapolis, for that matter—does not serve to cool the interest of every coal operator in labor. Everyone has it on his mind; if union, how to get along with the union, and if non-union, how to maintain that status. Thus the subject that is uppermost in the mind of each was no longer banned from the councils of the National Coal Association. True, the severity of the strike and the lack of ability of even the union operators to meet on any common ground prevented the National Coal Association from becoming a factor in the labor situation; in fact precluded it from opening the matter for discussion.

Thus we find at the beginning of its eighth year a national association composed largely of local groups that have as their chief, and in many instances their only, function the handling of labor matters. The labor policy of the national organization as expressed at the convention last year is to recognize and respect the rights and opinions of the locals on labor matters, to interfere in no way with the principle of "district autonomy." Such a policy aims in no way to give direction to thinking or action on labor matters. Its expression helped in no way to solve labor questions and but served to spread on the record what has always been the opinion of the membership.

The sentiment of a majority of the coal operators is still to maintain the National as a defender of the rights of individual action. They are even yet engaged in writing and defending their declaration of independence. Some day, surely, they will think about writing a constitution that will bind them together in progressive movement. It is not to be thought that no one of them has given this matter consideration, for the past year has emphasized to the leaders the necessity of a plan of action that will overcome the handicaps to the industry imposed by an uncemented two-thirds unionized majority and a solid one-third non-union group.

Not once but many times in the past few years has the question been raised, How long will the National Coal Association live? The answer is that it is here to stay. When last year defection of large union groups —Illnois, central Pennsylvania and Iowa and the largest operator in Pittsburgh—reduced the ranks, it seemed that the organization was drifting into the control of the non-union producers. The end in that direction would be fatal to the National, as everyone knows. The tendency has been unduly magnified, however, for the union operators who have remained with the organization have been working steadily toward consolidation of their ranks and the working out of a policy that will reunite the whole. Time for education must be allowed for this accomplishment.

Granted that the main purpose of this association remains the perpetuation of the right of individual enterprise in the coal industry, it were well to recognize that, unsatisfactory labor relations being the chief cause of disturbance and the root trouble, to correct this condition might well become the chief activity of the National. That is to say, correction of the cause of trouble is in the end more constructive than defence against the effects. Nevertheless a defensive alliance has served the useful purpose of holding the ranks together while education has been proceeding on other lines.

This education has advanced sufficiently to warrant the National in stepping forward beyond the mere assertion of the desires of local interest, the preservation of "district autonomy," to a definite alignment that is designed to carry forward that policy. As a program, a common ground for union and non-union operators within the association, a policy of maintaining the *status quo* is sufficient, but for the union operators something more is essential. Within the National if possible, otherwise outside, there is required a grouping of those who must meet the union sufficiently strong, aggressive, cohesive and purposeful to combat a united militant United Mine Workers. Save by the example of their unity of purpose and unity of action the non-union operators can lend the union producers no help in this. The problem is for those who are dealing with organized labor. That is why the well wishers of the National Coal Association, who outnumber the present membership, look forward to the return to active participation of those who are temporarily outside, believing that when a formula has been devised for meeting the labor question unitedly the National Coal Association will be but at the threshold of its greatest usefulness and success.

The Anthracite Market

THERE is a danger signal for the country in the unseasonable strength of the anthracite market. Domestic sizes are in such strong demand that independent quotations, the index of activity, have barely fallen from their winter's peak. In fact, quotations on scattered lots of pea and larger coal recently have set unusual records for this time of the year and the bulk of the independent coal is moving at a differential of a dollar over company coal. Normally April and May are comparatively dull months for the independents; their prices sag and movement declines with the coming of winter and the beginning of a new coal year.

Two things have combined to make this season out of the ordinary, aside from the fact that the city dweller is quite generally in funds and able and willing to buy almost irrespective of price. Probably first and foremost is the fact that the East squirmed its way through last winter on curb-to-furnace deliveries. No surplus of hard coal was at any time possible and bins were empty at the end of a long, cold winter and spring. Retail dealers have sought to replenish their yard supplies and have almost without exception found householders willing if not eager to take in next winter's requirements. The flow from mine to cellar has been uninterrupted.

Overhanging strike clouds are again making apprehensive the householder and particularly the trade. The wage contract between operators and mine workers in the hard-coal region will expire on Aug. 31. Will it be renewed without a suspension? No move is being taken to negotiate a new contract, and none is possible until after the mine workers' tri-district convention which is to meet on June 26 to formulate policy and demands. It is generally expected that the demands of 1922 will be restated, calling for 20 per cent increase in wages and for changes in working conditions that are calculated further to increase the cost of production.

The consumer is convinced in advance that his anthracite is costing too much. He will have no patience with a higher price although the majority of users will pay for a time—but under protest—whatever the price may be. So far has anthracite traveled the road toward the category of luxuries. The producers know the outcry that would follow a jump in price and will contend against the demands of the workers for higher wages.

Several unknown factors intervene in estimating the extreme to which the United Mine Workers may go in holding out for the increase it seems assured they will formally demand. One is the strength the radical movement among the workers may develop—that is to say, to what extent a conservative leadership may be able to control the men. Conservative leadership, opposed to nationalization and favoring the well-trodden paths of collective bargaining, may be able to read aright the signs of the times and come to a peaceful understanding with the anthracite operators, one not colored by a concurrent soft-coal settlement. This, we believe, is hoping for a great deal. What the undoubtedly strong radical element, Cappellini on the outside—as yet—and Golden on the inside, may accomplish is another matter. One does not need to be a pessimist to anticipate at least unsettled labor conditions in the anthracite region this year.

Unknown also are the facts about anthracite that the U. S. Coal Commission will release to the public on July 1, the date set by Congress for a special report, it seems in aid of the very situation that is developing. And what effect will the publication of the results of an impartial detailed investigation of the many moot points have on a restive, suspicious public and on operators and mine workers? Will the findings of fact and interpretation of the Coal Commissioners so definitely point the several ways that there will be no gainsaying the ultimate direction of action?

Uncertainty lurks at every turn. Between now and Sept. 1 is less than three months in which to take in anthracite. There is no complaint of the rate at which household coal is pouring into the consumer's cellar, but there is too little heed to the accumulations now, under quite favorable price and market condition, of substitutes. It were well that the advice be discreetly passed to the public that it is taking too many chances if it puts entire trust in getting hard coal easily next winter. Some judicious buying of substitutes in the next few months would be good policy for all.

A Daniels Come to Judgment

FINAL disposition last month by the U. S. Supreme Court of the New River Collieries case sets at rest all doubt as to the legal right of a seller to demand the market price for his coal. Even before the Lever act the Navy Department set its own price for the coal it commandeered or bought and invited the producer to accept that price or fight in the courts. After the government prices were lifted and until early in 1921 the same policy was followed. The test case for the producers was won in the lower courts and now is upheld in the highest court in a unanimous decision that contains a number of interesting and important statements.

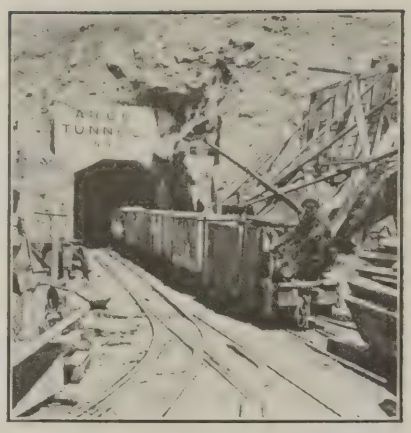
The ascertainment of compensation, it is stated, "is a judicial function, and no power exists in any other department of the government to declare what the compensation shall be or to prescribe any binding rule in that regard." That is, whether it be coal or coal mines, the courts will decide what price shall be paid if the government becomes the buyer. "Where private property is taken for public use, and there is a market price prevailing at the time and place of the taking, that price is just compensation." The refusal of lower courts to consider evidence on the owner's cost of production and a reasonable profit was upheld because the "owner's cost, profit or loss did not tend to prove market price or value at the time of taking, and was therefore immaterial."

The distinction was recognized between contract prices under which coal was currently moving in domestic business and the spot market on which the coal commandeered was being sold.

WHEN AS RECENTLY AS JAN. 29 Ellis Searles repudiated the nationalization plan of Brophy and Golden, he pointed out that Brophy's committee was not authorized to present its findings save to the next convention of the U.M.W.A. Brophy, reputed to be after John Lewis' scalp, was thus spanked. Now comes the proposal of the three anthracite district presidents, signed by none less than Ellis Searles, outlining a plan for nationalization of the hard-coal mines. It is now Brophy's turn to point out in Searles' words that "the 1921 convention did not commit the union to any particular form or plan of nationalization."

Coal- and Metal-Mining Methods Contrasted

By D. Harrington
Supervising Mining Engineer, U. S. Bureau of Mines



High Temperatures in Metal Mines—Methane Found in Workings of Both Types—Blasting Timber Causes Fires in Mines Producing Metals—Dust in Such Mines Probably Causes More Deaths Than Coal-Dust Explosions

THE products of the mineral industry of the United States were worth four billions of dollars in 1921 (the latest year for which figures are available), of which coal accounted for one and three-quarter billions and virgin metals for three-quarters of a billion, so a general comparison of practices at coal and metal mines should be instructive.

Natural Conditions.—In general the coal mined in the United States is less than 1,000 ft. below the surface vertically and the mining is all on one plane, usually tilted only slightly from the horizontal, though there are a few coal mines with over 2,000 ft. of cover, and a considerable number with steep pitches or working two or more seams. Metal mines generally work along several practically vertical horizons, and frequently have workings 3,000, 4,000 or even 5,000 ft. below the surface.

In this connection it is noticeable that ladders are only occasionally found in coal mines, and few coal miners are proficient ladder climbers. The natural temperature of surrounding walls or of water encountered in coal mines runs from about 50 to 70 deg. F., with rare instances where the wall temperatures are over 70 deg. and in places will reach as high as 90 deg. F. The natural wall temperatures in metal mines, while generally low near the surface, run as high as 135 deg. in deep workings, and in mines with fires, such temperatures may frequently approach 200 deg. F. Largely owing to the conditions recited, the air temperatures in working places in coal mines rarely rise above 70 deg. F., whereas temperatures of 80, 90 or well over 100 deg. F. frequently are found in the working places of metal mines.

Note—Published by permission of the Director, U. S. Bureau of Mines. These notes are presented as embodying personal impressions of coal and metal mining after twenty-two years of experience and observations wholly in the United States, about fifteen years being spent in coal mining and seven years in connection with metal mining, during which underground work has been done or trips taken into working places in over 150 coal mines in fifteen states of the Union, and in over 100 metal mines in fourteen states. The ground covered included twenty-five states—as far east as Virginia, as far north as Montana, and as far south as Alabama, eleven states being east of the Mississippi. Only two short trips were taken into anthracite mines, hence anthracite conditions are not included. The metal mines visited included those whose chief product was copper, gold, iron, lead, manganese, silver, tungsten or zinc.

The illustrations and captions were added by the editor without consultation with the author.

The headpiece depicts the Argo tunnel. Home-built locomotive, bringing out a load of 3-ton ore cars on a 36-in. gage. These are typical ore cars without flare, of narrow gage and of steel construction. Flare is less necessary where the mineral is heavy and the support of a flare also is more difficult under these circumstances.

Gases Encountered.—Many coal mines are afflicted with methane and occasionally coal mines are troubled with small outflows of nitrogen or sulphuretted hydrogen. In unventilated places, the percentage of oxygen may fall below normal, that gas being absorbed by the coal. Metal mines also occasionally emit methane and in many regions they also are troubled with sulphuretted hydrogen, carbon dioxide, or nitrogen which is emitted by the strata. Frequently, moreover, there is a dangerous oxygen deficiency due to the absorption of that gas by timbers or as the result of the oxidation of ores.

Besides these gases from natural causes may be found carbon monoxide. This occurs both in coal and metal mines, being the outcome of mine fires. Metal-mine fires also give off dangerous quantities of sulphur dioxide, fumes of dilute sulphuric acid, and even arsenical fumes. Moreover, in metal mines the firing of shots loaded with dynamite in confined and poorly ventilated places frequently leaves those places filled with dangerous percentages of carbon monoxide and oxides of nitrogen. Fatal gassing from this source is much more frequent in metal than in coal mining. In fact, metal mines as a whole have a much greater variety of dangerous gases than coal mines.

The coal miner usually is more or less familiar with gases and is disinclined to venture into abandoned workings unless they have been inspected by a fireboss. On the other hand, metal miners—even the men in charge—rarely have much knowledge of the possible pollution of the mine atmosphere, and the belief is general that so long as a candle continues to burn, the miner is safe, notwithstanding the fact that a candle may burn brightly when the surrounding air contains sufficient poisonous gas, such as carbon monoxide or oxides of nitrogen, to cause almost immediate death to persons breathing it.

Blasting Timber Causes Metal-Mine Fires

Fires.—Fires in metal mines have been caused by the spontaneous combustion of manure, by the ignition of hay, timber, or similar combustible material, by candles or matches, by the short-circuiting of electric wires, by the blasting of timber, by the use of fuse and dynamite in the vicinity of timber and by other causes. In the past, most metal-mine fires were started by the careless handling of candles, but the recent displacement of that means of illumination by the

carbide lamp has greatly reduced the fire risk, though the extension in the use of electricity for fans, pumps, locomotives, etc., has added a new hazard.

Most coal-mine fires have been caused by ignitions of gas or coal dust, by the use of dynamite, black powder and open lights. Fires also are occasionally caused by spontaneous ignition or the ignition of timber due to defective electric wiring. In general, coal-mine fires are extinguished by sealing or loading out the hot material—coal and slate—whereas metal-mine fires are put out by sealing or flooding, the latter method being used in metal more frequently than in coal mines.

Opening Mines.—Workings in coal mines generally can be planned ahead, and provision made for future requirements as to ventilation, haulage, etc. Immediately upon opening, intake and return aircourses are started, and underground workings are driven in duplicate, triplicate, etc., so as to provide for the circulation of air, and at the same time to afford more exits than one in case of a fire or a cave-in.

On the other hand, only infrequently can workings in metal mines be planned ahead, owing to the uncertainty as to the location, continuity or persistence of the ore deposits. As a result, usually but one opening is made into metal-bearing property until its ore bodies are well proved; and underground openings generally are driven singly. Hence it is difficult, in fact almost impossible, to provide adequate air circulation or even adequate protection to workers in case of cave-in or fire.



GUNITED TIMBER IN A CROSSCUT AT BUTTE

Anyone who notes this timbering will realize the fact that metal timbermen are, and must be, superior to those in coal mines. These timbers are some of the few being gunited in metal mines to preserve them from rot. This preservation it effectually affords. The narrow, badly cluttered roadways are a danger which would be greater were the crosscuts driven on a steep grade. Being level, and the car trips being short, the danger is somewhat reduced.

As a consequence, many metal mines have but one opening and are extremely unhealthy and dangerous places in which to work. Workings in coal mines frequently have their height determined by the thickness of the coal seam, and where a seam is 3½ to 5 ft. in thickness, the employees are bent over when walking or working, a condition seldom found in metal mines and one which the metal miner resents when he does encounter it.

Development.—The room-and-pillar system of coal mining roughly resembles the various stoping systems in metal mining. Some real room-and-pillar work is done also in metal mining. The caving systems therein, moreover, somewhat resemble the longwall method in coal mines. In general, the excavations are more frequently back-filled in metal than in coal mines, and the percentage of extraction from the original deposit in metal mining is far better than in coal mining. The strip pit in coal mining is similar to the steam-shovel methods on iron and copper deposits.

The "room" in coal mining is essentially the "stope" in metal mining, and the coal-mine "entry" corresponds to the metal-mine "drift," a "crosscut" in a coal mine is a short connection between two entries, or two rooms and is driven, in general, wholly in the coal; the word "crosscut" in metal mining usually is used to denominate an underground level which is driven in the country rock to intersect a vein. It is not used to designate a passageway driven in ore. The coal miner's "roof," or "top," is the metal miner's "back," and the "rib" of a room or entry in coal mining is the same as the "side" or "wall" which the metal miner leaves in driving his stope or his drift.

Ventilation.—The planning of ventilating systems is done largely before steps are taken toward the actual opening of coal mines, whereas many metal mines never have a ventilating system, and the few that do, install one only upon necessity. Many of the main fans in metal mines are placed underground, but to put a main fan underground in a coal mine would be a criminal absurdity, and no state law would allow it. As heretofore indicated, coal-mine openings are driven in pairs to allow of one opening for intake air and another for return air, and state laws generally require moving currents at all working faces.

Only rarely are metal-mine workings driven in pairs, and not 25 per cent of the working faces therein have air with perceptible circulation. Coal mines use overcasts, brattice cloth, air regulators, etc., to deflect air currents, but these are almost unknown in metal mines. Though the use of electrically driven fans underground as "boosters" is generally condemned in coal mines, it is a sign of progressiveness in metal mines.

The placing and use of numerous doors is good practice in metal mining but poor practice in coal mines, especially those which are gaseous. Ventilating doors in metal mines usually are flimsily constructed and maintained, whereas the doors in coal mines generally are fairly well-constructed and kept in good repair.

Lighting.—In general, metal-mining companies have been accustomed to supply lights for underground workers, whereas coal miners have paid for their own lighting. The candle so long supplied by the companies and used by the metal miner has not been used by the coal miner, largely because the air currents provided in coal mines would extinguish the candle flame.



SUPPORTING A MINE "BACK" WITH TIMBER

The "back" is the hanging wall of the vein, which is not stratified in the same direction as the mineral is lying. The country rock may be level while the vein is at a steep vertical angle. Moreover, the volcanic matter often has weakened the walls of the passage that it has made for itself, and the back consequently is dangerous like the roof above coal beds.

On the other hand, the old-time coal miner's oil-lamp could not be used in metal mines because, owing to the deficient ventilation in 90 per cent of the working places, the smoke it would cause would drive the men out. At present, where open lights are allowed, both coal and metal miners use carbide (acetylene) lamps, the coal miner buying both lamp and carbide. In general, the metal miner buys his lamp (usually from the company and at cost), the company supplying the carbide. In coal mines the carbide cap lamp is used almost exclusively, but some metal miners use this type of lamp and others a carbide lamp with a candlestick attachment. Many coal mines—both gaseous and non-gaseous—require miners to use electric safety lamps owned and maintained by the company, with rental charged the miners; but, as far as my observation goes, none of these electric safety lamps is yet used in metal mines, though their use would do much to eliminate fires.

Explosives and Blasting.—In metal mining magazines for explosives usually are placed underground, but this would be criminal in a coal mine. No coal miner would think of firing a shot without having inserted previously and firmly tamped some stemming material, whereas the metal miner often puts nothing in his blasting hole but straight explosive, frequently inserting a few extra sticks as stemming. However, there is increasing use of inert stemming among progressive and efficient metal miners.

The coal miner generally buys his own explosive and consequently is quite willing to use stemming. As the metal miner usually is furnished with explosive by the company which employs him, he sees no reason to go to the exertion of finding inert stemming. To save explosives and to decrease the proportion of fines shot down, the coal miner frequently undercuts the working face and then fires an opening or "buster" shot, delaying the other shots until the material shot down from the latter has been removed.

On the other hand, the metal miner does no undercutting, and though he fires his "cuts" (corresponding to "busters" in coal mining) first, usually he has provided to have the lifters blasted a few seconds later. These are heavily charged so as to throw material away from the face, all shots generally being loaded in such manner as to produce a maximum of fines.

Coal miners generally use black blasting powder, and occasionally 30 to 40 per cent dynamite; but in recent years dynamite, and to a certain extent black powder, has been superseded by permissible explosives, many of which are a modified dynamite with shorter and cooler flame and less violent action. The metal miner rarely, if ever, uses black powder, except in open-pit work.

Experiments with permissible explosives are being made in the hope that the number of fires in metal mines resulting from the blasting of timber may be reduced. It is hoped that, in a similar manner, accidents will be made less frequent in open-pit work. To use a mixed charge of explosive, such as two grades in a hole, is a dangerous practice when coal is the mineral being extracted, because gas or dust may be ignited by the successive flames due to different rates of detonation. On the other hand, the use of two grades of explosive in a metal mine is recommended as a means of obtaining additional strength of detonation. For instance a stick or two of 60-per cent gelatin may be used as a primer in a charge with several other sticks of 40-per cent strength. Material is more often shot by electricity in coal than in metal mines, the metal miner, even in shaft-sinking, generally preferring to use fuse to which he is accustomed rather than to change his habits of years and adopt a much safer practice.

Drilling.—Ability to drill holes with compressed-air machine drills determines largely the degree of proficiency of the metal miner, and air-compressors are an indispensable part of the metal-mine equipment; but in coal mining, drilling ordinarily is done by hand-operated machines and is a comparatively unimportant side issue. (In recent years in some mines the coal has been drilled by electric machines.) Compressed air rarely is available at a coal mine, especially since the electrically driven undercutting machines have displaced the puncher undercutter.

Tools.—The metal-mining company generally supplies all tools, hence drills, hammers, shovels, etc., frequently find their way into the waste rock or filling, or are otherwise lost or destroyed. The coal digger generally buys his own tools, such as picks, shovels, drills, etc., and in consequence rarely loses them. The coal miner invariably uses a short-handled, square-pointed, wide-bladed shovel and a light, sharp pick. The metal miner uses a narrow-bladed shovel with the blade either round or square, generally with a long handle. Where picks are found in metal mines they usually are of large size



"CROSSCUT" IN A COLORADO MINE

A "crosscut" in metal-mine parlance is a roadway driven level from a shaft through the country rock to a mineral vein. It is not located in the mineral, being extracted in "ground" that has no value. This crosscut has been driven by hand and is extremely irregular.

and not particularly sharp. The coal company often charges the miner for sharpening picks and other tools, but this is seldom if ever the practice in metal mines.

Timbering.—Though the coal operator makes a determined effort to save timber for re-use where possible, and immediately takes up for re-use rails and ties from abandoned places—even if abandonment is but temporary—only rarely does one see an effort made to save timber in metal mining except possibly some floor lagging, and the quantity of steel rails, pipe and ties allowed to decay and rust in many of our metal mines would put the ordinary coal company into bankruptcy. Timbering in metal mines is much more systematic than in coal mines, and the metal miner is a much more efficient timberman than the coal miner.

Coal or Ore Cars.—In metal mines the cars in use almost invariably are of steel, but in coal mines they usually are of timber with steel straps, though steel cars are becoming more numerous in coal mines. Similarly, metal mines use steel rails almost exclusively, but one frequently finds wooden rails in coal mines, especially in rooms. The metal mine uses skips and skip-pockets, whereas but rarely is the skip found in coal mines, unless the coal is to be used for steaming purposes.

Similarly, sheet-iron turn-sheets, which are used in connection with the tramming of cars in metal mines, are seldom used in or around coal mines. In general, much larger tonnages are handled in coal than in metal mines, and haulage ordinarily is much more efficiently arranged and the track better maintained in coal than in metal mines. However, the largest average daily output from any one underground shaft in the United States comes from a metal mine. This mine produces 20,000 tons of copper ore normally whereas the largest bituminous-coal shaft hoists only 8,000 tons per day.

By intensive mining methods the metal mine obtains a much higher percentage of material from the ground than does the coal mine, which in many cases (mostly lignite mines), wastes 75 per cent or over of the original coal available. Filling after mining is done much more systematically in metal than in coal mines.

Personnel.—A daily or shift wage has predominated in metal mining, but during or toward the end of the World War, contracting or bonus and penalty systems were introduced somewhat freely in driving drifts, crosscuts and raises, in drilling holes, in setting timber, in stoping, etc. In coal mines, contracting has for years been the rule in much of the underground work, except that relating to the transportation of coal.

Wages in metal mining generally were higher that in coal mining before the war, but during and since that period the coal miners' earnings per day or per year probably will exceed those of the metal miner. Though the coal miner's employment is seasonal and more or less intermittent, he is in general assured of at least 200 days' work per year and in some years 250 or more days (if he cares to take it), and his daily remuneration is comparatively high. The metal miner works at a lower rate per day, and if business conditions are depressed, cold weather does not ensure him any work. On the other hand, when "times" are normal, the metal miner has much the more steady employment.

The proportion of English-speaking men probably is greater in metal than in coal mines, and, at least in the West, it is noticeable that there are comparatively few Japanese or Chinese in metal mines and comparatively few Irish or Finns in coal mining. Coal-mine



HYDRAULIC STRIPPING LAYS BARE THE MINERAL VALUES BELOW THE SURFACE

This is not a gold placer but an iron-ore mine. The surface is being stripped hydraulically. This practice seems as unusual in iron as in coal mining though some of this work has been done in both. The stripping shown is known as the Rowe mine and is in Crow Wing County, Minnesota, on the Cuyuna Range. Rowe is near the town of Riverton, a village located close to the Mississippi

workers are much more thoroughly organized than metal-mine workers. A somewhat peculiar condition exists at many metal mines, in that the miners (general underground workers) are unorganized, whereas certain crafts (machinists, hoisting engineers, electricians, etc.) are thoroughly organized, yet all work together in comparative harmony. The coal-miner's union includes all occupations in or around the mine, whereas around metal mines, where any group of men is organized, the various occupations, such as miners, hoistmen, machinists, and others, each have their separate organizations.

Products, Markets, Wages, Prices, Costs.—The metal-mine operator produces a commodity for which the selling price is, to a large extent, fixed. Hence there is comparatively little direct local competition, whereas each coal operator, at least up to the time of the war, negotiated his own selling price. Consequently local competition was keen. Largely as a result of these conditions, metal-mine operators could co-operate and work harmoniously.

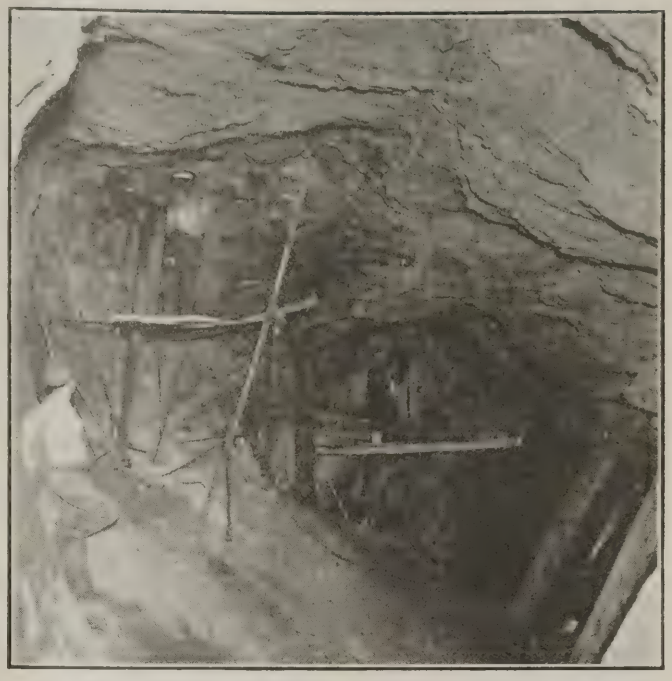
On the other hand, while coal operators formed associations, only too frequently there was no real harmony; and even if there was peace on the surface, there was only too likely to be subsurface undercutting of prices, juggling of the sizing of coal, tampering with wage scales, etc. Notwithstanding these factors, costly litigation has been much more frequent between metal-mining companies than between coal corporations. To-day, with metal prices low—that is, considering war prices and present operating costs—the metal-mine operator is anxiously trying to hold wages and all other costs to a minimum, and in doing this the lower wage fails to hold labor.

On the contrary, the public has a well-defined suspicion that coal operators have a community of interest with their employees in holding high the wages and general cost of coal, in order that the profit per ton may be held as high as possible, as it is obviously easier and much more remunerative for the coal operator to take a profit of 50c. per ton on coal, now costing about $3 per ton at the mine, than it was to take 25c. per ton on coal costing $1.50 or less per ton in pre-war times.

Moreover, with the higher wage, the coal mine attracts and holds labor, even with other work plentiful and operations at the coal mine intermittent. To be commercially available, the cost of producing coal rarely can be more than $4 per ton, and is usually under or around $3; on the other hand, the cost of producing a ton of ore may be over $20 or even over $100, and yet the operation may be profitable. The price of some metals, such as copper, is dependent largely upon foreign demand, whereas the price of coal, except in a few localities, is practically independent of foreign influences.

How Coal and Metal Miners and Engineers View One Another.—In general—at least in the past—the metal-mine employee from general manager to shoveler, considered himself much superior to corresponding grades of workers in coal mines. For instance, I have yet to encounter a metal-mining engineer who did not look with ill-concealed contempt on the coal-mining engineer, yet the latter undoubtedly has a greater number of intricate operating problems to encounter than his metal-mining brother and, in general, has much the greater record of efficiency to his credit.

Coal-mine foremen generally are disinclined to employ metal miners because they feel that the latter will



A STOPE IN THE CALUMET & HECLA

After all a stope is nothing more than an extremely steep room. Here the stope is empty except for timber, and the men have to watch against an awkward slide. Note the scaffolds which the men have erected to aid them in using machine drills.

"agitate" or, if employed on wages, will be inclined to "take five" (take frequent resting spells) as frequently as they had been accustomed to do in metal mines, which would be far too frequently for general coal-mining practice. Nearly all metal mines have an assayer or a chemist, or both, whereas only rarely is either found at a coal mine. Similarly, the geologist finds employment at or around a metal mine much more frequently than at a coal mine because the ore must be followed, and the veins or deposits more often than not are faulted and uncertain, whereas in this country the coal beds usually are comparatively regular and continuous, and their prospecting by drill-holes is comparatively simple.

Safety and Health.—Notwithstanding the almost universal impression of metal-mine workers that coal mining is too dangerous for them, the annual record—especially in recent years, even when explosions from gas and dust are included—frequently indicates that there were more accidents per 1,000 men employed in metal than in coal mines, though ten or more years ago metal mining had much the better record of the two. Considering only those accidents occurring from ordinary causes (eliminating those from explosions of gas and dust) there is no doubt that the coal miner has much the safer occupation.

The decreasing accident rate in coal mining is due largely to the eliminating of explosions of gas and dust by taking advantage of our latter-day knowledge of the methods by which these major accidents may be prevented. It must not be forgotten, however, that there was what appears to have been a sort of epidemic of major coal-mine accidents late in the year 1922.

In my opinion those metal-mining companies which make a definite attempt to reduce the accident rate generally have a much more efficient organization than can be found similarly engaged at coal mines. The metal-mining company generally chooses as safety man a young, vigorous and forceful engineer who has had underground experience as shift-boss and possibly in



WATER STOPING DRILLS IN DAVIS-DALY MINE

The head of the standing driller is almost touching the "back" or the "hanging wall" of the stone. The man with the drill steel is sitting on the edge of the footwall and at his back is the mineralized material into which the drill is holing. The men's feet are on waste material, on which indeed two of the men are squatting. The use of drills is more extended in metal than in coal mines.

other capacities; whereas ordinarily the safety man at a coal mine is a foreman or superintendent incapacitated by age or physical infirmity for performance of his ordinary work. It is for this reason that he is placed in the safety department, and the inevitable result is that the safety or inspection work is made less effective.

The men generally are better supervised in metal than in coal mines, as a shift-boss in the former rarely has over 50 men under his jurisdiction, and he is in the mine while his shift is at work. The coal mine usually has a fireboss for every 100 to 300 men, and he works chiefly while the men are out of the mine and has comparatively little authority over the men when he is in the mine. When a coal miner is killed underground, work in that mine automatically ceases for the day, and in places the day of burial causes another day's shutdown. On the other hand, the death of a metal miner underground occasions little comment, except among those who aid in removing him from the mine.

The metal mine has no official similar to the fireboss at a coal mine, who examines the working places to see if they are safe before the workers enter them. It would seem advisable, however, to follow coal-mining practice in this regard at metal mines so far at least as to have someone examine workings after shots are fired, in order that incipient fires might be discovered. In case of fire, many metal mines now have an efficient method of warning miners. Stenches are introduced into the compressed-air lines. So far, coal mines have not developed any system of warning as efficient as the stench method.

From the point of view of health, the coal miner has much the better occupation. He works in comparatively good air with comfortable temperatures, and as the air is cool is not bothered by humidity, whereas frequently the metal miner, even when performing actual work only a fourth to a third of the shift, is compelled to wring sweat out of his shirt every few hours.

Though coal dust is explosive, its ordinary physiological effect on the mine worker is held to be negligible —at least until he has worked in it for 30 to 50 years— whereas metal-mine dust, acting through lead poisoning, miners' consumption, etc., sends hundreds of miners to graves before they have worked in it over five years and before they have reached the ordinary prime of life. It is probable that metal-mine dust kills far more men annually in the United States than does coal dust, even including deaths from dust explosions.

Metal mines generally are provided with systematic underground toilet facilities. These are almost wholly lacking in coal mines. Metal mines, too, frequently provide the miners with ice water in barrels set at convenient points underground or pipe city water to central points with available faucets, sanitary fountains, etc., whereas the coal miner generally carries his own drink in his bucket.

Conclusions.—The following conclusions may be drawn from the preceding:

1. Interchange of methods—coal from metal mines. It would appear to the writer that coal-mining operators could with advantage adopt the following methods and practices from metal mines:

(a) Choose young, active, forceful, yet experienced engineers as safety men, paying them enough to attract them to the work.

(b) Provide a more intensive supervision of work (comparable to that of shift-bosses in metal mines) to look after pillar drawing, haulage, timbering, etc.; especially should pillar-bosses be employed more frequently than at present.

(c) Pay more attention to machine drilling. Much of the present-day heavy shooting of coal, giving slack instead of lump, is due to the disinclination of coal miners to drill a sufficient number of holes so that each hole may be loaded lightly.

(d) Provide sanitary toilet facilities underground. This, though now regarded as an absurdity, will undoubtedly be an accomplished fact within ten years.

(e) Learn metal-mine methods of timbering and back-filling and apply them to the support of worked-out coal areas.

(f) Follow the lead of the metal-mine operators in reducing the costs of mineral extraction. If this is not done, coal-mine operators will most certainly alienate the good will of the general public, and some sort of governmental regulation of the industry will possibly result.

2. Interchange of methods—metal from coal mines. Metal-mining operators could with advantage adopt the following coal-mining methods and practices:

(a) Provide more adequate ventilation, thus assuring more healthful and comfortable working places, for this provision will reduce the formation of dust and its dissemination, will lower high air temperatures and humidities and will prevent men from being gassed by



MESABI OPEN PITS LIKE ANTHRACITE STRIPPINGS

In the Mesabi region the cover over the iron ore is taken long distances in large dump cars instead of being cast and dug by the same shovel, as is the method in bituminous strip pits. The locomotives are larger, the shovels are bigger and the cars are of greater capacity in the Mesabi than in the anthracite region. This is a small pit and the shovels are smaller than is the general practice at metallic ore strippings.

the fumes from explosives, etc. In general this can be done only by utilizing mechanical fans with doors, ventilators, tubing, brattices, curtains, etc., all under the constant supervision of a competent ventilating man. In short, metal mines should consider ventilation a vital part of operation instead of a fad or a more or less useless side issue.

(b) After having provided safe and healthful working places, place all work as far as possible, including timbering, drilling, shoveling, blasting, etc., on a contract or bonus basis.

(c) Adopt the haulage methods employed at coal mines, including larger cars, wider gage, the elimination of hand tramming, the introduction of storage-battery locomotives, etc.

(d) Reform the entire method of storing, handling, and using explosives underground. Reduce the consumption of explosives to a reasonable figure by making an intelligent use of stemming.

(e) Compel the workers to buy their own tools, as is done to a great extent in coal mining. If miners and shovelers had to buy their own wrenches, picks, shovels, etc.; and if machine drills and drilling steel were charged against users until returned, the waste piles of our metal mines would not contain the thousands of dollars worth of that material now there. This, of course, is ultimately charged against the cost of production of the metals mined.

(f) Use more systematic methods in handling and distributing timber underground. Thereby much timber could be recovered and re-used in metal mines, and much of it which is now lost without ever having been used could be saved from decay, caves, etc. Remove rails, ties, pipe, etc., immediately from abandoned places and put them in use in active workings, even though it may be necessary in a year or so to replace them in the workings from which they were temporarily withdrawn.

(h) Use electric lamps with the system of rental charge as at coal mines. Thus an ever-present fire menace would be removed.

(i) Use permissible explosives or electric shotfiring in shooting timber. This would tend to make impossible the fires now caused by the use of dynamite and fuse.

(j) Make a more intimate study of the gases which may be met in mines. For instance, it should be learned that it is *not* always safe to go wherever a candle or a carbide lamp will burn, as such an atmosphere may contain carbon monoxide or other dangerous gas. Recently explosions of methane in metal mines have indicated that exploring abandoned places with naked lights is dangerous even in metal mines.

Jig Operating Without Suction Through Coal Bed Serves as Its Own Pump

WHEN the product of a coal mine contains much material in which pure coal is so intimately mixed with refuse that they cannot be broken apart, and when the mixture is of such a specific gravity that it is little different from that of clean coal, jigging is likely to become wasteful or ineffective. Another problem in washing is that of handling the fine coal. The old idea with jigs was to disturb the coal and refuse—and the jig certainly successfully did so—by water under pressure on the upstroke and with a water suction on the downstroke.

The more modern idea is to apply the force in one direction. It makes no difference whether the separation is made by water or air—the lighter material will be driven farther from the side from which the force is applied. If the force comes from opposite sides alternately, the mass will only be mixed and not separated. This is the theory upon which the Montgomery coal washer, built by the Montgomery Coal Washing & Manufacturing Co., Birmingham, Ala., was designed.

The crushed coal or coal to be washed is fed to the jigs either from a storage bin directly above and at the back of the jigs or is elevated from a storage bin built on the ground. In the latter case the feeder gate feeds the coal to the elevator, and the elevator feeds the jigs. If the bin is above the jigs, the gate is arranged as shown at *A* in Fig. 1. In any event the coal falls into feeder box, *B*, and the separation of the coal from its impurities then begins. The refuse that is heavier than the coal, as it falls more rapidly than the purer material through the water in the jig, reaches the stationary screen, *D*. This screen is gently inclined toward the slate gate, *M*.

That gate, which is kept closed until the slate bed rises to the level, *I*, is adjusted by motion of the lever, *R*, which has a latch for engaging in the quadrant, *Q*. This quadrant can be made to oscillate by contact of the roller, *S*, against the weight lever, *P*. Owing to

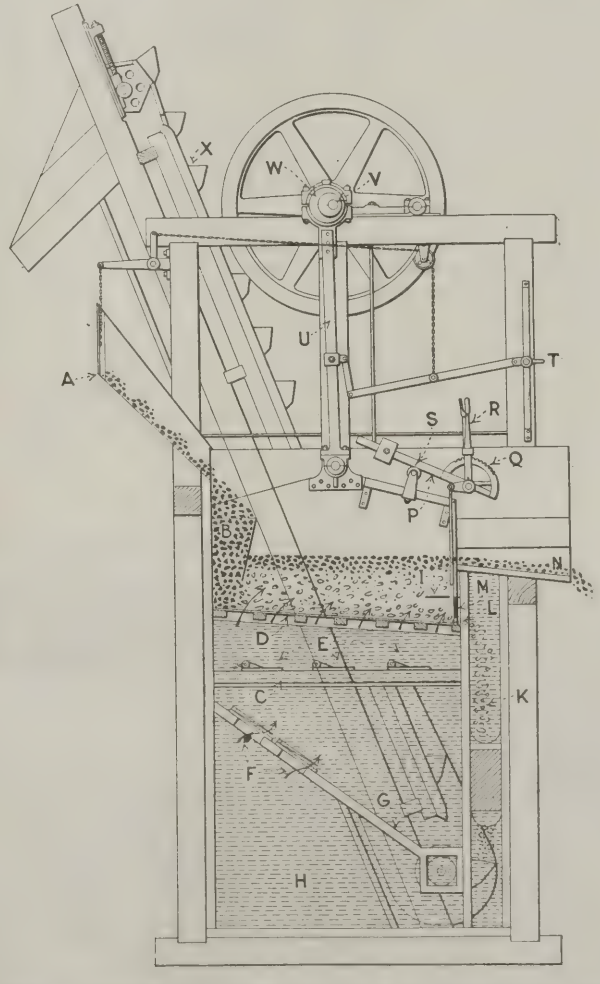


FIG. 1—VERTICAL SECTION OF COAL-WASHING JIG

The plunger of the jig is at *E*, and it has on the upper side valves which open upward and allow water to pass through them when the plunger is lowered and which close when it is raised, enabling the plunger to draw water through the valves *F*. *D* is a screen on which the refuse and coal rest, the former, which is the heavier of the two, being next to the screen. Water passes up through the coal but never goes back through it. It leaves by the coal overflow, *N*, and after settling is introduced below the plunger. Thus the suction of the plunger does not disturb the coal bed on the screen.

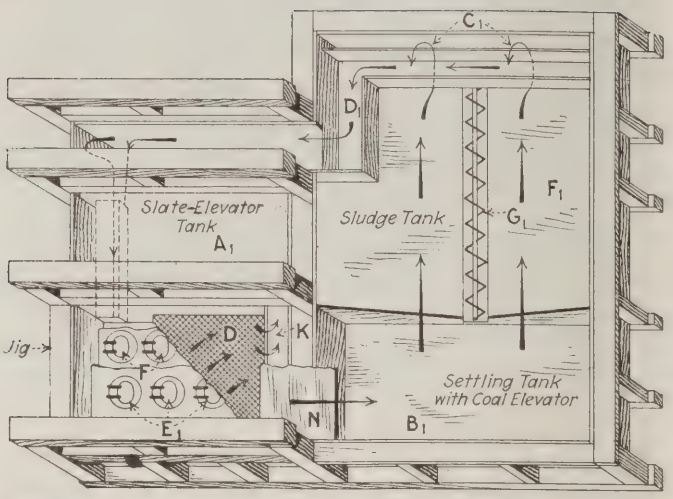


FIG 2—ISOMETRIC VIEW OF JIG AND SETTLING TANK AS SEEN FROM ABOVE

Almost a plan view. The water-bearing coal leaves the jig tank at *N* and falls into a settling tank where a self-draining clean-coal elevator removes the sedimentary material. On account of the size of this tank, the water moves very slowly toward the return trough and the fines settle to the bottom and are caught by a spiral conveyor which carries them back to the clean-coal elevator, where they are mixed with the larger sizes of coal and carried out to washed-coal storage.

this latitude as to movement, material can be handled varying in size, for the larger pieces of refuse are allowed to pass out with the finer materials at *L* into the slate trough *K*, which is inclined toward the slate compartment (A_1, Fig. 2), where it is carried away by an elevator (*X*, Fig. 1) for disposal.

The coal, being lighter than the refuse, rises to the top of the coal box and is washed out by water at the overflow, *N*, into the settling tank (B_1, Fig. 2), from which it is removed by a dewatering elevator, not shown, to the storage bin for washed coal. Much water also leaves with the coal at *N* and enters the tank, B_1, where it has an opportunity to settle. The water, thus cleaned, overflows at C_1 into the passageway D_1 and passes back into the water compartment of the main jig tank. From this compartment it enters the waterway, *H*, under the inclined bottom, *G*, of the jig tank. On the upward stroke of the plunger, *C*, the valves, *F*, open, and water enters on its underside, whereas on its downward stroke the valves, *E*, open in the bottom of the plunger, *C*, admitting water on top of the plunger between it and the screen frame, *D*.

On the upward stroke of the plunger the water is forced through the screen, *D*, and through the bed of coal and refuse. It then passes out through the overflow, *N*, to the point of beginning. Thus the jig acts as its own pump, and centrifugal pumps or tanks set on high towers are not required, as the water returns by gravity from the settling tank to the jig tank, and the jig does all the pumping that is necessary. In this way less machinery is required, all of which reduces maintenance and running expense and the frequency of breakdowns. Not infrequently a division in function at a washer between two or more machines, like a division of labor between two or more men, doubles or otherwise increases the possibility of trouble. The only fresh water needed is that which is necessary to replace the water carried away with the wash coal and refuse, which is about 50 gallons per ton of coal washed.

A few words should be added relative to the driving mechanism. The plunger, *C*, is driven from the main drive shaft, *V*, through an adjustable eccentric, *W*, and the connecting rod, *U*. The feeder gate, *A*, is operated by the floating lever, *T*, which is attached to the connecting rod, *U*, and the quantity of coal entering the jig is regulated by raising or lowering the lever, *T*.

The adjustability of the eccentric is an item of much importance, for jigs that will wash one class of coal will not give satisfactory results with another. An adjustable jig, therefore, is necessary, for it can be regulated to suit the class of coal that at any time may have to be washed.

Some further information should be given regarding the settling tank. These tanks are built with ample width and very long in order to give the coal time to settle before water is returned to the jigs. An elevator boot is provided somewhat deeper than the remainder of tank B_1. The settling part of the tank F_1 is built in variable lengths, depending on the class of coal and the number of jigs. It is V-shaped and in this V runs a screw conveyor, G_1, that returns all settlings to B_1, where they are picked up by the dewatering elevator, not shown.



FIG. 3—MONRO-WARRIOR COAL & COKE CO., WASHERY AT NO. 1 MINE, NORTON COAL MINING CO.

This plant at Nortonville, Ky., has a capacity of 1,600 tons per day. It was completed in the early part of this year. The Norton Coal Mining Co. is a subsidiary of the company that owns and operates the washer.

How to Repair and Balance a Broken Belt Pulley

Broken Pulleys May Be Put Back in Service by Repairs Made at the Mine — Method of Balancing a Pulley — Preventing the Belt from Slipping—Covering a Pulley for Greater Adhesion

By Gustav H. Radebaugh
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A FEW of the common kinds of material from which pulleys are made are wood, pressed steel, paper-pulp composition and cast iron. The two most common types of pulleys are split and solid. The split pulley is used exclusively in transmitting power from line shafting. In using this style of pulley it is never necessary to take down the shaft to remove the pulley, this being an advantage over the solid pulley for this kind of transmission work. The drive pulley on an engine, or main machinery shaft generally is a solid pulley. These pulleys give much better service on this type of drive than can be obtained by the split pulley.

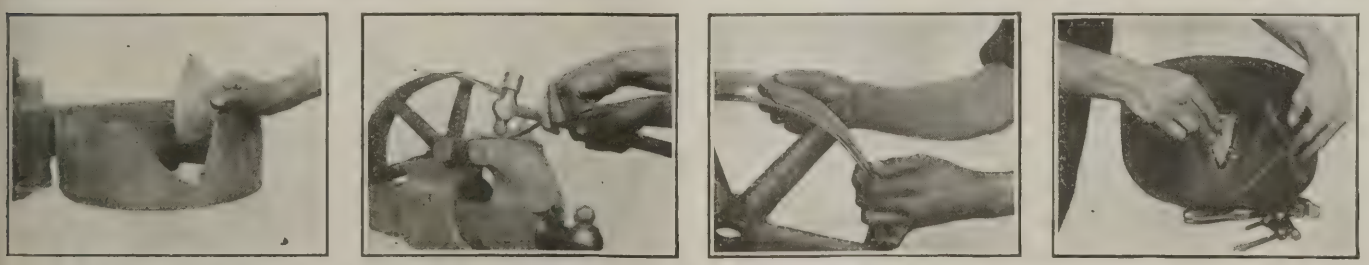
A pulley delivering considerable horsepower that is keyed on the shaft and is expected to render long and continuous service must never have an opportunity to loosen up on the shaft fit. This, of course, is impossible with split pulleys. The clamp bolts become loosened, causing the pulley to spring apart. On ordinary small drivers the split wooden pulley is used to good advantage, it being unnecessary to cut keyways and fit keys. The pulley is held on the line shaft by friction. The center bushing which fits on the shaft is fitted in the pulley in such a manner that tightening the bolts clamps the bushing securely to the shafting. Pulleys of the same design can be used as drivers and as loose pulleys. If used for a loose pulley, a brass bushing and grease cups must be provided. The pulley, which is used as a driver, must be arranged with setscrews or keys, or both.

Pulleys on mine power-driven machines quite frequently are broken or damaged to such an extent that it is impossible to repair them. Many pulleys, however, are discarded that could be placed back in service by a little planning and a few minutes work in the mine shop. There are two common ways of patching broken cast-iron pulleys: by oxy-acetylene welding and by patching with rivets. If the spokes are broken, about the only practical method is the welding process. This necessitates taking the job to a commercial shop for the repair if the mine repair shop is not equipped with a welding outfit. If the flange or face of the pulley is broken, the repair can be made in the mine shop, which is advantageous in conserving time and cost. If the machine is in use and the broken pulley throws it out of service, every minute that can be saved means a great deal as several trucks, teams and men may be held up on the job until the pulley is repaired.

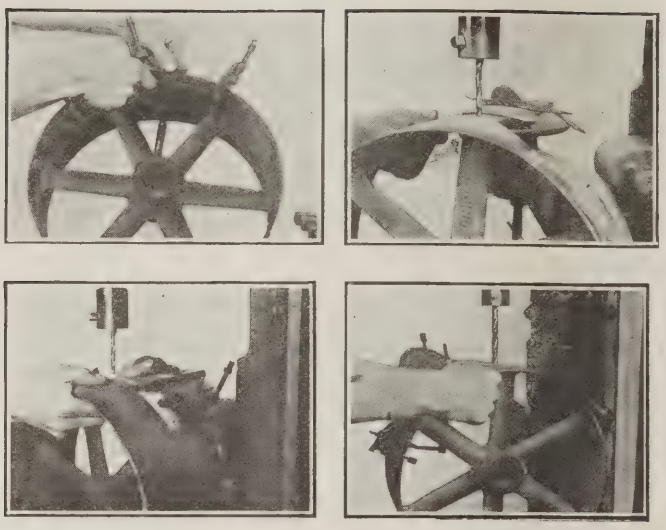
When a pulley is broken as shown in Fig. 1 it may be impossible to find all the pieces that came from the fracture, but as many pieces as can be found should be gathered up and kept for the repair. After close examination of the pulley for other cracks has been made the method of mending the break should be decided upon. In this job the pulley is cracked across its entire face. This necessitates placing steel straps on each side of the spokes. To proceed with the repair procure a piece of soft steel scrap about $\frac{5}{16}$ in. or $\frac{1}{4}$ in. thick to 1 in. to $1\frac{1}{4}$ in. wide and cut to a length that will permit 3 or 4 in. to extend on each side of the patch or crack. The stock is then bent to the proper radius to fit the inside of the pulley. The bending operation is shown in Fig 2. Notice how simple it is to bend the piece when it is held in the vise as shown. The vise jaws are opened and with the ball peen of the hammer the stock is bent to the desired shape.

A good job of bending is important, as the strap will fit the job much closer if the bend is an even one and the pieces that were broken from the pulley can be held in more accurate position. In bending steel stock of this size a much better job can be done with the stock cold. It is common among some mechanics to heat a job such as this for bending. It will be found, however, that the cold bend is much easier and is just as good. During the bending operation constantly check the shape of the bend with the pulley. After you are satisfied that the strap has been fitted as closely as possible it is then ready to be located as in Fig. 3 and clamped in position. If it is at all possible, the strap should be located about $\frac{3}{4}$ in. from the edge of the pulley. This, however, is entirely influenced by the shape and number of the pieces broken from the fracture.

A glance at this view will show the large piece that was being held by the operator in operation 1 is fitted in place, showing that another small piece is needed to finish out the patch. This piece was either lost or was in several small pieces. This makes it necessary to cut and shape a piece to fit, as shown in Fig. 4. This was made from aluminum taken from the lower portion of an old discarded crankcase. A template was made



FIGS. 1, 2, 3 AND 4—FITTING THE BROKEN PIECES INTO THE PULLEY AND FORMING THE BRACE
All pieces of the broken section are gathered and matched in place. Any pieces too small to be fastened to the brace are discarded. The bracing piece is then formed as accurately as possible and the face of the pulley filled in with the large broken pieces and a filling piece which takes the place of lost parts or small parts



FIGS. 5, 6, 7 AND 8—CLAMPING AND DRILLING PREPARATORY TO RIVETING

After all parts are assembled an extension is placed on the plate of the drill press. This plate prevents the pulley from rolling and permits the proper drilling of the holes for attaching the broken pieces to the brace and the brace to the pulley.

of the exact shape of the required piece; the aluminum was then marked off, sawed, and filed to shape. It was then fitted into position.

Fig. 5 shows clearly the location of the patching strip. The operator is making close inspection of the patch to be sure that all pieces fit properly. In clamping a job such as shown here the parallel machinist clamp will be found best adapted to the job. Clamps taken from old clothes wringers also can be used. This job could be done without the use of clamps, but it is not recommended, as it makes the job much more difficult. When clamps are not available the approximate location of the holes can be made in the rim and a hole drilled. The strap is then marked off and the hole drilled. It is then riveted in position. The next hole is located and drilled and the rivet placed. This is continued until the job is finished. You will be very fortunate if a good smooth job is obtained. It is obvious that it would be difficult to hold the pieces in place while drilling.

The clamps hold the pieces securely in the proper position, which insures a good, even job. Every mine shop should be equipped with a couple of pairs of good dropped forged clamps. They will pay for themselves in a short time. After the pieces are clamped in position on the patching strip, the job is now ready to be laid out for drilling. Some discretion must be used in locating the holes. They should be placed to insure proper holding of the patch with the rivets.

To make the job of drilling an easy one, an old shop practice, as shown in Fig. 6, can be employed. In drilling holes on a job of this kind it is nearly impossible to place the pulley on the table and drill, as the tool has a tendency to roll. If this happens, a broken drill is the result. By clamping a small board on a strip of steel on the platen or table of the drill press as shown, the pulley easily can be held in a positive drilling position. This type of drill press set-up is used for all cylindrical jobs which are to be drilled on the periphery, such as the drilling of steel bands for water tanks, drilling of holes when covering pulleys, etc.

The size rivet that is to be used is decided upon and the proper drill for the rivet is selected. For a job as shown here a ¼-in. rivet round head is satisfactory. If rivets cannot be found in the shop supply, it is an easy matter to make up enough for the job from ¼-in. round stock.

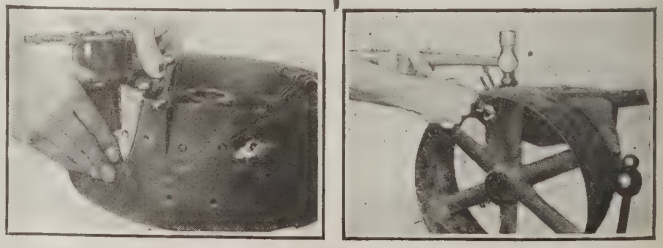
The job is then placed on the strip clamped to the table of the drill press and all the holes are drilled as indicated in Fig. 7. The surface of the pulley must be left smooth. This necessitates the countersinking of the holes, which permits the rivets to be driven down flush. This can be done with a countersinking tool or with a drill that is twice the diameter of the rivet. In Fig. 8 is shown a ½-in. drill countersinking the holes preparatory to riveting. A rivet is placed in a hole and gaged for proper length, as shown in Fig. 9. It should protrude from the face of the job three-quarters of its diameter for a countersunk head. This, of course, is regulated to a certain extent by the depth of the countersink. Judgment must be used, as it may be best to cut one rivet to estimated length and rivet it down. This will assist in gaging the length of the other rivets. It always is best to have the head fill the countersink completely.

The most convenient way to hold this job for riveting is by placing a heavy bar of iron in the vise and clamping it securely. Hold the pulley for riveting as shown in Fig. 10. By backing up the rivet in this manner and delivering light, firm blows with the ball peen of the hammer a good tight job should be the result. The loose pieces which were fitted closely in position and held securely with the clamps driving the drilling and riveting operation are now held securely in place with the rivets. The clamps can now be removed. The newly formed heads of the rivets oftentimes are not riveted down flush and it becomes necessary to file them flush with the pulley face, as shown in Fig. 11.

The view in Fig. 11 gives a good idea of the correct way to hold a file. Notice how the operator's right hand grasps the file handle. His forward stroke is the cut stroke, and by grasping the file firmly and applying a little pressure the file cuts as it is designed to do, removing the extra head of the rivets with a few strokes of the file. Too often the file is held in one hand and rubbed over the job and expected to cut. This is hard on the file and is improper practice. The file pressure always should be released on the return stroke.

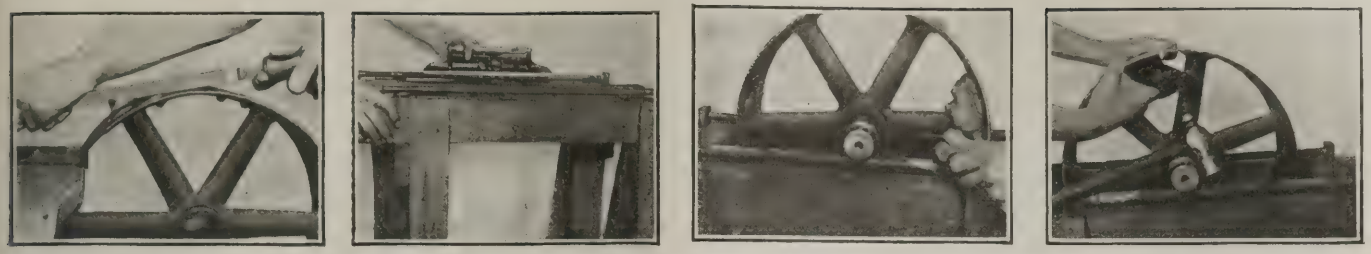
A file never should be used without a handle—it is too dangerous a practice for the shopman as he has seen the many accidents caused by handleless files. Therefore, the mine-shop foreman should take advantage of the well-established practice and supply files with good, substantial handles of proper shape, so that better jobs of filing can be done that will protect against accidents. This operation completes the patching of a pulley.

If the pulley just repaired is used on high-speed power transmission it may be necessary as well as advisable to balance the pulley. The strips and rivets used in repairing make the pulley heavier on one side than the other, which throws it out of balance. If the pulley



FIGS. 9 AND 10—ALL PARTS CLAMPED AND RIVETED

With the parts mounted the holes are lined up and rivets inserted and peened over, thus fastening all parts rigidly.



FIGS. 11, 12, 13 AND 14—DRESSING UP SURFACE AND BALANCING THE PULLEY
Filing the surface is important so that the belt will run true. Balancing the pulley is the next step. This is done by placing a temporary weight on the pulley to locate where weight must be added to create balance

is used on high-speed work, this may be the reason for vibration and jerking of the machine.

A pulley is said to be in standing or static balance when its center of gravity coincides with the axis upon which is revolves. A pulley may be in standing balance and not in balanced state when running at high speed. This is known as running balance. The exact position of the heavy section should be located and the balancing effected either by reducing the weight of the wheel or by adding counterweight opposite each section and in the same plane at the proper radius; but if the rotating part is rigidly mounted on a stiff shaft, a running balance that is sufficiently accurate for practical purposes can be obtained by means of comparatively few counterweights located with reference to the unbalanced parts.

To do this the most simple method that has been developed in the commercial shop is to level carefully with a parallel bar, as shown in Fig. 12. In this job long bolts of $\frac{5}{8}$-in. diameter have been substituted for the commercial parallel. They can be used with about the same guarantee of accuracy as is expected from the parallel bar, and, of course, will eliminate the necessity of borrowing or buying the standard parallel bar. In leveling up a job as shown here be sure that the rods are on the same plane. This can be determined by placing a straight edge across the two bolts and adjusting to a level. Washers, paper, tin, shangles, etc., are a few objects for blocking up material. They may be used when bringing the rods to an accurate horizontal plane surface.

After the parallel ways have been provided and leveled, an accurate shaft or mandrel is inserted through the bore of the pulley. It should be understood that this must fit snugly. The job is then placed on the bolts as shown in Fig. 13. If the pulley is in an unbalanced state it will turn until the heavy side is downward. If the center of gravity of the pulley coincides with the center of the shaft there will be no movement, but if the center of gravity does not coincide with the center of the shaft the shaft will roll until the center of gravity of the wheel comes directly under the center of the shaft or until the heavy side of the pulley is downward. The center of gravity may be brought to the center of the shaft by adding or taking away weight at proper points on the pulley. The simplest way to do this is to make up a plastic mass of clay or mud and apply this to the light side of the pulley, as shown. This acts as a counterweight, and when the proper amount has been placed it should be possible to revolve the pulley in either direction or in any position, and the shaft and pulley should remain stationary when the hand is removed.

A chalk line is made to indicate the center of the clay counterweight. The mud or clay can now be removed from the pulley and weighed. A counterweight of equal weight made from steel can be secured and riveted in place, as shown in Fig. 14. It is best after the new counterweight has been placed to try out the job for balance before riveting in place.

Many belt drives on mine machines give considerable trouble in keeping them on the pulleys. In a heavy pull the belt often leaves the pulley. This may be caused by not having the shafts parallel. The belt will always run toward the "low side" of the pulley—on the side where the centers of the shaft are closest. It is obvious that the friction of leather on leather is much greater than of leather on iron or steel. Leather-covered pulleys will transmit considerable more power than plain, uncovered pulleys for the same belt tension. The slippage can be considerably eliminated. In covering a pulley with leather the grain side of the leather should be on the outside.

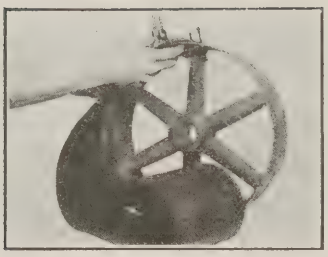
If the shafts are checked and found parallel and the belt continues to leave the pulley the trouble may be remedied by crowning the pulley. The crowning of a pulley tends to keep the belt on only when the belt as a whole does not slip. A slipping belt will run off a crowned-faced pulley quicker than from a straight-faced pulley. If this fails to accomplish the desired results the pulley face should be covered with leather to eliminate the slippage which causes the difficulty since all the other schemes failed.

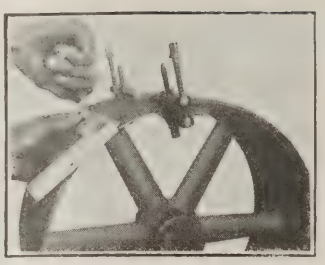
It should be understood that creeping is due to the tension element and must not be confused with the slip due to insufficient frictional grip on the pulley. To increase the frictional grip of a belt the belt manufacturers instruct all users of leather belts to run the grain side to the pulley. It is claimed that 33 per cent more power can then be transmitted than with the flesh side to the pulley. The grain of the leather has a velvety surface which enables it to hug the pulley closer than the hard-flesh side.

In covering a pulley two common methods are employed: the glued endless cover and the riveted cover. To put on a glued endless cover select the leather which is to be used on the job, make the cover endless and about $\frac{1}{8}$ in. to the foot shorter than the circumference of the pulley. This is done in the same manner as you



FIGS. 15 AND 16—MAKING THE LEATHER SOFT FOR MOUNTING ON THE PULLEY RIM
Softening the leather generally will aid in fitting it to the pulley. Light hammering also will make the leather more pliable.






FIGS. 17, 18, 19 AND 20—SURFACING THE PULLEY WITH LEATHER
The leather covering is next applied to the pulley by rivets. The heads of the rivets should be on the outside. The ends of the leather facing should be made to meet so as to form a smooth joint.

would glue a belt. The face of the pulley should next be thoroughly cleaned with gasoline. The endless cover is then slipped or driven onto the pulley about an inch. An application of cement is then applied. After applying the glue the cover is driven in place by lifting the pulley and striking the cover edge on the bench or floor. This should be done as quickly as possible, as the cement has a tendency to set.

A good formula for a cement to fasten leather to iron is as follows: Paint the iron with some kind of lead color; say, white lead and lampblack. When dry, cover the cement as follows: Take 1 oz. of the best glue, soak it in cold water till soft, then dissolve it in 1½ fl.oz. vinegar with a moderate heat, then add one-third of the bulk of white pine turpentine, thoroughly mix and by means of the vinegar make it of the proper consistency to be spread with a brush. Apply it while hot. After the cover is driven in place a hammer handle should be used to rub out all the air pockets between the leather and the rim of the pulley. To do this job this way requires considerable time and practice. It is not recommended for the mine shop, but may come in handy some time. This principle can, of course, be applied to several other types of repair jobs.

The easier way to cover a pulley is to rivet on the covers. This is done by first cutting the leather facing to 1 or 2 in. longer than required, and it does not complicate the job if it is a little wider. This leather facing can be made from old leather belts, in fact any leather stock that has the necessary size to cover the pulley. To soften up the leather and make it pliable so that it will fit snugly on the pulley it is advisable to soak it in water, as illustrated in Fig. 15, for an hour or more. It is then removed and hammered out, as in Fig. 16. This operation is not absolutely necessary, but if the belt is stiff and dry before it was placed in the water bath the hammering has a tendency to make the leather more flexible and pliable. The leather facing is next clamped to the pulley as shown in Fig. 17.

The job is now ready to be drilled to receive the copper rivets. The rivet is measured and the proper drill selected (Fig. 18). The drill should be just a trifle smaller than the rivet. This will make a drive fit and insures a much better job. Holes are first drilled through the facing and the pulleys on each side and at the end. They should be drilled about ¾ in. from the edge of the pulley. A rivet is then placed with the head on the outside in each of these holes and fastened down. This holds the end securely in place. The clamps are then removed and clamped about 4 in. from the rivets.

The facing or covering is then hammered over the surface between the rivets and the clamps. This is done to stretch it evenly over the surface of the pulley. The drilling and placing of rivet is repeated, and the clamps are again changed. This procedure is followed until rivets have been placed entirely around the pulley. The number of rivets required must be decided upon by the repairman. It is not necessary to have them any closer than necessary to prevent buckling of the cover.

To make the ends meet closely before the last two rivets are placed, the cover is cut in length as shown in Fig. 19. After this is done the last two rivets are placed. The edge is now trimmed as in Fig. 20, which completes the work.

Reviews Work of N. J. Fuel Commission

In a report to Governor Silzer of New Jersey, Wm. T. Grier, chairman of the New Jersey Fuel Commission, on May 24 reviewed the work of the commission during the eight months ended April 1. He pointed out in particular that despite the shortage of domestic sizes of anthracite last winter the State of New Jersey received 25 per cent more than its original share, which was 60 per cent of the total received the previous year. It was pointed out that there was no shortage of bituminous coal in the state and that the total cost of the New Jersey commission's work was $4,000. In conclusion, the report states:

"Congress adjourned without doing anything to avert a similar shortage in the future, except by providing for the appointment of another Fact-finding Commission that will probably report to the next session of Congress.

"Our own Legislature adjourned in like manner without doing anything.

"The State of Pennsylvania, which absolutely controls the anthracite situation, has up to date done nothing to avert a repetition of the conditions of last year, and its Legislature, which meets biennially, will adjourn at an early date.

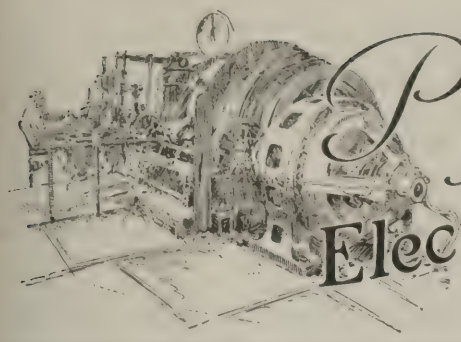
"The Interstate Commerce Commission has done nothing toward an adjustment of coal-carrying rates, which our experience indicates are grossly excessive in our state; nor has it attempted to penalize coal-carrying roads, which in some instances ignored the commission's orders during the shortage period.

"The agreement between miners and operators, under which mining was resumed on Sept. 15, 1922, will expire Aug. 31, 1923, and up to date no effort appears to have been made to secure a renewal.

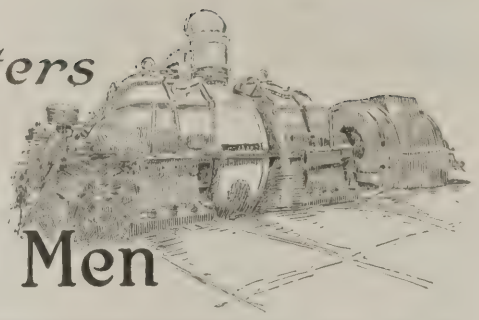
"Several railroads are storing vast quantities of coal for their own use. Whether or not they have inside information as to the probability of another shortage resulting from a strike, is not disclosed."

DR. RICHARD B. MOORE, chief chemist of the U. S. Bureau of Mines, has resigned, to take effect June 1. He will be succeeded by Dr. Samuel C. Lind, who has for some years acted as a superintendent of the Rare and Precious Metals Experiment Station of the bureau at Reno, Nev. Dr. Moore will enter the commercial field with a well-known firm of consulting chemists and metallurgists in New York City.

R. H. GROSS, OF BOSTON, has been made a member of the Bituminous Operators' Special Committee to serve during the absence of J. G. Bradley. Mr. Bradley expects to make an extended European trip.



Practical Pointers for Electrical and Mechanical Men



What Determines the Speed of An Induction Motor?

I HAVE been greatly interested in your pages under the heading "Practical Pointers for Electrical and Mechanical Men," and have found a great deal of information in them. I am glad to see the explanations you have been publishing of fundamental and more advanced application of electricity as used in coal mining.

Will you kindly give an explanation in your columns of what determines the speed of an induction motor at no-load. Confusion frequently arises in my mind when speaking about the speed of an induction motor. For instance, I sometimes hear of an induction motor of 690 r.p.m. and then again the same motor is sometimes called a 695-r.p.m. motor, while sometimes it is even called at 720-r.p.m. motor.

The no-load speed of an induction motor is determined by the frequency of the supply circuit and the number of poles in the motor. This represents the normal no-load speed of the motor when across the line and all speed control equipment has been cut out. The full-load speed will be from 4 per cent to 8 per cent slower, depending upon the design of the motor.

Knowing the frequency of the circuit and the number of poles into which the winding has been arranged the speed may be calculated from the following formula:

$$R.P.M. = \frac{120 \times frequency}{no.\ poles}$$

This gives the no-load or synchronous speed, which always is slightly higher than the actual no-load speed. This slight difference is due to the principle of the motor; a small difference between the synchronous speed and actual no-load speed is necessary for the motor to operate.

Induction motors frequently are designated by the number of poles in the winding and the frequency of the circuit rather than by a particular no-load speed, which is a slightly variable quantity in all motors.

The following table derived by use of the above formula will assist in pointing out the relation between frequency, poles and speed:

	SYNCHRONOUS SPEED		
Poles	60 Cycles	40 Cycles	25 Cycles
2	3,600	2,400	1,500
4	1,800	1,200	750
6	1,200	800	500
8	900	600	375
10	720	480	300
12	600	400	250

How Big a Load Can a Locomotive Haul?

WHAT is the method of calculating the haulage capacity of electric locomotives? Is there any simple table which would show the haulage capacity on various loads? I am merely interested in knowing how many cars or, in other words, what trailing load may be attached to a locomotive and hauled efficiently.

W. VIRGINIA.

The haulage capacity of a locomotive depends upon many important factors, principally among which is the condition of the equipment—in particular, the locomotive, the cars and the track. Friction of the bearings, track friction, curves, grades, gear ratio and air resistance also are important factors, and without any definite knowledge of these quantities only an estimate can be made. For the average condition the following assumptions can be made and the table appended probably will give a fair idea of the haulage capacities of various sizes of locomotives.

The rated drawbar pull of a locomotive equipped with cast-iron wheels is 20 per cent of its weight; when equipped with steel wheels it is 25 per cent of its weight.

Assuming the locomotive to be equipped with steel wheels and the coefficient of friction to be 30 lb. per ton on a level track and 20 lb. per ton for each per cent of grade, the following table may be constructed

TABLE GIVING LOCOMOTIVE DRAWBAR PULL AND HAULAGE CAPACITIES

Locomotive Weight, Tons.	Level Track		1 Per Cent Grade		2 Per Cent Grade		3 Per Cent Grade		4 Per Cent Grade		5 Per Cent Grade		6 Per Cent Grade	
	Drawbar Pull, Pounds	Haulage Capacity, Tons	Drawbar Pull, Pounds	Haulage Capacity, Tons	Drawbar Pull, Pounds	Haulage Capacity, Tons	Drawbar Pull, Pounds	Haulage Capacity, Tons	Drawbar Pull, Pounds	Haulage Capacity, Tons	Drawbar Pull, Pounds	Haulage Capacity, Tons	Drawbar Pull, Pounds	Haulage Capacity, Tons
3	1,500	50	1,440	29	1,380	20	1,320	15	1,260	12	1,200	9	1,140	8
4	2,000	70	1,920	39	1,840	26	1,760	20	1,680	15	1,600	12	1,520	10
5	2,500	84	2,400	48	2,300	33	2,200	24	2,100	19	2,000	15	1,900	13
6	3,000	100	2,880	58	2,760	39	2,640	29	2,520	23	2,400	18	2,280	15
7	3,500	117	3,360	67	3,220	46	3,080	34	2,940	27	2,800	22	2,660	18
8	4,000	133	3,840	77	3,680	53	3,520	39	3,360	30	3,200	25	3,040	20
10	5,000	167	4,800	96	4,600	66	4,400	49	4,200	38	4,000	31	38,00	26
13	6,500	216	6,240	126	5,980	85	5,720	63	5,460	50	5,200	40	4,940	33
15	7,500	250	7,200	144	6,900	99	6,600	73	6,300	57	6,000	46	5,700	38
17	8,500	283	8,160	163	7,820	112	7,480	83	7,140	65	6,800	52	6,460	43
20	10,000	333	9,600	192	9,200	132	8,800	98	8,400	76	8,000	62	7,600	51
25	12,500	416	12,000	240	11,500	164	11,000	122	10,500	96	10,000	77	9,500	64

and used as a guide. If the locomotive is equipped with cast-iron wheels the values will be 80 per cent of those shown in the table.

Eliminating the Noises from Mine-Telephone Circuits

I HAVE just encountered a problem pertaining to telephony in a coal mine which I believe would be very helpful to engineers operating a telephone system under the same conditions. The problem follows:

At the Rich Hill mine of the McClane Mining Co. a telephone circuit is run through the length of the mine—3 miles—in parallel with a 250-volt traction circuit. The average distance between the two circuits is 10 ft. Lately the telephone circuit has been giving very inefficient service, due to excessive receiver noises in all phones in the mine.

At first I followed the circuit, thinking that the telephone wires might be lying on the trolley circuit at some crossover or that the wires might be too close to the trolley circuit. But a thorough inspection failed to place the cause of the trouble as such.

The only possible cause left then was in the insulators. It was concluded that a leakage current—present in most all damp coal mines—found a path through a broken-down telephone insulator, followed the telephone circuit and caused the receiver noises. However, as the spacing was considerable, this did not seem to be the cause.

As we have no insulation resistance measuring instruments or devices, no definite insulator could be tested and found to be broken down. The only method of eliminating bad insulators was by observation. When a cracked insulator was found it was replaced. Or when a wire was almost eaten through—probably caused by the leakage current flow through that insulator—the insulator was discarded. After a number of insulators were replaced, the system was greatly improved, the noises being much reduced.

As this trouble that I experienced is unusual, I hope it will be of interest to engineers operating telephone circuits in a mine where the circuit is in parallel with a traction circuit, especially in damp mines where high leakage currents are present. W. G. HAGESTEN.

Meadowlands, Pa.

Noises in mine-telephone systems may be broadly classified into three main groups—namely, faults in the equipment, induced currents and leakage currents.

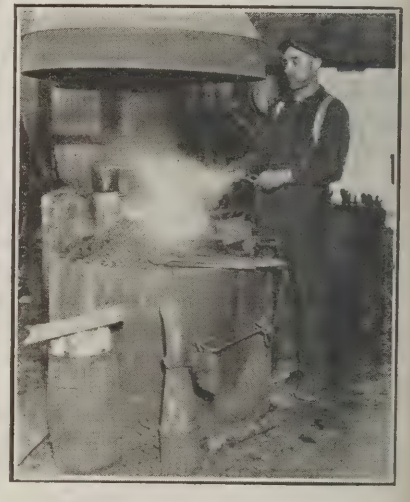
Defects in equipment may be due to many causes, such as moisture, incorrect assembly, grounds, short-circuits, etc., in the telephone. These difficulties may easily be eliminated by carrying on hand a spare telephone, which may be installed and the defective one repaired. By such a plan the telephones may be kept in good operating condition at all times, the spare telephone always being the last one returned for repairs.

Induced currents may be present due to the telephone circuit paralleling an alternating-current or direct-current circuit; a fluctuating load on a direct-current system will at times cause considerable noise. The closer the telephone circuit is to any other line the greater will be the induction. The most common practice used to prevent induction is the transposition of the telephone line wires. This is an interchange of position of the telephone line wires every 20 to 50 ft. Another method is the use of a twisted pair of wires for the telephone circuit.

Leakage currents will cause considerable noise whenever they travel over any section of the telephone circuit. In mine work these leakage currents are primarily due to grounds on the telephone wires. These grounds may be at insulators, on the wires between insulators or on switching equipment on the line. Leakage currents may enter a line at one point and later leave at another, especially where the insulation has become broken or the insulators are damp and dirty. Leakage currents may at times find their way into a telephone circuit a considerable distance away from the trolley wire; this is due to the return circuit of the trolley system being grounded and the return current selecting any path which presents a low resistance.

An Easy Way to Wet Down a Forge Fire

AN OLD saying goes, "Habit makes cowards of us all," and there is much truth in these few words. Because of habit one frequently does routine work mechanically, with little mental exertion to suggest how it might be more efficiently accomplished. Thus, many of the methods of the blacksmith about the mines have been handed down through several generations without modification. Consequently it is not surprising to observe that most blacksmiths still adhere to the old method of wetting down the outer region of the fire on the forge by dipping water by means of a tin can from the tempering barrel and pouring it around the fire in an irregular stream



WETTING THE FIRE MADE EASY AND SAFE

This simple and efficient method gives an even distribution of the water and permits the control of wetting without the steaming and burning that frequently occurs when the old method is employed.

How much better is the method pictured in the accompanying illustration! It is the one employed by a blacksmith in the shop of the New Field By-Products Coal Co., at North Bessemer, Pa. The bottom of a heavy tin can is punctured with holes so as to form a sieve, and is suspended in a trunnion handle. When not in use the can rests on the bottom of the tempering barrel with the grip projecting above the surface of the water. The fire is wetted down evenly, giving a more uniform heat, and the operation is accomplished by the blacksmith standing erect and away from the fire.

COAL PRODUCED DURING 1922 IN QUEENSLAND, Australia, totaled 958,519 tons as compared with 954,763 tons in the previous year, according to the report of Henry Marshall, Under Secretary for Mines. The output of coke in the Ipswich district was 5,265 tons as compared with 7,557 tons in 1921. Mr. Marshall says that depression in the coal trade necessitated closing down several of the mines in the Ipswich district, which affected the output of coke materially. In this district during the year two coal-washing and cleaning plants were in operation and another started operations early this year. One of these plants has a laboratory for testing the quality of the products of the washer.

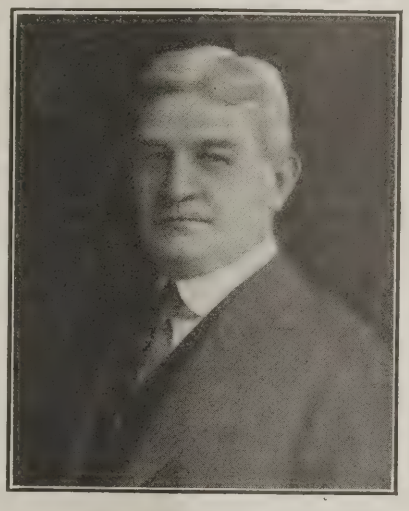
H. M. Griggs Explains How the Ore & Coal Exchange Handles Lake Coal Traffic

In an address on "The Transportation of Lake Coal," before the convention of the International Railway Fuel Association, May 22, at Cleveland, H. M. Griggs, manager of the Ore & Coal Exchange, Cleveland, prefaced his remarks with the statement that the subject was of such magnitude and interest that in a single paper one could hope to deal with it in only a brief and general way.

"Bituminous coal," said Mr. Griggs, "has been shipped from ports on Lake Erie by vessels to destinations on the Great Lakes for considerably more than half a century. For a number of years the tonnage was quite small, gradually increasing until in 1896 the total was 4,000,000 tons. By 1905 it had grown to 10,000,000 tons and in 1910 to 20,000,000 tons. In 1913 the tonnage reached 26,800,000, and the same amount was moved in 1917. The maximum was reached in 1918, the war year, when 28,153,000 tons of bituminous coal were transshipped by vessels from Lake Erie ports.

"The first general pooling of Lake coal was in June, 1917, the pool being operated during the season of 1917 as the Lake Erie Bituminous Coal Exchange. Before the opening of navigation in 1918 the pool was reorganized and operated by the railroads, Lake coal shippers, vessel people and ore shippers jointly under the title of Ore & Coal Exchange.

"After the close of the 1918 season the pooling of Lake coal was discontinued. The Ore & Coal Exchange was continued by the U. S. Railroad Administration, then operating the railroads, for the season of 1919. When the carriers were turned back to private ownership in March, 1920, all of the railroads interested in the coal and ore traffic to and from Lake Erie ports continued the organization and have since operated it at their expense.



H. M. GRIGGS
Manager Ore & Coal Exchange, Cleveland

"The purpose of the Ore & Coal Exchange is to facilitate the handling of the Lake coal and ore traffic; to expedite the release of cars loaded with Lake coal and to provide a sufficient supply of cars for ore loading as vessels arrive at Lake Erie ports. If the ore and grain cargoes were unloaded promptly and regularly there would be no supply of boats for the upbound coal loading, so the handling of the ore cargoes is an intimate part in providing vessels for and in the movement of Lake coal.

"Cleveland is the headquarters of practically all of the Lake coal transshippers, the vessel fleets and the ore shippers, the few not located there having branch offices to look after the Lake traffic. The Ore & Coal Exchange assembles reports each morning from all of the coal docks and ore docks, giving full information to Lake coal shippers and vessels as to the coal at port and due within the following four 12-hour periods, and shows the boats unloaded during the previous 24 hours, at the ore docks at 7 o'clock each morning and due during the next three 24-hour periods. In short, the reports from the docks and from the superintendents' offices of the railroads of the coal in transit are centered in the Exchange, as well as similar reports covering the ore movement, so that, with a complete picture of the Lake situation before the Exchange, the Lake coal shippers and the vessel people, boats will be provided at the time sufficient coal reaches port to complete the cargo.

"This centralization and co-operation of the coal shippers and railroads and vessel interests has greatly reduced the time it has taken to release and unload the coal cars at Lake ports and return them to the mines for loading, as well as to give better dispatch to vessels in loading coal and unloading ore.

"The transportation of Lake coal may be separated into two parts: First, the rail transportation to Lake ports and the dumping into vessels; second, the transportation by vessels from Lake Erie ports and the unloading onto the destination docks.

"When a boat has been named and the time it will be due at the port determined the coal is switched to the smaller yards at the docks where the machines are located that dump the coal into the vessel when it arrives. When the vessel is up to the machine ready to load, the cars are run onto the platform of the dumper, one car at a time. The machine lifts the car from 10 to 20 ft., as conditions require, and turns the car over, emptying its contents into a pan which permits the coal to run slowly through a cylindrical chute called a telescope, which is movable and by which the operator can turn the stream of coal to either side or part of the vessel desired within range of this telescope arm. This pan and telescope arrangement is to let the coal down easily into the hold of the vessel and thereby reduce breakage of coal to the minimum and also to trim the loading of the vessel. The largest of these dumping machines have a capacity to lift and turn over 40 to 44 cars per hour and will handle cars up to 100 tons capacity. We have 20 of these machines at Lake Erie ports for dumping bituminous coal, all but 3 of which are now in operation.

"As the occasion requires, the extra machines are put into service. The maximum dumping capacity of these machines is 375,000 tons per 24-hour day. The actual maximum dumping in one day at all ports was 4,401 cars, performed on Oct. 9, 1918. This was a total of 225,000 tons loaded into 27 vessels. These machines have dumped into vessels for cargo and bunker 1,453,684 tons in a week—the week of Sept. 25, 1922—and 5,043,887 tons in one month, the month of October, 1918.

"In 1922, when all mines north of the Ohio River were shut down for five months of the Lake season, April to August, there were forwarded during the months of September, October and November 12,852,000 tons, showing the capacity of the dumping machines as well as the railroads and the Lake fleets to handle large volumes of traffic when the emergency arises.

"This cargo coal goes to all the principal ports on Lake Superior and Lake Michigan, Georgian Bay, the ports on rivers and lakes from the Sault to Lake Erie and to ports reached through the Welland Canal and the St. Lawrence River, principally Montreal, to which point the tonnage is quite heavy, being used for railroad fuel, gas making, manufacturing, fueling river and ocean vessels and for domestic purposes.

"Lake coal is handled in bulk freight vessels of varying capacity, the larger running from 5,000 to 15,000 tons capacity. Vessels on the Great Lakes of less than 5,000 tons capacity are few in number and extremely small in proportion to the total capacity. At the opening of the season of 1923 the bulk freighters engaged in the coal, ore, grain and stone handling on the Great Lakes was 487, with total carrying capacity of around 3,500,000 tons per trip, depending upon the stage of the water in the rivers, channels and harbors. Four hundred and one of these vessels are of American registry, belonging to 33 fleets, and with one or two exceptions are all steel vessels.

"The aggregate carrying capacity for a season depends upon a number of factors: weather conditions, stage of water and dispatch in loading and unloading. The latter is

contingent upon promptness in receiving and discharging cargoes and is the most important factor, affecting the total carrying capacity of a vessel during the season more than any other item. The fleets of vessels on the Great Lakes, in my opinion, are the most highly efficient transportation facility on this continent. They handle more freight in a given time than any other transportation agency of like size and at freight rates that are so much less than the rail rates for equal distances that there is no comparison.

"The rates on ore from the head of the Lakes to Lake Erie, an average distance of something like 880 miles, runs from 70c. to 80c. per gross ton; the rate on coal from Lake Erie ports to Lake Superior ports is from 40c. to 45c. per net ton and to Lake Michigan ports from 50c. to 55c. per net ton. The rates on grain vary considerably from time to time during the seasons. From ports on Lake Superior and Lake Michigan to ports in Georgian Bay and in Lake Erie during 1922 they ran from 1¾c. to 5½c. per bushel, although higher rates than the latter figure were paid at times of scarcity of available vessels. An average rate from Lake Superior to Lake Erie of 3.42c. is reported for the season.

"The Great Lakes fleets carried during the last big season, that of 1918, 114,614,000 net tons of ore, coal, grain and stone. This was carried practically in 7 months and is as great a tonnage as is handled by many of the large trunk lines in twelve months. The ton-miles of the traffic handled in the bulk freight boats on the Great Lakes has been estimated at 92,000,000,000 ton-miles, which is about one-fourth of the total annual ton-miles for freight handled on the rail carriers of the country.

Fleets Meet War Emergency

"These great fleets have met every emergency. In 1917 there was a tremendous movement of ore and coal and in addition they were called upon to move an unheard-of volume of wheat late in the fall to supply the armies of the Allies in France. It took until Christmas Day in 1917 before the last vessel was in port; but they did what the government asked of them after battling almost constantly through ice from Lake Superior to Lake Erie.

"In 1918 the various war boards laid out a program on account of war requirements that was greater than any ever contemplated on the Lakes in any previous season. Notwithstanding the fact that the fleet was smaller than in previous season because a number of vessels had been taken out of the Lakes to the sea coast, all that was set up to be done was fully accomplished.

"In 1920, when the Northwest was in great distress over its winter's coal supply and appealed to Washington so vigorously that the Interstate Commerce Commission arbitrarily required the shipment of 4,000 cars—200,000 tons—of coal to the Lakes daily, to accomplish a total movement of 20,000,000 tons up the Lakes after Aug. 1, the vessels prepared to move it and did so to the full extent that they were called on to meet all the requirements of the Northwest docks.

"In 1922 the strike of the coal miners held back the Lake movement until about Sept. 1. The fleets were called on to handle over 13,000,000 tons from Labor Day to the end of the season. By organization, co-operation and co-ordination of every factor through the Ore & Coal Exchange the movement was fully completed before the season closed.

"The estimate of the traffic to be moved on the Lakes during the season of 1923, made prior to the usual time of opening of navigation was: Iron ore, 60,000,000 tons; bituminous coal, 25,000,000 tons; anthracite, 3,500,000 tons; fluxing stone, 9,500,000 tons; grain, 15,000,000 tons, a total of 113,000,000 tons.

"The unusual weather and ice conditions prevailing this spring much later than customarily, have delayed vessels and the movement of Lake traffic to such an extent that boats will not be running in a regular way before June. The later opening has cut down the carrying capacity of the fleets at least 10 per cent, and the reduced draft caused by low water stages in the channels, rivers and harbors likewise has reduced the carrying capacity of the fleets estimated, if this condition prevails throughout the season, at another 10 per cent.

"To give a better idea of the trip capacity of the Lake vessels and the rapidity of Lake transportation the following record cargoes and operations will be interesting: During the season of 1922 the Steamer 'Col. J. M. Schoonmaker' handled in one trip 14,336 tons of iron ore down and 14,500 tons of soft coal up on another trip. In the season of 1919, when the stage of water was more favorable, the Steamer 'D. G. Kerr' carried 15,532 tons of soft coal, and the 'W. Grant Norden,' a Canadian vessel handled 15,500 tons. The record of loading ore into vessels was made by the Duluth & Iron Range dock, Two Harbors, Minn., Sept. 7, 1921, when there were loaded into the Steamer 'D. G. Kerr' 12,508 gross tons of ore in 16½ minutes. This same cargo made the unloading record at the Bessemer & Lake Erie dock at Conneaut, Ohio, on Sept. 12, 1921, when the 12,508 gross tons of ore was lifted out of the vessel and loaded into cars in 3 hours and 5 minutes, or, at the rate of 4,056 tons per hour. The best record of loading vessels with soft coal is 13,976 tons of cargo and 369 tons of fuel in 4 hours and 30 minutes.

"When a vehicle of transportation can receive 14,000 tons of coal, transport it 880 miles, unload it, reload 14,000 tons of ore, transport it 880 miles, unload it, and perform all this in 192 hours, or exactly 8 days, there is no transportation and handling in the world that can be compared with it. Of course, this is not always the regular performance, but shows what has been done and could be possible under perfect conditions.

"Railroad transportation involves the haul of the coal from mines in the Pittsburgh and Connellsville districts of western Pennsylvania; the Fairmont, Pocahontas, New River and Kanawha districts of West Virginia; from mines in eastern Kentucky and in Ohio to the Lake ports.

"The coal at port on Monday morning of this week [May 21] was 14,347 cars and in the 48-hour transit report 5,601 cars, total of 19,948 cars. Back of coal shown in transit there is practically 5,000 cars moving from the mines to the scales or division points where the coal begins to show in the transit report. This means about 25,000 cars of coal under load daily with Lake coal. The amount of coal at port on Monday mornings is greater than other mornings in the week, the average coal at port should run around 10,000 cars. We dumped into vessels last week [May 14-19] notwithstanding the fact that we had bad weather conditions to contend with during two days of the week, 20,317 cars, or an estimated total of 1,035,000 tons, 46,000 tons of which was vessel fuel, thus bringing the total dumping of cargo and bunker fuel for the season up to 3,540,000 tons.

"The average loading of Lake coal prior to the season of 1922 was generally about 50 tons per car, but with increasing numbers of 70-ton cars and 100-ton cars the average loading per car is growing greater, and will run this season, from present indications, about 60 tons per car.

"All of this Lake traffic must be handled by the railroads within a season of practically seven months. In order to do this it is necessary to dump into vessels at Lake Erie ports an average of 3,000 cars of Lake coal and to furnish cars for and haul away an average of 5,000 cars of iron ore per day during the season. This necessitates the railroads operating days, nights and Sundays throughout that period.

"The railroads have a large undertaking to handle the 26,000,000 tons of Lake coal, including 1,000,000 tons of bunker coal furnished the vessels, and the 35,000,000 tons of iron ore during the season of seven months. In the emergencies the railroads have responded as wonderfully as did the vessels. Considering all the unfavorable conditions that have confronted the railroads they have made a splendid record in handling this Lake traffic for the past half dozen seasons and we hope for and expect no less satisfactory service this season."

Production of Coal in the State of New South Wales, Australia, during 1922 was 10,183,133 tons, according to A. Simpson, British Trade Commissioner at Sydney. This compared with 10,793,387 tons in 1921, a decrease of 610,254 tons. The making of coke was handicapped by the diminished smelting operations at Newcastle and Lithgow, production amounting to 240,229 tons, as compared with 592,097 tons in the previous year. There were 21,634 persons employed in the production of coal and coke, an increase of 369 over 1921.

Daily Output of Both Byproduct and Beehive Coke Higher in April

Output of byproduct coke in April, according to the Geological Survey, showed a slight decrease. The total production for the month was 3,206,000 net tons, against 3,256,000 tons in March. The fact that there was one less working day in April was responsible for the decline, as the average daily rate of production increased from 105,000 to 107,000 tons. The quantity of coke actually produced was 88.7 per cent of the capacity of the plants in operation, a percentage that compares favorably with that in preceding periods when demand for coke has been most active. Of the 70 byproduct plants, 64 were active and 6 were idle. One plant that has produced no coke for many months was reported permanently abandoned and being dismantled.

Unlike byproduct coke, the production of beehive coke increased slightly. The total output was 1,776,000 net tons, against 1,749,000 tons in March. It is of interest to note that of the total output of all coke, 64.4 per cent was contributed by byproduct plants and 35.6 per cent by beehive ovens, whereas in 1920 59.5 per cent and 40.5 per cent, respectively, were furnished by the two branches of the industry.

The present rate of production of all coke—4,982,000 tons—exceeds the average monthly rate in 1920 by 669,000 tons, or 15.5 per cent

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE IN THE UNITED STATES *a*

(In Net Tons)

	Byproduct Coke	Beehive Coke	Total
1917 Monthly average	1,870,000	2,764,000	4,634,000
1918 Monthly average	2,166,000	2,540,000	4,706,000
1919 Monthly average	2,095,000	1,638,000	3,733,000
1920 Monthly average	2,565,000	1,748,000	4,313,000
1921 Monthly average	1,646,000	462,000	2,108,000
1922 Monthly average	2,374,000	669,000	3,043,000
February, 1923	2,810,000	1,482,000	4,292,000
March, 1923	3,256,000	1,749,000	5,005,000
April, 1923	3,206,000	1,776,000	4,982,000

(*a*) Excludes screenings and breeze.

To manufacture the coke produced in April it is estimated that 7,408,000 tons of coal was consumed, of which 4,607,000 tons was used in byproduct ovens and 2,801,000 tons in beehive ovens. From the table below it will be seen that the present rate of consumption is 16.7 per cent more than the average monthly rate in 1920, and 4.5 per cent more than that in 1918, when demands for war-time purposes were at their height.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE *a*

(In Net Tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average	2,625,000	4,354,000	6,979,000
1918 Monthly average	3,072,000	4,014,000	7,086,000
1919 Monthly average	2,988,000	2,478,000	5,466,000
1920 Monthly average	3,684,000	2,665,000	6,349,000
1921 Monthly average	2,401,000	706,000	3,107,000
1922 Monthly average	3,411,000	1,056,000	4,467,000
February, 1923	4,037,000	2,339,000	6,376,000
March, 1923	4,679,000	2,759,000	7,438,000
April, 1923	4,607,000	2,801,000	7,408,000

(*a*) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged in byproduct ovens, and 63.4 per cent in beehive ovens.

Fuel Economy in Self-Firing

That human nature is the same in the army as in any other walk of life is clearly shown in a study made during the past year by the construction service of the Quartermaster Corps to determine what saving could be made by more efficient use of coal and wood at the various posts and stations where regular troops are on duty.

The records now indicate that the least coal is used where individual stoves are installed, and the most burned in central heating plants which care for the same number of people. Individual steam and hot-water plants come between these limits. As the construction service statement points out, "It compels the inference that the least coal is used when people have to fire for themselves."

This review of fuel allowances has borne great fruit in economy. One Western post had its allowance reduced 3,000,000 lb. from the amount used in 1921 and 2,000,000 from previous allowances. An Eastern post was reduced 1,000,000 lb.

Fuel for the army cost $10,274,502.19 in 1921, and in 1922 this amount was reduced to $5,877,897.98, a saving of $4,396,604.21.

British Columbia Coal Mining Grows Slowly

Coal mining in British Columbia is on a slow increase. The total coal production for the province in 1922 was 2,511,843 gross tons, valued at $12,559,215, making the aggregate for the province from the year 1836 approximately 59,205,333 gross tons with an estimated value of $213,768,998. The coke production for 1922 was 45,835 tons, valued at $320,845. This brings the total provincial coke production since 1895 to 4,228,536 tons, valued at $24,520,567. The coal output of last year was 27,848 tons in excess of that of 1921 and, with the exception of 1920, was greater than that of any previous year since 1912. The coke production of last year fell short of that of the previous year by 13,599 tons.

British Columbia's coal production for the years 1921 and 1922 may be summarized as follows:

	1921	1922
Vancouver Island Mines	1,625,931	1,754,656
Nicola and Similkameen Mines	183,153	270,890
Crow's Nest Mines	759,755	554,361
Omineca-Telkwa	800	1,008
Total quantity coal mined	2,569,639	2,580,915
Less made into coke	85,644	69,072
Net quantity of coal produced	2,483,995	2,511,843

Seventy-two per cent of the gross production of 1922 was mined by three companies, viz., the Crow's Nest Pass Coal Co., East Kootenay; the Canadian Collieries (D), Ltd., and the Western Fuel Corporation, the two latter of Vancouver Island. Other collieries figured as follows: Pacific Coast Coal Mines, Ltd., now in liquidation, mined no coal but recovered 4,752 tons of slack from one of the old dumps at the Morden Mines; the Nanoose Collieries, Ltd., produced 99,049 tons; the Granby company, from its collieries at Cassidy, V. I., produced 276, 919 tons; and King & Foster, operating at the Old Wellington, V. I., produced 9,148 tons. In the Nicola Valley section the Middlesboro Colliery Co. mined 69,330 tons; the Fleming Coal Co., 38,485 tons; the Princeton Coal & Land Co., 19,418 tons, and the Coalmont Colliery, 142 806 tons. In the East Kootenay, in addition to the Crow's Nest Pass Coal Co., which produced 508,339 tons, the Corbin Coal & Coke Co. had an output of 46,022 tons.

A new coal field has been opened up in the Omineca, northern British Columbia, where two small collieries are being developed on the Telkwa River. The Aveling Coal Co. shipped 669 tons last year while the Telkwa Collieries contributed 339 tons.

Canada's 1922 Coal Output Is 2 Per Cent Below Previous 3-Year Average

The Dominion Bureau of Statistics states that the output of Canadian coal mines in 1922 was 15,045,300 short tons, which is 2 per cent below the average of three previous years of 15,307,800 tons. Exports of Canadian coal were 1,818.582 tons, 82 per cent of the three-year average of 2.205,049 tons. Coal made available for consumption in Canada totalled 27.482,300 tons, a decrease of 14 per cent from three-year average of 31,736,800 tons.

11,359,000 Barrels of Portland Cement Produced During April

Production of portland cement during April, 1923, according to the U. S. Geological Survey, totaled 11,359,000 barrels, compared with 9.243,000 barrels in the corresponding month of 1922 and 9,880,000 barrels in March, 1923. Shipments for the month were 12,954,000 barrels, against 8,592,000 barrels in April a year ago and 10,326,000 barrels in March, 1923. Stocks at the end of April were 11,450.000 barrels, compared with 14,470,000 barrels at that period in 1922 and 13,045,000 barrels at the end of March, 1923.



Problems of Operating Men

Edited by James T. Beard



Failure of Fireboss Cannot Be Ascribed to His Lamp

Careless Acts of Firebosses Often Cause Disaster Attributed to Failure of Safety Lamp—Exact Information Too Often Lacking

WITH more than ordinary interest, I read the letter of W. H. Moore, *Coal Age*, Jan. 25, p. 184, entitled "Relative Safety of Safety Lamps Under Varying Conditions in Mines." The letter gave a brief description of an explosion that occurred in the Wakesiah mine, Nov. 24, 1922, and which cost the lives of the fireboss and a pumpman.

From first to last, there has been much said in *Coal Age*, in regard to the use and safety of the testing lamp in coal mines. Having had a long experience in the use of the Wolf testing lamp, I consider it safe if properly assembled and carefully handled, under ordinary working conditions. Neither this lamp, however, nor any other testing lamp with which I am acquainted, is absolutely safe if carelessly exposed to a highly explosive mixture of gas and inflammable dust carried in a current moving with a high velocity.

Firebosses frequently do very careless things while using the safety lamp. In the event of an accident when the actual circumstance is not known it is generally charged to the failure of the lamp, instead of being attributed to carelessness on the part of the fireboss. The Wolf testing lamp, I believe, is safe for the purpose for which it was intended. So are many other instruments. A revolver is a safe weapon in the hands of a careful and experienced man, but would be a dangerous plaything in the hands of a thoughtless boy.

Movements of Fireboss Not Made Clear

Returning, however, to the account of the explosion as given by Mr. Moore, it does not make plain to me the exact movements of the fireboss after he had connected the hose to the air-line pipe on the slant. Did he then take the hose up the slant, carrying his lamp with him, and attempt to adjust the hose at the face so that it would blow down the slant? This being done, did he now take his lamp and, going back, turn on the compressed air in full force? Then, with his lamp in his hand, did he again advance up the slant against a highly explosive mixture, to within 21 ft. of the end of the hose when the explosion occurred?

If we are to understand that was his proceedure, I must say it was not only a most careless but a highly foolish act for an experienced fireboss. It would seem to me likely that to carry a lamp against such an explosive mixture traveling at a high velocity, would result in the lamp being put out or the explosion occurring before the point was reached where the lamp was found lying in the passage, after the explosion.

It is stated that the fireboss was killed by the force of the explosion; but it is not explained how he could have gotten 84 ft. away from his lamp. Without information as to how the man's lamp was found 21 ft. from the end of the hose, and his body 105 ft. from the same point, one is led to assume that the order of his procedure may have been as follows:

Having connected the hose to the air-line pipe and taking it and his lamp, the fireboss went up the slant, for the purpose of adjusting the hose at the face as he did. Setting his lamp down 21 ft. from the face or end of the hose, so that he could properly adjust the hose by the light of the lamp, and leaving it setting on the bottom, he goes back and turns on the compressed air without ever thinking of his lamp. Returning up the slant, the explosion occurred when he was 84 ft. from where he had left the lamp.

Overheated Condition of Lamp Probable

Mr. Moore's suggestion that as the lamp had been used several hours previously for illuminating purposes it was overheated, I think is both logical and correct. Let me add, that to get more light by which to work, and in his hurry changing the hose, the man may have raised the flame of his lamp and forgotten it, while the heat of the already overheated lamp was increasing. Coming in contact with an explosive mixture traveling under high pressure, would be more than any testing lamp could be expected to stand in this heated condition.

Mr. Moore does not inform us as to the experience and competency of his fireboss. I presume, however, the man held a certificate of competency granted him by an authorized examining board. But, doing as it appears likely he did do, the result would have been the same had he possessed a pocket full of certificates.

In closing, I wish to say that I am not criticising Mr. Moore, further than that he seems to ascribe all the blame to the assumed failure of the safety lamp, and none to his fireboss. Just here, let me emphasize this thought, rules of safety, unless strictly practiced, and safety lamps, unless carefully handled and properly used, will not insure protection to life in coal mines.

JOHN ROSE,
Dayton, Tenn. Former District Mine Inspector.

Where Mine Foremen Too Often Fail

Many mine foremen rely too largely on their assistants—Efficiency requires personal supervision of the work—Assistant foreman often lacking in needed experience.

SINCE reading many letters in *Coal Age* where reference is made to foremen who have failed to make good, I am prompted to offer a few remarks on this important subject. A mine foreman holds a most responsible position and on his success or failure depends the future successful operation of the mine.

Close observation, extending over a long period, and a study of the habits of a large number of mine foremen have brought me to the conclusion that the chief cause of many failures on the part of foremen is the fact that they rely too largely on their assistants. Strange as it may seem, mine foremen will often leave the planning and carrying out of the work entirely in the hands of assistants.

Without casting any reflections on the well meaning and faithful work of many of these assistants, it must be said that, in too many instances, an assistant foreman lacks the needed experience to enable him to plan the work and give the necessary instructions to the men in his charge. It is just here that the need of an efficient mine foreman is much felt.

Supervision by Mine Foreman Needed

Efficiency in mine management underground requires the constant close supervision of every branch of the work, by the mine foreman himself. On his shoulders alone should rest the responsibility for the successful planning and prosecution of the work. It is not enough that he has faithful assistants, who are each put in charge of work in different sections of the mine. A good foreman will, himself, look constantly after the work, thus aiding and encouraging each assistant foreman in the performance of his work.

More than once, have foremen come under my observation who seldom ever left the bottom of the shaft. From that point, generally, they would assume to direct the work and issue orders to their several assistants. If they did leave the bottom for a time they would hardly ever get farther into the mine than to some parting where they would sit down and remain until they got ready to return to the bottom for the balance of the day.

Reports, coming from reliable sources, have informed me that two months would frequently elapse between the visits of a head foreman at the working face of a mine. No argument is needed to show that work of this kind, on the part of the foreman in charge of a mine, is a real handicap. Instead of assisting the production of coal, a foreman of this type is an absolute hindrance. The mine would do better without him.

Influence of Foreman's Example

In plain words, a foreman of the kind I have just described is lazy and of no value to the company who employs him. Yet, we often see such foremen retain their positions for years. In every case, the company appears to be perfectly satisfied and seems to think that the foreman is doing the best that can be expected of him. It is an enigma to me how such men can hold their jobs. Should they ever get a position in another company it is certain they would have to change their tactics in order to hold their places longer than a few days or months, at the most.

It goes without saying that such foremen are failures. A lesson I learned long ago is that when a mine foreman shifts his responsibilities onto the shoulders of his assistants he is bound to fail and, sooner or later, the results of his inefficiency will be clearly seen by practical men in touch with the mine where he is employed. If the management of the company fails to see his shortcomings it is because their eyes are closed to his faults.

As I said before, assistant foremen, however faithful in the performance of the work allotted to them, cannot be expected to perform the same tasks and assume the responsibilities of the mine foreman. That official should have a wider experience, which would fit him for the larger duties of his position. For this reason, it is a mistake for a foreman to fail to supervise the work of each of his assistants and give them the benefit of his more mature judgment and experience.

Advantage Gained by Close Supervision

By so doing, he will assure his own success as foreman, and the force of his example will inspire every worker in the mine. The cost of production of coal will be decreased, as a result of the close supervision which every intelligent foreman gives to the work in his charge. Not only that, but the same pleasing results will be manifest in the pay envelope of every worker in the mine.

One word more and I am done. I want to say many foremen seem to think that, having obtained their certificates, they need not exert themselves to learn more. They should remember that coal mining is very much like a progressive plant, requiring constant study and reading, together with hard work to keep oneself up to date on the latest improved methods and equipment.

Hillside, Ky. O. Kennett.

Draining Gas from Seam by Sinking Boreholes from Surface

Effect of water in borehole to prevent escape of gas—Holes drilled at intervals on line of entries—Casing pipe extended above surface.

IN LOOKING over a few back numbers of *Coal Age* the other day, my eye caught a letter written by an inquirer, in which he mentioned having tried sinking boreholes from the surface to drain the gas from a coal seam, in order to prevent the sudden outburst of gas in the mine, which had occurred at frequent intervals. Thinking the matter over, it seemed to me that the inquirer had overlooked one thing that was probably the cause of his getting poor results by this method.

As far as I know, mention has never been made of the effect of water standing in the borehole and preventing the escape of the gas coming from the coal seam or the overlying strata as the case may be. To my mind, when water stands in the hole to a considerable depth, it must form an obstacle and obstruct the flow of gas from the seam.

High Pressure of Gas Caused Outbursts

In the instance referred to by the correspondent, the gas in that seam was under a considerable pressure and was the cause of sudden and severe outbursts in the mine, throwing down tons of coal in the entries and filling the mine with gas and dust. It was to avoid these outbursts of gas that boreholes had been sunk from the surface, at points ahead of the workings, in the hope of draining the gas from the seam and reducing its pressure to a safe amount.

Allow me to suggest, in this connection, that it would be well to sink the boreholes to such a depth below the bottom of the seam as would hold the water accumulating in the hole and prevent its obstructing the flow of the gas from the seam or overlying strata. In order to determine the necessary depth of the holes, previous careful measurements should be taken to ascertain the amount of water standing in the hole before starting to drill to a greater depth.

In order to obtain good results, these boreholes should

be drilled at regular intervals, not more than 1,000 ft. apart, on the line of the main entries; and the same system should be followed over each pair of cross-entries. If there are abandoned workings in the mine, every effort should be made to push the work of drawing pillars and entry stumps, so as to induce a general fall of roof in such places, which will assist in relieving the great pressure of the gas.

Before closing, allow me to suggest that all boreholes drilled from the surface, for the purpose of draining gas from the seam below, should be cased and the casing pipe extended from 8 to 10 ft. above the surface. This will prevent the hole from becoming obstructed by earth and other matter falling into it, or by mischievous persons filling it with stones, dropping them into the hole. I would also advise fencing in these holes by a substantial enclosure with a suitable warning to persons not to interfere with the pipe. OSCAR H. JONES.

Wilder, Tenn.

Inquiries Of General Interest

Cripple Creek Drainage Tunnel

Pumping in Individual Mines Fruitless—Drainage a Joint Problem in the District—Many Mines Derive Benefit

PLEASE advise through the columns of *Coal Age* what is the longest tunnel driven for drainage, in mining districts, stating where it is located and the number of mines drained. P. A. Z.

Santoy, Ohio.

Inquiry in different mining districts has elicited the fact that probably the longest drainage tunnel, driven for such purpose, in this country, is that known as the "Cripple Creek Drainage Tunnel," which was started early in the year 1903 and practically completed the following year.

The problem of mine drainage had grown to be one of vital importance in the Cripple Creek district, where the flooding of many mines had caused their temporary abandonment. The matter was finally brought to a head by trying experiences in the Elkton, and other deep mines. It was found that pumping operations in those mines resulted in handling the water from a large number of other mines in the vicinity. Investigation showed that the drainage area was of considerable extent, which made the question of mine drainage in the entire district a problem of joint interest.

COMMITTEE OF MINE OWNERS APPOINTED

A committee was therefore appointed, representing the mine owners of the district, to look into the matter. Their report showed that the general water level in the mines had an altitude of practically 9,000 ft. above sea level. Several plans were discussed, the two main propositions being the sinking of a shaft and the erection and operation of a large pumping plant capable of handling the water from the district; as compared with the driving of a long drainage tunnel to accomplish the same object.

The comparative cost of these two propositions favored the latter scheme. The length of the proposed tunnel was about 10,000 ft. and the work was estimated to cost in the neighborhood of $300,000. The question of financing the scheme, however, was one of minor importance, in a district where the yearly production of gold amounted to $20,000,000 worth of metal. Moreover, it was realized that the results growing out of the work of driving the tunnel would not be confined to the question of draining the mines, which was the object in view. Incidentally, the geological information obtained by cutting across the strata would be of the greatest interest, in showing the continuity of the veins and ore bodies in respect to depth, and much other information that would be of value in the district. It was not unreasonable to assume that many new ore bodies would be discovered during the progress of the work.

Owing to the extent of the drainage area in the district, it is impossible to state how many mines derived a permanent benefit when the work was completed. The results were general throughout the region. We shall be glad if *Coal Age* readers can give further information regarding this or other drainage tunnels, here or elsewhere.

Blue Flame at Finger Tips

Static charge from engine belt, due to friction, appears as bluish flame at finger tips—Effect caused by rarefying of the air—Appearance similar to blue vault of the heavens.

KINDLY explain through the interesting columns of *Coal Age*, what is the cause of the appearance of a blue flame at the finger tips when one extends his hand toward the rapidly moving belt of an engine driving a generator or other machine. There is, at the same time, a prickling sensation felt, but the fingers are not burned or otherwise harmed. The experience is a new one to me, and one that I fail to understand.

Stillwater, Ohio. J. H. BLAIR.

The bluish appearance here referred to is not a flame or the fingers would be burned. It is a halo caused by or resulting from a local rarefication of the air, due to the passage of a static electrical charge from the belt to the hand held with fingers pointing toward it. As in all electrical devices, the intensity of the charge is greatest at a pointed end, which seems to have an increased power of attraction. This intensity at the finger tips may be assumed to produce a local effect to give the air a bluish tinge similar to the blue sky of the rarefied upper atmosphere.

An engine belt driving a heavy machine of any description and running at a high velocity will often become highly charged with frictional electricity. The static charge flows continuously from the belt to the finger tips that attract it; but the intensity of the charge is not sufficient to produce a spark. The bluish halo can be seen best in the dark or a subdued light.

The friction of the rapid belt in the surrounding air and, in part, to slippage on the pulleys, is what creates the electric charge. A similar static charge is produced when the hand is rubbed over a sheet of paper, or when a person, in slippered feet, moves about briskly over a new brussels carpet. On a dry, cold day, the writer has frequently lighted a gas jet by this means, touching the burner tip with his fingers and producing a spark that ignited the gas.

Examination Questions Answered

Examination for Mine Examiners Springfield, Ill., Mar. 19, 1923

(Selected Questions)

QUESTION—*What is the law as it applies to air currents and splits?*

ANSWER—The Illinois law (Sec. 14-b) requires the main air current to be divided, so as to give a separate current to every 100 men at work; but the mine inspector is authorized to order, in writing, separate currents for a smaller number of men, when he deems this necessary. The same section (a) authorizes the mine inspector to require, in writing, a larger circulation of air than 100 cu.ft., per man per minute, and 500 cu.ft., per mule per minute., in non-gaseous mines, or 150 cu.ft., per man per minute, in gaseous mines, if conditions, in his judgment, require such increased quantities.

QUESTION—*Why is the air split in mines?*

ANSWER—The purpose of splitting the air current in a mine is, chiefly, to afford a better distribution of the air, according to the need in each section of the workings, and to give to each section purer air than when the current is carried from one section to another continuously. A local explosion of gas or dust occurring in one section of the mine may not be transmitted to another section ventilated by a separate air split. Also, dividing the air reduces its velocity and not only requires less power for the circulation but provides safer conditions at the working face.

QUESTION—*Is it proof of good ventilation, in a gaseous mine, when a very rapid current of air is passing through a small airway? Give reasons.*

ANSWER—A rapid current passing in a small airway indicates a high velocity of the air, which is a dangerous factor in the ventilation of a gaseous mine, because of the danger of the high velocity of the air current forcing the flame of a safety lamp through the gauze. Moreover, the high velocity of the air current will cause it to carry a greater quantity of dust in suspension than where the air is made to travel at a lower velocity, by enlarging the sectional area of the airway.

QUESTION—*With a temperature of 32 deg. F., what is the weight of a cubic foot of air when the barometer reads 29.2 in.?*

ANSWER—The weight of a cubic foot of air, under these conditions, is given by the formula,

$$w = \frac{1.3273B}{460 + t} = \frac{1.3273 \times 29.2}{460 + 32} = 0.07877 \text{ lb.}$$

QUESTION—*What are the laws in reference to persons seeking a certificate as mine examiner?*

ANSWER—Section 2 (f) of the Illinois mining laws requires each applicant for a certificate to produce satisfactory evidence that he is a citizen of the United States, twenty-one years of age, of good repute and temperate habits and having at least four years practical mining experience. He must pass an examination regarding his experience in mines generating gas and his knowledge of the nature and properties of firedamp, laws of ventilation, construction and use of safety lamps and the laws relating to safeguarding the mine against fire. He must also possess a knowledge of first-aid to the injured and mine-rescue methods.

QUESTION—*What are the duties of a mine examiner?*

ANSWER—Section 21 (b) of the Illinois law requires the mine examiner to examine the underground workings, in his charge, within eight hours previous to the time for the dayshift to go to work, each day that the mine is to be operated. Where an air split generates gas in dangerous quantity the examination must be made within six hours of that time, provided the mine inspector, in his judgment, does not require a still shorter period for the examination. In mines where electric lamps are used exclusively, the law requires the examination to be made within four hours of the time for the dayshift to enter the mine.

The examiner must carry with him a safety lamp, in good order, and a rod or bar for sounding the roof. He must see that the air current is traveling in sufficient quantity in its proper course. The law requires the examiner to measure the air passing at the last crosscut in each pair of entries, or the last breakthrough in a section, in longwall mining, and at other necessary points and note these measurements in a book kept for that purpose. He must inspect all places where men must pass or work, and observe any dangerous roof conditions or bodies of accumulated gas. He must examine all roadways and air-courses, together with the accessible part of recent falls and old gobs.

As evidence of his morning examination, the examiner must mark with chalk the date of his visit, in a suitable place on the wall, but not on the face of the coal, in each place examined. Where danger is found, he must mark the place plainly, as a warning for men to keep out, placing two obstructions across the road, not less than 20 ft. apart, one being outside of the last open crosscut, in any place where a body of gas is found. He must record the results of his examination in a book kept for that purpose, when completing his work each day, and take possession of the entrance checks of men in whose places danger has been found, giving such checks to the mine manager before the men are permitted to enter the mine.

QUESTION—*How would you remove firedamp from the face of an entry, the face being 50 ft. inside of the last open crosscut?*

ANSWER—Before making any attempt to disturb this gas, all the men working on the return airway, or the return of this air split, must be withdrawn and every approach to the return current of that section properly safeguarded, to prevent men from entering the current. This being done, a line of brattice must be carried from the outby corner of the rib of the last open crosscut and extended up the entry, by adding short lengths of brattice as the gas is removed. The line of brattice must be set about two feet from the right-hand rib when facing the head of the entry, so that the intake side of the brattice will have the smaller area. Only experienced men must be employed in this work and frequent tests must be made with an approved safety lamp to ascertain the progress of the work. No open lights must be allowed in any portion of the entry. When the gas has been cleared from the face of each entry the mine examiner must then make a thorough examination of the entire section, on the return of this current, before permitting men to enter for work.

Gray Silver and H. L. Stimson to Speak At N. C. A. Convention

An address by Gray Silver, president of the American Farm Bureau Federation, will be the principal event of the Wednesday session of the annual convention of the National Coal Association, which will be held in Atlantic City beginning June 19. There will be no general session on Tuesday, however, for that day will be given over to the state and districts meetings. Delegates will register on that day and the directors will meet at luncheon at the Hotel Traymore.

In addition to Mr. Silver's address on Wednesday morning President Ogle will make his report, as will Executive Secretary Gandy. The Cost Accounting Committee and the Credentials Committee also will submit reports.

On Wednesday night there will be vaudeville acts and a boxing match at the North Side Athletic Club.

The principal address on Thursday morning will be made by Colonel Henry L. Stimson. J. C. Brydon will acquaint the delegates with the work which has been done by the Bituminous Operators' Special Committee and C. E. Bockus will tell of the work of the Publicity Committee. A letter from Senator Stanley, of Kentucky, will be read at this session. On Thursday morning also reports of the election of directors from the various states and the nominations of directors at large will be received.

"The Poison in a Democracy" is the title of an address which will be delivered on Friday morning by Colonel Guy D. Goff. At this session the directors at large will be elected. Immediately thereafter the new board of directors will retire for an organization meeting. The incoming president will be introduced. Reports will be presented by the Railroad Relations Committee and by the Finance Committee.

Wadleigh Reports Spotty Conditions in Principal Bituminous Coal Fields

F. R. Wadleigh, Federal Fuel Distributor, on June 12, gave out a survey of transportation, distribution and labor conditions in the principal bituminous coal fields as of June 1, indicating that the market throughout the country is spotty. Colorado operators are convinced that with the conditions existing nothing can prevent an abnormal demand this fall and winter. In Illinois there is almost no movement aside from a large tonnage of steam coal and railroad fuel. The mines in Indiana are being operated at approximately 45 per cent of capacity, but there is no scarcity of coal. Car supply, taken as a whole, is not bad.

Consumers of western Kentucky coals are storing some, with car supply and movement generally good. Mine-run coal can be purchased from 25c. to 50c. per ton less than the cost of production. The mines in northeastern Kentucky are operating on about a 38 per cent basis, the loss of time being due to shortage of transportation facilities. This district has not felt any noticeable reflection of the "no market" condition, because a great volume of this coal is used by the steel industry, byproduct coking and gas plants. The market in the eastern Kentucky fields is rather dull, demand being for the better prepared coals. Some of the high-cost production mines have closed down.

Reports from New England show an inactive buyers' market with about 60 days' stocks on hand, exclusive of railroads. All embargoes have been removed and there is only slight congestion at the junction points.

The Somerset County (Pa.) district reports little change in market conditions, but a better demand for the higher grades of coal. Car supply, however, is better.

The demand from the West for Pocahontas district coals is better than the Eastern, Southern or export markets. Some concern is felt over the apparent hesitancy of consumers of household coal to take in the proper amount of domestic sizes. Tug River district conditions are good, with a brisk demand for tide and westbound coal. The markets of the Fairmont field are absorbing a record tonnage from this section. With the free movement of tonnage and the return of ideal conditions from the standpoint of the consumer, some 100 inefficient mines, or mines producing inferior coal, have permanently closed down, enabling the railroads to distribute cars to the mines continuing operation.

Logan County district market conditions are reported as poor, and most operators shipping on contracts only. Some of the mines in the Kanawha district on both the C. & O. and New York Central lines have shut down, giving as their reason that the prices which may be obtained are not sufficient to permit operation except at a loss. There is still a strong demand for more New River coal that can be produced under present car-supply conditions.

The outlook for coal in the Northwest is good. Some industries, while not buying heavily, are closely canvassing the situation, and other industries are buying from hand to mouth.

The production of anthracite is being pushed as hard as labor conditions will permit. Distribution is going forward regularly, preference, of course, being given to northern New England and the territory served by the upper Lake docks, where movement must be completed before it can be interfered with by adverse weather conditions. The storage yards of the operators are bare of domestic coals, as also, generally speaking, are the yards of the dealers, the latter delivering coal to consumers as soon as they receive it.

Midwest Retailers Resent Questionnaires As Discriminations Favoring Snowbirds

The annual meeting of the Midwest Retail Coal Association opened June 5 at the American Annex Hotel, St. Louis, with an attendance of seventy-three. L. P. Coan, president of the Coal Service Bureau of St. Louis, welcomed the dealers to St. Louis, and H. F. Shrankler, president of the association, responded.

The program included a talk on "Automatic Conveying Machinery," by A. L. Shaw, of the Chicago Automatic Conveyor Co., after which several questions were asked and answered.

A paper on "Coal Storage" by C. G. Brinley, of the Gifford-Wood Co., developed an interesting discussion, in which Mr. Kelly, of Springfield, took a conspicuous part. H. S. Mitchell of the Coal Credit & Correct Weight Bureau, Kansas City, spoke on claims and claim problems from the viewpoint of those having an association through which to collect them, while H. R. Oglesby discussed the problem from the standpoint of the small-town dealer.

After a spirited discussion this resolution was adopted:

"Resolved, That the request of the Coal Commission that retail coal dealers answer questionnaires is unreasonable, unjust, is an illegal request and is a rank discrimination against honest business men in favor of dishonest coal agents and jobbers, commonly known as snowbirds;

"Be it therefore, further resolved that to be constitutional a law or statute must not discriminate, and it is not lawful to make an honest coal merchant go to trouble and expense in furnishing a history, for a ten-year period, of his business and to further compel him to keep books that will quickly furnish to any investigator the status of the business of such dealer, and all this because this dealer invests money in land, buildings and necessary equipment to properly conduct a coal business and to carry coal in storage for the protection of his community during strikes, blizzards and other contingencies, and

"Whereas, This same dealer has competition that has no investment, pays no license or taxes, keeps no books or records, has no established place of business, but as a rule is dishonest, unfair, incompetent, ignorant of coal knowledge and conditions, and destroys public confidence in honest tradesmen who sell coal of good quality at a fair price, by misrepresentative advertising, who incites public unrest and prevents the spring and summer buying of coal by false and ignorant rumors of lower prices to come;

"Be it therefore further resolved that we protest against any reports being furnished from retail coal dealers properly equipped and of legal and financial responsibility to any commission for any purpose whatever while the retail coal trade's unfair and unreliable competitor and the wholesale distributor for whom the local distributor is often an agent is not forced to furnish the same data requested of the dealer."

Stabilizing Effect of Concentrated Ownership on Supply And Price of Anthracite Impresses Commission

By Paul Wooton
Washington Correspondent of *Coal Age*

While members of the President's Coal Commission are being particularly careful not to anticipate any of the conclusions which may be reached in the anthracite report, it is difficult to see how they can avoid passing on two great industrial problems—competition versus centralization and what procedure is to be followed when labor and capital fail to reach an agreement. In all industry there is no better illustration of highly concentrated corporate ownership and of runaway competition than is afforded by the anthracite and bituminous mining operations in the United States.

The commission's study has brought out clearly the stabilizing effect of this concentrated ownership on supply and price. The members of the commission, it is known, have been impressed with the success of the anthracite producers in preventing a runaway market during the past winter, through their control over the bulk of the tonnage. Such flurry as there was can be blamed on the competition that does exist, many believe. There are some who believe a majority of the commission would oppose any effort to break up the closely knit business organization which produces most of the anthracite. They may have some suggestion in their report as to the means which can be employed to prevent possible abuse of this control. It is difficult to imagine how the commission can make a report on anthracite coal without passing on the merits of that type of control. In the bituminous-coal industry many things can be done which would improve the situation, but in anthracite the outstanading questions are two—centralization and labor relations.

The situation in the anthracite field is such that it seems highly probable that the report will have some suggestion as to what additional machinery is to be set up for use when the operators and the mine workers cannot reach an agreement. In anthracite each side is 100 per cent organized. The employees present a homogeneous front and the operators are always in step. For nearly twenty years their differences have been handled in a fairly satisfactory manner through the existing machinery, but it is recognized that it is not adequate when a major difference occurs.

How Anthracite Deadlocks Are Settled

When a deadlock occurs under present conditions the two parties to the controversy either fight it out or voluntarily agree to some form of arbitration. In the former case the public frequently is denied adequate fuel supply while the contestants engage in the fighting out. Arbitrations in the past usually have been undertaken after great losses have been suffered and after coal production has been long reduced. None would be surprised if the Coal Commission were to prescribe the exact form arbitation would take. It may not go so far as to make arbitration compulsory, but it may have some plan whereby the arbitrational machinery is expected to begin to function immediately when a deadlock is reached, with reliance placed on the force of public opinion to bring about its use.

Chairman Hammond stated Saturday that the commission is wrestling with the valuation problem. The situation with regard to valuations is affected importantly by recent decisions of the Supreme Court of the United States. He admitted that the public will be critical of the valuations used in the computing of profits in the anthracite industry. The report of the special advisory committee on valuations had not been received on that date, however. Mr. Hammond brought out that it is unfortunate that the law prescribes an exact date for the issuance of the anthracite report. If the commission had three weeks more time a more complete report could be made, he stated. He admitted, however, that the commission has had before it for some time a large enough proportion of the returns from the industry to enable members to form conclusions contingent on corroboration by the remaining returns covering the full tonnage. The report made by Senator Pepper on the legal aspects of royalty regulation has been received.

The commission is going minutely and carefully into the whole question of the check-off, Mr. Hammond revealed. He admitted that it would be interesting to know in detail the use which the Mine Workers makes of its revenue. He gave no intimation, however, that any such request would be made or that union officials would be asked as to the alleged use of large funds at Herrin.

Illinois Mining Institute Studies Safety and Other Mine Problems on Boat Trip

A boat trip from St. Louis up the Mississippi and Illinois rivers to LaSalle, Ill., and back, with a fare of geology, roller-bearing problems, fried fish, mining methods, jollity, "down South" hot biscuits, hot discussions, mine safety schemes and appliances, long sleepy rests on deck, jazz music and a conglomeration of other things marked the summer convention of the Illinois Mining Institute June 7-9. About seventy-five men made the trip, absorbed some new ideas, had a vacation that was good though short, and went home looking forward to next summer. For five years the Institute has made such a boat trip, and combined pleasure with a technical program, often resulting in real contributions to the science of coal mining.

This year the convention noted with sadness the absence of the late Prof. H. H. Stoek, of the University of Illinois, a mining engineer whose influence and activity in the Institute had been marked. Also it noted the absence of J. B. Hebenstreit, of Nokomis, Ill., a charter member who is seriously sick. On the afternoon of the second day, as the Institute's steamer, the Piasa, touched at Peoria, a telegram of sympathy and good will was dispatched to the sick man from the group of engineers, state mining officials, coal operators and machinery and equipment men aboard. John G. Millhouse, president of the Institute and Martin Bolt, secretary, conducted the technical sessions and otherwise arranged and engineered the outing.

The very first subject on the Institute's program proved a live one which brought many a man to his feet earnestly. It was mine safety—how to protect men's lives and limbs in spite of their carelessness, ignorance or bullheadedness, and how to protect mine property in spite of difficult conditions. The question came to the fore in a paper written by George H. Dieke, president of the Mine Safety Appliances Co., and read by J. R. Fleming, of St. Louis. The paper treated first the broad proposition of safety in a general way and then got down to detail concerning the principles, the construction and the service of some modern appliances such as the electric cap lamp, masks and rescue outfits, gas indicators, carbon-monoxide detectors to replace canaries and mice, and an inhalator which resuscitates by injecting into a gassed patient a mixture of 95 per cent oxygen and 5 per cent carbon dioxide, making him breathe deeply and bringing him around often without the usual complications of pneumonia, violent headache and the like.

Following the paper, J. E. Jones, safety engineer for the Old Ben Coal Corporation and a man who always is counted on to contribute something worth while to any safety discussion, said that it is strange that in Illinois, in spite of all the safety effort and mechanism of today, the death rate per 1,000 men employed is just as high as it was between 1882 and 1892, the first decade of safety statistics in the state. An average of 3½ lives per 1,000 men per year are sacrificed today, as was the case then. The fatalities per million tons produced have decreased, however.

To his way of thinking, safety effort should be devoted 95 per cent to preventing accidents and 5 per cent to such after-work as first aid and mine rescue. The main thing to do is find causes and eliminate them. Replacing black powder with permissibles was one great step. Using enclosed lights even in non-gaseous mines was another. An open-flame lamp in a non-gaseous mine was the cause, he said, of the terrible Cherry mine disaster in Illinois in 1910.

Much could be done, he thinks, to cut down accidents at faces. It is criminal, in his opinion, to put a loader up against a face that has been undercut and shot but which is hanging loose. Another cause that could be remedied is the taking of miners from their accustomed jobs and putting them on company work. When a man is taken from the face and set at trip riding, trouble may be expected. Men should be trained for their particular jobs and then kept on those jobs. Factories, he said, do an infinitely better job of training their men than do coal mines.

"Few first-aid men get hurt," commented D. D. Wilcox of the Superior Coal Co. "Why is that? We feel that it is because a man gets to thinking safety until precaution with him is natural. If all men could get that attitude of mind, a great advance would have been made. But nowadays in Illinois men don't seem to know whether they are working for the company that pays them or for the union. Union leaders and wrong-headed fellows, too often say that the company wants to teach men safety just to save company money, and the result is that a man may be prejudiced against safe practice. It's true the company wants to save money, but it also wants to save its men's lives and legs and hands and collarbones."

He granted that careful and proper timbering would prevent many roof falls, but it is mighty difficult to tell just how to timber to meet varying conditions of roof and overlying strata. Injuries at the face, he thought, would be reduced if coal were shot down properly and never left overhanging.

Favors Change in Law Requiring Certificates

J. H. Haskins, a state inspector, favored a change in the law to require miners to earn first-aid certificates before they could be certified for work by the state examining board.

"Co-operation between man and company is essential," contributed Frank Tirre, of St. Louis, thereby precipitating a discussion which struck a little fire here and there. Martin Bolt, assistant director of the State Bureau of Mines and Minerals and secretary of the Institute, caused the first flash.

"Proper mining rules properly enforced is the main thing needed to prevent accident," declared Mr. Bolt. "There's no other way to reduce minor accidents. There's a marked lack of enforcement by companies and mine superintendents, and all of you know it. It isn't that you superintendents haven't got horse sense and backbone. It simply is that you don't take the trouble. Tell the rule breakers they must obey or get out, and tell it so that what you say will be heard clear up to the international officers of the union."

He said, further, that too many companies fail to take safety to heart. They pay an insurance company a specified amount of money to watch out for such things and then feel they have done their duty. He thinks companies should encourage their men to study rescue work and send teams to rescue meets and all that sort of thing. J. A. Jefferis, of St. Louis, said his company offered to pay the expenses to a Springfield training course for all the employees who wanted to go. Only six went. Others declined unless the company paid them day wages while they were studying. His experience is that men expect the company to meet them not half way but all the way. Peter Grant, Jr., of Peoria, said he thought better feeling and mutual understanding could be had between men and company if the company took a hand in educating them along many lines.

Replying to Mr. Bolt's frank suggestion to mine superintendents, Mr. Wilcox said superintendents can't fire miners right and left for every little offense. It often would be better to keep the offender and train him better, rather than fire him and spend a lot of time breaking in a new one. Anyway, a superintendent can't be beside every man all the time. He can't see most of the rule infractions for that reason.

A novel and original system of mining on a retreating basis was explained in a paper by Joseph Lord, of Peoria. Mr. Lord explained a diagram of underground layout which he said could be developed to produce almost any amount of coal up to 24,000 or more tons a day. He would run eight triple main haulageways from the center of a square area out diagonally to the corners and out at right angles to center points on each boundary, and the whole area cut into 32 long blocks by branch entries, all driven clear to the boundaries of the property.

Mining this coal by the retreating method, each block would have two faces pointing the outer end of the block into "V" shape. Since each block would be 1,320 ft. wide, each of the two faces would be 870 ft. long. A mining machine could make a continuous cut along each of the 870 ft. faces, the coal shot down and then a trip of 40 cars on a track laid parallel to the face could be loaded with great dispatch either by hand or by mechanical loader. Hoisting would be through a double-deck four-track slope rising from a bottom close to the center of the property.

Mr. Lord declared that the output of such a layout would be almost unlimited, ventilation would be more nearly perfect and damage by an explosion would be less because of greater space for pressure escape, extraction would be practically complete by a system of caving down the roof, and the greatest possible tonnage would be obtained at the least possible cost.

The Institute devoted close attention to a discussion on the geology of Illinois coals by Harold E. Culver, who has been working under the co-operative agreement in Illinois in an effort to determine just what the coal resources of the state are and to work out a method for recognizing each seam as it is encountered.

On the second day of the trip as the boat was passing through the region above Peoria, M. M. Leighton, newly appointed chief of the Illinois Geological Survey, succeeding F. W. DeWolfe, who resigned last spring, talked absorbingly to the Institute about the geology of the locality, whose surface they could see from the boat's deck.

A discussion of roller bearings followed a paper by P. B. Liberman, engineer of tests for the Hyatt Roller Bearing Co. of Newark, N. J. Mr. Lieberman made a number of valuable suggestions about lubrication and the use of heat-treated steel for axles.

John A. Garcia, of Allen & Garcia, Chicago, designers of the skip hoist, told the Institute some of the recent history of that method of hoisting coal and described some of the mining plants where skips are now used.

On the return trip of the boat from LaSalle to St. Louis, L. E. Young, president of the Union Colliery Co., recounted for the Institute some of the experiences his men had driving an entry through a fault in the Kathleen mine at Dowell, Ill.

Name Advisory Boards of Shippers for Full Co-operation with Railroads

The Car Service Division of the American Railway Association announces the appointment of regional advisory boards, composed entirely of shippers, and selected by the shipping public itself, for the purpose of bringing about the fullest measure of co-operation between the shippers and the railroads of the country. These boards will work in conjunction with the district manager of the Car Service Division, together with representatives of the railroads in the various districts.

Regional advisory boards have already been organized in five districts. In the Southeastern region, S. L. Yerkes represents the coal shippers on the advisory board. The Southwestern regional advisory board has A. P. Rudowsky, traffic manager of the Oklahoma operators, as a member, the Trans-Missouri-Kansas advisory board has C. E. Warner, of Kansas City, the Central Western has A. B. Currie, of Omaha, and the Northwestern region has Wayne Ellis, Ivan Bowen, Frank Milhollan and J. J. Murphy, representing the coal industry.

United Mine Workers Would Raise Wages and Cut Prices By Nationalization of Anthracite Mines

Reduction of charges against anthracite through a nationalization plan for the retirement of all capital stock of anthracite companies by the substitution of 6 per cent bonds and the retirement of these bonds through a period of fifty years is suggested in a brief filed with the U. S. Coal Commission by the anthracite miners. The brief, which was made public June 11, was prepared under the direction of Thomas Kennedy, Hazleton, Pa.; C. J. Golden, Shamokin, Pa.; and W. J. Brennan, Scranton, Pa., presidents of the three anthracite districts of the United Mine Workers of America, and is signed by Ellis Searles and John Moore.

In their brief the miners challenge the U. S. Coal Commission's procedure, declaring that neither the miners nor the public will know the facts about the industry unless the present accounting system is revised. The mine workers' officials assert that the commission's questionnaire to the coal operators gives no guarantee of securing the desired facts, and they are of the opinion that the figures obtained by it will probably be inaccurate. The brief recommends the installation of a uniform accounting system for the anthracite industry, so that the public may at all times be in position to ascertain the facts about its fuel supply, the costs, profits and everything connected with it.

"The financing of the anthracite industry," the brief states, "should be so regulated that within fifty years the industry can be entirely free from the charges made upon it by present investors. This applies to both mining companies and coal land companies. It is proposed that this be done without the slightest impairment of reasonable investment totals by:

"(1) Completing the retirement of the present bonded indebtedness.

"(2) Replacing the actual investment represented in outstanding stock by bonds bearing interest at 6 per cent, equal to the net sacrifice of such investment, and then retiring such bonds over a fifty-year period. Power to take stock for conversion purposes, by eminent domain, shall vest in the regulating authority.

"(3) Arranging for public or joint ownership and control of the properties as the stock is replaced by bonds.

"Necessary new capital for additions and betterments shrould come so far as possible from reinvested profits. With interest instead of dividends to pay, profits may be expected to produce a sum sufficient for such additions and betterments.

"We believe that no harm can result from planning out the financing of the industry fifty years ahead. If such planning had been done in 1873 there might be none of the recurrent dissatisfaction which has prevailed ever since. We have, in suggesting a fair return to investors, stated our conviction that the industry should pay no more than it has to pay for necessary new investment. In making our two proposals for financing the industry we have the above consideration in mind.

"We know also that the service which the investors of capital render to the industry is not a permanent one. There is at a given time a need for capital and it is secured by the issue of stocks or bonds. After a course of years, if sufficient surplus has been accumulated, there may be no further need for that capital. But the stocks and bonds are still outstanding and must legally receive their return annually, in the case of stock, indefinitely. The advantage of canceling these obligations has already been recognized by the stockholders of certain mining companies. They have frequently canceled their bonded indebtedness and preferred stock long before maturity.

"Retiring of securities is therefore made when the controlling elements in the companies have been able to accomplish it. It is the wise thing to do from their point of view. It makes their control more complete and more profitable. Just as these controlling elements in some of the companies recognize the fact that the services of certain investors are temporary, to be rewarded with the guarantee of an income for a definite time only, followed by a return of principal, so we recognize that fact. Managers and miners are both paid for their services until they are not needed in the business any more. Then they are discharged. We propose to follow these companies in their quiet accurate logic, and suggest that the industry treat the services of investors like the services of managers and miners."

The miners estimate that retiring the present investment would average only 28c. a ton over the next fifty years, while the amounts paid to capital holders were 78c. in 1920, and $1.40 in 1922-23, and may be more in the future.

The actual cost of the investment in the anthracite industry must be found, the miners say, and they also desire to ascertain the net sacrifice cost of investment. The latter they would base on what the investors have put into the business in cash or its equivalent, what they have taken out of the business in dividends or drawings, and what constitutes a fair and reasonable rate of return. They inform the commission that "if such investment figures are not secured, we fail to see how any fundamental program for the industry can be outlined, or any real progress made in the settlement of an intolerable situation."

The miners say that their proposals provide for a reduction in futurer liabilities of the industry, lower prices and better wages, and the elimination of "the disorganizing influence of high royalties." The brief continues:

"It is proposed that after the investors' net total sacrifice to date has been established and compared with the actual cost of investment, and after a uniform accounting system has been put into effect, a fair rate of return be allowed mining companies and coal land companies if and when earned. Six per cent would be considered as a fair rate of return. Earnings in excess of this rate should be devoted to additions and betterments, lower prices and better wages, as conditions warrant.

"Necessary new capital can be raised by authorized increases in the bonded indebtedness. In the case of coal land companies, excess returns would go to decrease future royalty rates. It is proposed that the investment of stockholders as determined be guaranteed by adequate depletion and depreciation reserves, so that the net sacrifice will be on hand to be returned in full as the several mines are exhausted.

"It will be noted that our proposals cover coal land companies as well as mining companies. This is a very essential provision. Many independent mining companies, because they pay high royalties, and because of their small size, feel free to charge, in time of shortage, as much as $5.50 a ton more than the large companies and to make such charges regardless of the actual mining cost. The result is that the same size and quality coal reaches the big cities at prices which have, in time of shortage, a $5.50 range. Consequently, as Colonel Goethals said in retiring from office as New York State Fuel Administrator, there is at present no way of checking the profiteering of wholesalers and retailers.

"The latter are put in a position where they can make the highest price they pay for any one shipment the basis of their charges to consumers, instead of taking a weighted average as the basis. We propose to eliminate a large part of the present mine cost of the smaller companies by guaranteeing that land owners get a fair return on their investment and no more. The result would be to decrease royalty charges drastically and to abolish the whole system by which prices to consumers can be raised beyond reasonable levels through the disturbing element of the small marginal producer."

In proof of the need for regulating the rate of return on investments in anthracite mining and land leasing the brief cites an instance of 30,000 acres of anthracite land bought by Stephen Girard in 1830 for $178,000, or $6 an acre, the

estimated royalty income of which up-to-date has been about $8,900,000 or 3,800 per cent net.

Citing the profits of five large companies in 1920 as running from 14 to 121 per cent, the brief says: "These figures represent the rate of net income to capital stock outstanding. It will be remembered that profits as reported are probably understated, due to bad accounting procedure."

The miners object especially to arbitrary revaluations of property as unjustifiable overcharges on the public. They ask that excess coal land reserves be eliminated from present mine costs, and quote the bituminous industry, where such elimination would reduce investment 53 per cent.

Wages, the brief states, are bound up with questions of financing the industry and it alleges that capital charges, depletion, interest and profits were 78c. per ton in 1918, and are estimated at $1.40 in 1923. In the opinion of the miners, "some limitation of the investors' constantly encroaching claims upon the industry is imperative."

Continuing, the brief says: "In respect to securing new capital, the fact that to 1920 four companies, mining together about 40 per cent of the total commercial production, had accumulated a book surplus of $74,000,000, leads to the belief that such new capital may be secured in adequate amounts from reinvested profits. Any surplus earnings over such needs would be devoted to reducing prices, paying better wages or hastening the amortization of bonds.

"Mining companies to a very considerable extent have built up the industry through corporate savings. This process should continue. It should become the accepted method for securing new funds. Their surplus earnings should, however, from now on become recognized public property. Only so can they be utilized in a manner which will help and not harm the future of the industry.

"Finally, we suggest that the control of the industry after capital has been retired or funded might rest with the management, the public, the miners or a combination of the three. Such control would be introduced concurrently with the conversion of capital stock into bonds. It is probable that such control would have to be exercised by a holding company under Government auspices. The exact method of ownership and control awaits definition. As we said before, we desire at this point to lay down the general principle of retiring the ever-encroaching claims of anthracite investors upon the public interest and to point out that such claims can be retired at a fraction of their present annual burden. We can see no reason why this should not be done."

Complete Unionization Would Skyrocket Prices, Says Bituminous Commission

Complete unionization of the bituminous coal-mining industry would operate to cause the price of coal to soar to unprecedented heights, according to a statement issued June 9 by the Bituminous Operators' Special Committee.

"If all of the American mines were unionized," the statement says, "the mere threat of such a strike as was called and maintained for five months last year would cause a buyers' panic which would send prices skyward. Under the conditions which existed last year, the beginning of the strike, while it caused some concern on the part of buyers, did not have an immediate effect on coal prices.

The non-union mines were put to work at capacity, bringing their output up so that they were able to supply half the tonnage ordinarily consumed by the country. In states where unionization is complete, such as, for instance, Indiana, the mining of coal was absolutely stopped by the strike. If the whole industry was dominated by the United Mine Workers of America, a general strike would prevent the mining of a single ton of coal anywhere in the United States.

"It is unreasonable to believe that the union would not wield this terrific weapon against the public to force upward the already inflated wage scale. This would increase the cost of producing coal, and would be reflected in higher prices."

Strike at Illinois Mine to Force Making of Scale for Underground Loaders

What scale will Illinois operators be forced to pay men who run mechanical loaders? The question has been coming rapidly to the fore recently as the number of loaders in the state increased and was brought to a head June 5 by a strike of about 300 men at the new Orient No. 2 mine of the Chicago, Wilmington & Franklin Coal Co. near West Frankfort, Ill. The company has been paying a little above the union day wage to the operators of several loaders doing development work mainly. But the mine has reached a point now which gives the men excuse to assert that it is passing out of the development stage and therefore a loader scale should be fixed at once for room work and all other loader operations.

It is obvious that the miners have chosen the Orient No. 2 mine for the start of the loader scale controversy just now because they feel that the time and the place are propitious for forcing the new scale at the highest level. The company has been paying approximately $8.25 a day to loader operators, which is 75c. a day above the union day-wage scale. The machines are said to have operated successfully in spite of obstacles thrown in their way and the output of the mine has swelled. The miners assert that they have loaded out enough coal a day to average them $20 a day at the union tonnage rate. They demand that a scale be fixed at once. Negotiations have produced no scale. Hence the strike, which was not officially authorized by district union officers but was started by the men after a joint board of miners and operators had decided that the company was right, that a scale of $8.56 per day was fair and that the mine was still in the development stage.

A few loaders have been used in other big Illinois mines, but they also have been restricted almost entirely to entry work and rock loading. In Indiana another handful of loaders of various types have been used with varied success. The operators have been paid as high as $12 a day. The machine idea has been spreading with some speed in spite of the knowledge in every operator's mined that a scale for loading could not be fixed peacefully. The entire Middle West is watching with interest the controversy now going on at Orient No. 2.

Bituminous Coal Loaded Into Vessels at Lake Erie Ports During Season to End of May*

(In Net Tons)

Ports	Railroads	1923 Cargo	1923 Fuel	1923 Total	1922 Cargo	1922 Fuel	1922 Total	1921 Cargo	1921 Fuel	1921 Total
Toledo	Hocking Valley	760,562	21,622	782,184	617,287	16,103	633,390	821,739	20,518	842,257
	N. Y. C.–Ohio Central Lines	304,405	9,456	313,861	.....	.....	.....	196,039	5,342	201,381
	Baltimore & Ohio	305,272	9,561	314,833	823,958	17,125	841,083	402,239	10,629	412,868
Sandusky	Pennsylvania	387,362	10,244	397,606	488,143	11,655	499,798	223,214	6,060	229,274
Huron	Wheeling & Lake Erie	272,491	9,261	281,752	7,612	334	7,946	424,250	11,132	435,382
Lorain	Baltimore & Ohio	474,584	30,316	504,900	17,820	3,353	21,173	625,935	24,727	650,662
Cleveland	Pennsylvania	323,427	22,443	345,870	43,358	6,704	50,062	512,323	20,143	532,466
	Erie	266,874	10,458	277,332	.....	.....	.....	126,769	4,260	131,029
Fairport	Baltimore & Ohio	92,771	8,503	101,274	.....	.....	.....	.....	.....	.....
Ashtabula	New York Central	844,358	40,764	885,122	31,083	5,757	36,840	462,355	16,887	479,242
	Pennsylvania	277,094	11,102	288,196	28,342	2,113	30,455	532,897	17,128	550,025
Conneaut	Bessemer & Lake Erie	524,636	26,974	551,610	24,744	194	24,938	196,091	1,911	198,002
Erie	Pennsylvania	101,209	11,801	113,010	23,575	6,685	30,260	278,816	12,901	291,717
Total		4,935,045	222,505	5,157,550	2,105,922	70,023	2,175,945	4,802,667	151,638	4,954,305

* Compiled by Ore & Coal Exchange, Cleveland, Ohio; H. M. Griggs, manager.

Dock Operators Deny Illegal Practices

The response of the Northwestern Coal Dock Operators' Association to the charges of the Federal Trade Commission is a general denial of all allegations implying illegal action. As to the alleged existence of a conspiracy in restraint of trade and an effort to establish a monopoly, both charges are flatly denied. The operators admit that credit information is collected and distributed among the members of the association, but it is contended that this is a lawful practice. They deny that price lists have been circulated among members before publication or that there is one wholesale price for the independent retail companies in the Twin Cities and another for the retail concerns owned by the wholesalers. They offer to show the books of members and to supply any information bearing upon the question. They admit that they have sold the same grades of coal at differenet prices in the Twin Cities than at Duluth, which they explained on the basis of competition from rail coal in the Twin Cities that does not exist at Duluth.

Wholesalers Plan to Smooth Relations of Producers, Shippers, Buyers and Roads

An arbitration plan and other schemes for smoothing out relations between shippers and railroads and between producers, shippers and buyers of coal was awaiting decision of the American Wholesale Coal Association as it opened its convention in Cincinnati, Ohio, on Tuesday, June 12. It was hoped that the association would adopt a standard arbitration method and ask the railroads to adopt it also. An effort was to be made to get the railroads to stop permissive embargoes. Indications were that C. L. Dering, of Chicago, would be elected president to succeed Seth Morton, of Albany, N. Y., though the Pittsburgh delegation was grooming Vice-President Jay W. Johns for a race and the Cleveland contingent also showed signs of a counter administration attitude. About 150 men attended, all having something to say about the U. S. Coal Commission's requests upon wholesalers but nobody apparently proposing that anything be done about it.

John J. Tierney Dies in Philadelphia

John J. Tierney, vice-president and general sales manager of the Crozer-Pocahontas Coal Co. died in Philadelphia, June 11. The funeral is to be held at 10 a.m., June 14, at St. Patrick's Church, Philadelphia. Interment is to be at Newtown, Pa.

At the time of his death Mr. Tierney was the treasurer and a director of the National Coal Association, having served as the association's treasurer since 1917. He was a past president of the Smokeless Coal Operators' Association and had been active in the affairs of the Pocahontas Coal Operators' Association.

Mr. Tierney was born in Newcastle, Pa., Aug. 29, 1857. He married Miss Ida Reedy, of Tremont, Pa., in 1885. He first worked as a telegraph operator in the anthracite region and later attended Villanova College, Villanova, Pa. He was graduated as a mining engineer and worked on the engineering staff of the Philadelphia & Reading Coal & Iron Co. in the anthracite fields.

Mr. Tierney went to the Pocahontas field of West Virginia in 1885 as engineer for the Bluestone Land Co. and later became associated with the extensive Crozer interests there. Along with his own extensive interests throughout that section he was president of the Smokeless Coal Operators' Association of West Virginia from November, 1911, until December, 1915. He moved to Philadelphia and opened his present offices in November, 1900. He was an extensive reader and an authority on coal mining and coal sales.

At the time of his death Mr. Tierney had the following positions: President, Powhatan Coal & Coke Co., Powhatan, W. Va.; Sharon Coal & Coke Co., Sharondale, Ky.; Tierney Coal Co., Powhatan, W. Va.; vice-president, Crozer-Pocahontas Co. and Page Coal & Coke Co., Philadelphia, also Tierney Mining Co., Powhatan, W. Va. He also was a driector and stockholder in the Peerless Coal & Coke Co., Pottsville Pa., besides having numerous other large interests, mostly in mining properties.

Mr. Tierney is survived by his wife and four children: John L. Tierney, Sharondale, Ky.; Edward M. Tierney, Powhatan, W. Va., and Washington, D. C.; George E. Tierney, Philadelphia, and Mrs. Alexander Chambers, Newtown, Pa.

Supreme Court Says Industrial Tribunal Cannot Regulate Wages and Prices

The Kansas Court of Industrial Relations received what is practically equivalent to its death blow when, on June 11, the U. S. Supreme Court, in an unanimous opinion read by Chief Justice Taft, declared that the Industrial Court had no authority to fix wages of employees of the Charles Wolff Packing Co. While the Court did not directly declare the entire act creating the Industrial Court unconstitutional, the decision greatly limits the activities of the Kansas industrial tribunal and the effect probably will be to nullify the objects for which it was created.

The Kansas act gave the Industrial Court authority to adjust disputes and fix wages and conditions of labor in industries producing food, clothing, fuel and for public utilities. While an employee could not be prevented from quitting his job, concerted action, such as a strike, in the face of a mandate from the court was declared illegal.

In the case at issue the secretary of the Meat Cutters' Union in January, 1921, appealed to the court against a reduction in wages by the Charles Wolff Packing Co. A hearing was held and the Industrial Court ordered that wages be advanced beyond the scale fixed by the company, asserting that an emergency existed and that higher wages were in the public interest, as the plant produced food. The company resisted payment of the higher wages and the Industrial Court applied to the State Supreme Court for a mandamus to compel compliance with its order. A commissioner appointed by the State Supreme Court reported that the company had lost $100,000 the year previous and that the evidence did not support the claim that an emergency existed. The State Supreme Court overruled this report by the commissioner and issued the mandamus, whereupon the company applied to the U. S. Supreme Court for a write of error, alleging its property would be taken without due process of law.

In his decision, Chief Justice Taft says the act "curtails the right of the employer on the one hand and of the employee on the other to contract about his affairs. This is part of the liberty of the individual protected by the guarantee of the due process clause of the Fourteenth Amendment."

Coal Export Situation Shows Little Change

Reviewing the overseas coal export situation, F. R. Wadleigh, Federal Fuel Distributor, in a statement on June 8 announced that there has been no marked change since May 1, although coke exports have declined considerably and inquiries are few. An increase in the exports of coal to South America is noted.

Figures given by Mr. Wadleigh show an increase in overseas shipments of coal in April of 192,671 tons and of coke, 98,162 tons over the month of March, when the first effects of the French occupation of the Ruhr were felt.

The statement shows that from April 30 to June 2 a total of 57 charters for coal and 9 for coke shipments abroad were closed.

The falling off in overseas shipments of coke is attributed mainly to an increase in shipments from the Ruhr district and to the expectation of further increases and a possible settlement of the Ruhr situation.

Accurate information on the Ruhr occupation as regards coal and coke production and shipments is impossible to obtain, Mr. Wadleigh states. The strikes in the Ruhr field are reported to be over, but the situation is still difficult and no settlement seems to be definitely in sight. It has been reported that production in April was about 45 per cent of normal and that shipments of coal to France and Italy have increased, but tonnage figures conflict.



Production and the Market



Weekly Review

Production and demand for bituminous coal are now so evenly matched that the market is for the time being becoming firmer. Prices in the aggregate, as shown by *Coal Age* Index of spot prices, held even last week, the average price of $2.60 and index of 215 being unchanged from the previous week. The strength is in the East, offsetting general dullness in the West and South.

The low point in spot prices with union wages at the present level was reached in March, 1922, at an average for the fourteen major coals of $2.05 per net ton at the mines, 55c. below the present level. Of the four Illinois coals on the list, Southern is yet 60c. above the pre-strike figure, Mt. Olive is 20c. below, and the others about equal. Indiana, western Kentucky, Hocking and Ohio No. 8 are now at approximately the same low point touched early in 1922.

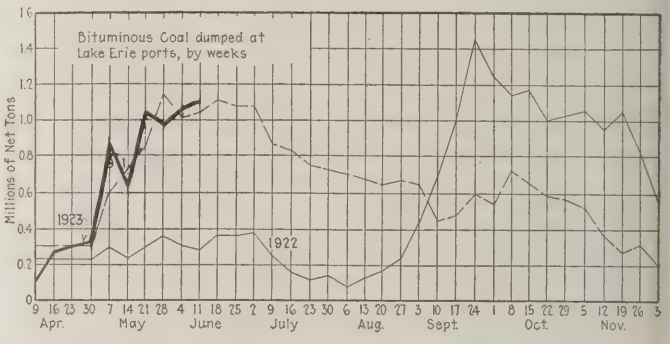
Eastern Kentucky is now higher by 90c., Clearfield by 65c., Pittsburgh by 25c., Cambria and Somerset by 85c., Kanawha by 60c. and Smokeless by 30c. than in March, 1922. Of course Smokeless, Somerset, parts of Clearfield and eastern Kentucky, although non-union, have a wage scale as high as or higher than the union scale, and materially above that in force when the low prices of March, 1922, were the rule. Of the ruling spot quotations there are but two that can be considered profitable—Smokeless and eastern Kentucky. Some shrinkage is possible in Cambria, Somerset and Clearfield prices, but the remainder of the list are at the bottom. With industrial and railroad buying on the present basis there is little likelihood of important spot price recessions through June and possibly July.

Production Well Maintained

Production of soft coal is well maintained at between 10,000,000 and 11,000,000 tons per week. Car supply is better in most fields despite the unprecedented records being attained in total freight loadings. In fact the excellent performance of the railroads leads many coal men to foresee ample cars next autumn and winter, and of course a very easy market. Output of bituminous coal in May was 41,555,000 tons, compared with 50,927,000 the corresponding month of 1918—the record year—47,086,452 in May, 1917, and 33,330,000 in 1921. Production this year to date has been 231,110,000 tons, exceeded in the same period only in 1918.

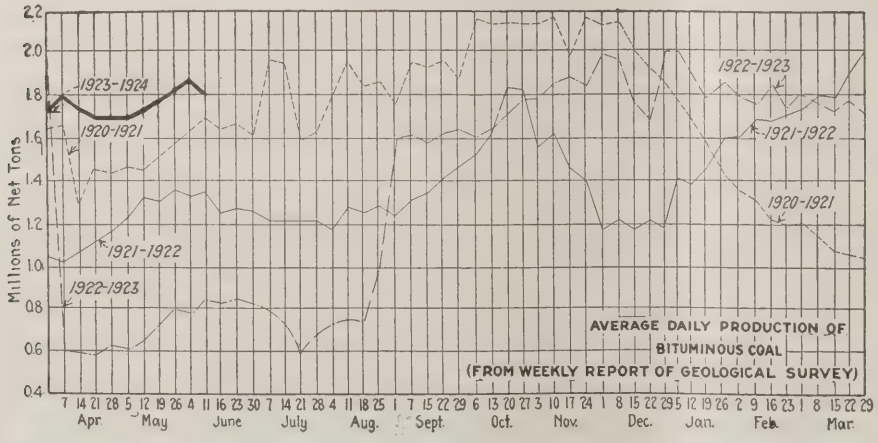
Buying for the Lake trade, for railroad fuel stocking and for New England industries are the chief features of the market. The overseas export demand is fading, a few scattering inquiries from South America being the only activity.

"Preliminary estimates of soft coal produced in the week ended June 2," says the Geological Survey, "placed the total, including coal coked, lignite, and mine fuel, at



10,059,000 net tons. Thus the short week shows a decrease of 990,000 tons from the revised estimate for the week preceding. The record of daily car loadings shows that with respect to soft coal production Memorial Day counted for one-third of a day. On that basis, the average daily loadings for the week show a small increase over the average of the full week preceding.

"Early returns on car loadings during the week June 4-9 indicate a slight decrease in the rate of production to somewhat below the level attained in the fourth week of May. The total output for the week probably will be in the neighborhood of 10,700,000 net tons."



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
May 19	4,481,000	10,270,000
May 26 (*b*)	4,889,000	11,049,000
June 2 (*a*)	4,616,000	10,059,000
Daily average	769,000	1,898,000
Calendar year	167,112,000	231,110,000
Daily average cal. year	1,280,000	1,777,000
ANTHRACITE		
May 19	8,000	2,045,000
May 26	10,000	1,956,000
June 2	8,000	1,606,000
Calendar year	21,842,000	43,125,000
COKE		
May 26 (*b*)	97,000	415,000
June 2 (*a*)	97,000	379,000
Calendar year	2,787,000	8,429,000

(*a*) Subject to revision. (*b*) Revised from last report.

Anthracite production is expected to fall off materially the last half of June due to union elections and the tri-district convention at Scranton on June 26. Prices hold firm, the premium on independent coal being unusual for this time of year. Domestic sizes are moving through dealers' yards to householders' cellars. The upper Lake region is already worrying about the smallness of hard-coal receipts. Anthracite loaded at Buffalo last week for Lake movement was 84,700 tons, of which 34,300 went to Duluth and Superior.

No Life in Chicago Market

The coal market in Chicago and the Midwest continued to bump bottom last week with no sign of material change one way or the other. Domestic demand is flat except in the Northwest, where coal is sold all the time from Indiana, Illinois and western Kentucky mines. The steam trade eased along with what it could pick up on the open market at rock-bottom prices.

Smokeless coals in Chicago glutted the market for a few days and bumped the price, but are expected to regain their position as soon as a burst of comparatively heavy shipping is over. A small, steady trade in anthracite is going on all the time. But other domestic trade south of the Minnesota line is dead and almost everything else in the coal trade is in the same condition. Contract coal is about all that is moving. No real strengthening of the market is expected before July 1.

St. Louis Is Inactive Too

A slim domestic trade in storage coal does not satisfy the coal selling agencies of St. Louis.

The southern Illinois mines are stumbling along with one and one half and two days a week working time, while their tracks stand full of no-bills. Du Quoin and Jackson County mines are even worse, as might be expected. A little railroad coal is about all that moves. The Mt. Olive mines continue to approach a complete standstill. Standard district operators freely admit that if it were not for railroad storage business they would be shut down.

After getting about as low as it is possible to go with the present labor scale in western Kentucky, prices have taken a check, and a firmer market is reported. Prepared sizes are quite firm all through the list. Mine-run prices are a little low due to competition from some of the small mines and wagon mines.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

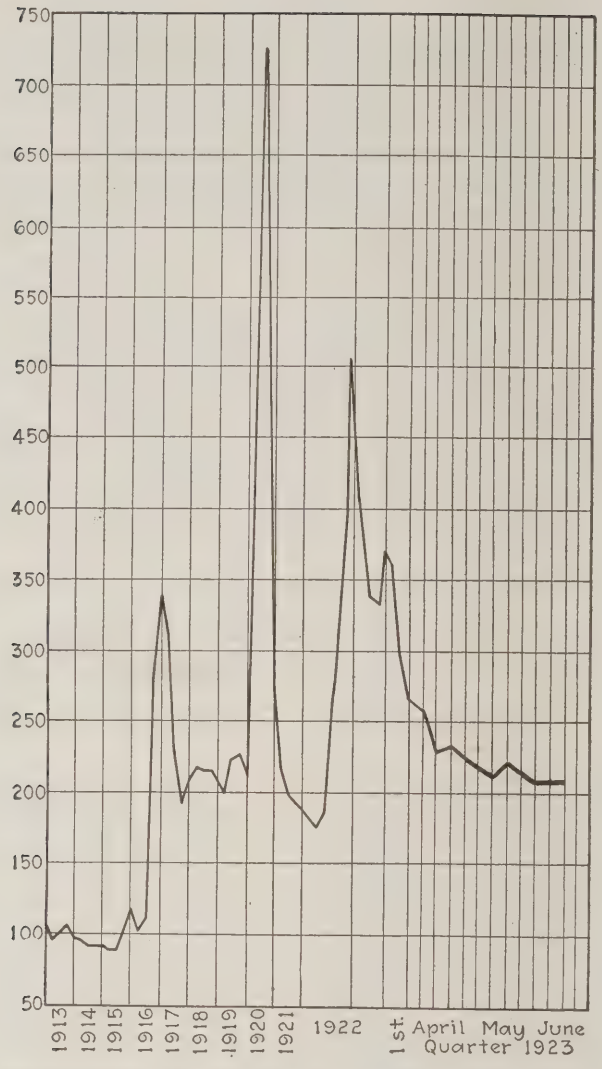
	Market Quoted	June 12 1922	May 28 1922	June 4 1923	June 11 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.75	$6.25	$6.25	$6.00@$6.50
Smokeless mine run	Columbus	3.50	4.15	4.25	4.00@ 4.50
Smokeless screenings	Columbus	3.20	3.60	3.60	**3.35@ 3.90**
Smokeless lump	Chicago	3.65	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	3.40	4.10	4.10	4.00@ 4.25
Smokeless lump	Cincinnati	3.65	6.25	6.25	6.00@ 6.50
Smokeless mine run	Cincinnati	3.40	4.25	4.10	4.00@ 4.25
Smokeless screenings	Cincinnati	3.00	4.25	4.00	4.00
*Smokeless mine run	Boston	6.65	6.35	6.35	*6.00@ 6.25*
Clearfield mine run	Boston	3.25	2.35	2.35	**2.25@ 3.00**
Cambria mine run	Boston	3.75	3.05	3.10	2.75@ 3.50
Somerset mine run	Boston	3.25	2.60	2.85	2.50@ 3.25
Pool 1 (Navy Standard)	New York	.....	3.75	3.75	3.50@ 4.00
Pool 1 (Navy Standard)	Philadelphia	.....	3.75	3.75	3.40@ 4.00
Pool 1 (Navy Standard)	Baltimore	.....	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	4.00	2.90	2.85	*2.60@ 3.00*
Pool 9 (Super. Low Vol.)	Philadelphia	4.05	2.85	2.85	*2.50@ 3.10*
Pool 9 (Super. Low Vol.)	Baltimore	4.25	2.55	2.55	**2.75@ 2.80**
Pool 10 (H.Gr.Low Vol.)	New York	4.00	2.45	2.35	**2.25@ 1.75**
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.75	2.35	2.30	*2.10@ 2.45*
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.75	2.15	2.15	**2.25**
Pool 11 (Low Vol.)	New York	4.00	2.05	2.00	1.75@ 2.25
Pool 11 (Low Vol.)	Philadelphia	3.50	2.00	1.95	*1.70@ 2.15*
Pool 11 (Low Vol.)	Baltimore	3.75	1.95	1.95	**2.00**
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	4.00	2.00	1.85	1.75@ 2.00
Pool 54-64 (Gas and St.)	Philadelphia	.....	2.05	2.05	**2.00@ 2.20**
Pool 54-64 (Gas and St.)	Baltimore	3.80	1.75	1.75	**1.90**
Pittsburgh sc'd gas	Pittsburgh	.....	2.85	2.85	2.75@ 3.00
Pittsburgh mine run (St.)	Pittsburgh	.....	2.25	2.20	2.15@ 2.25
Pittsburgh slack (Gas)	Pittsburgh	.....	1.65	1.55	*1.50@ 1.60*
Kanawha lump	Columbus	3.65	2.75	2.75	**2.50@ 3.10**
Kanawha mine run	Columbus	3.40	2.05	2.05	1.90@ 2.20
Kanawha screenings	Columbus	3.15	1.75	1.60	**1.50@ 1.80**
W. Va. lump	Cincinnati	3.50	4.00	3.10	**2.50@ 4.00**
W. Va. Gas mine run	Cincinnati	3.50	1.85	1.70	**1.60@ 2.00**
W. Va. Steam mine run	Cincinnati	3.25	1.85	1.70	**1.60@ 2.00**
W. Va. screenings	Cincinnati	3.15	1.50	1.40	*1.25@ 1.50*
Hocking lump	Columbus	3.65	2.55	2.60	2.35@ 2.90
Hocking mine run	Columbus	3.40	1.90	1.85	1.75@ 2.00
Hocking screenings	Columbus	3.15	1.35	1.35	1.25@ 1.50
Pitts. No. 8 lump	Cleveland	4.00	2.95	2.85	*2.35@ 3.25*
Pitts. No. 8 mine run	Cleveland	3.70	2.15	2.05	$2.00@$2.10
Pitts. No. 8 screenings	Cleveland	3.70	1.50	1.45	*1.35@ 1.45*
Midwest					
Franklin, Ill lump	Chicago	.....	3.80	4.05	3.75@ 4.35
Franklin, Ill. mine run	Chicago	.....	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	.....	1.80	1.80	*1.75@ 1.85*
Central, Ill. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.85	1.85	*1.50@ 1.75*
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.85	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	.....	1.85	1.80	1.75@ 1.85
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.55	1.55	1.50@ 1.65
Standard lump	St. Louis	.....	2.25	2.35	2.25@ 2.50
Standard mine run	St. Louis	.....	1.80	1.80	1.75@ 1.90
Standard screenings	St. Louis	.....	1.50	1.50	1.50
West Ky. lump	Louisville	3.75	2.30	2.30	2.25@ 2.35
West Ky. mine run	Louisville	3.75	1.80	1.80	*1.65@ 1.85*
West Ky. screenings	Louisville	3.75	1.35	1.35	1.25@ 1.50
West Ky. lump	Chicago	4.15	2.35	2.35	2.25@ 2.50
West Ky. mine run	Chicago	3.95	1.35	1.45	1.40@ 1.50
South and Southwest					
Big Seam lump	Birmingham	2.20	2.70	3.05	2.90@ 3.20
Big Seam mine run	Birmingham	1.85	2.05	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	3.75	3.75	3.25	3.00@ 3.50
S. E. Ky. mine run	Chicago	3.50	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Louisville	3.75	3.75	3.50	3.25@ 3.75
S. E. Ky. mine run	Louisville	3.50	2.25	2.25	2.00@ 2.50
S. E. Ky. screenings	Louisville	3.25	1.65	1.65	1.50@ 1.85
S. E. Ky. lump	Cincinnati	3.50	3.75	3.05	**2.50@ 3.75**
S. E. Ky. mine run	Cincinnati	3.40	1.80	1.60	**1.50@ 1.85**
S. E. Ky. screenings	Cincinnati	3.15	1.55	1.55	*1.25@ 1.75*
Kansas lump	Kansas City	5.00	3.85	3.85	**3.50@ 4.50**
Kansas mine run	Kansas City	4.25	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.85	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	June 4, 1923 Independent	June 4, 1923 Company	June 11, 1923† Independent	June 11, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@ $8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.00@ 8.10	.....	7.00@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.25	8.00@ 8.35	**$8.50@ $11.50**	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@ 9.50	8.10@ 8.35	**9.25@10.00**	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	8.50@11.50	8.00@ 8.50	8.50@11.50	8.00@ 8.50
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.25	8.00@ 8.35	**8.50@11.50**	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@ 9.50	8.15@ 8.35	**9.25@10.00**	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	8.50@11.50	8.00@ 8.50	8.50@11.50	8.00@ 8.50
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@ 9.50	8.15@ 8.35	**9.25@10.00**	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	8.50@11.50	8.00@ 8.50	8.50@11.50	8.00@ 8.50
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	6.30@ 7.50	6.00@ 6.30	**7.00@ 8.00**	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	6.00@ 6.50	7.00@ 8.00	6.00@ 6.50
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.50@ 3.25	3.50@ 4.15	**2.75@ 3.50**	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.00@ 1.50	1.50	**1.25@ 1.50**	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	1.50@ 1.60	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 215, Week of June 11, 1923. Average spot price for same period, $2.60. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

Car supply is good, especially on the Louisville & Nashville lines this month, while the Illinois Central is well up. Mines are reporting around a day and a half to two days a week.

Louisville Hears of Labor Troubles

According to reports of operators and jobbers shortage of cheap labor for unloading cars is resulting in retailers in Louisville and in many districts having shipments held up on orders and this is also having a tendency to check retail buying and industrial stocking. The talk of cutting miners' wages in non-union eastern Kentucky to reduce coal prices is worrying operators paying the union scale.

Movement of prepared coal is fairly good, considering the season. A fair movement to the Lakes is getting away from the Hazard field, and in the Harlan district bigger operators are getting into the Lake movement. Screenings are weakening as a result of increasing production of prepared sizes.

The coal market at Milwaukee is dull. Wholesale and retail movements are only fair for the season. While prices are seemingly maintained at the May schedule, jobbers of western coal assert that dock men are secretly cutting to the extent of 50c. to 75c. per ton on eastern soft coal in an endeavor to win back the trade lost during the recent fuel famine. They say this course is being pursued at the head of the Lakes, where coal is now $1 per ton cheaper than at Lake Michigan ports, and that a general campaign of price cutting may ensue at Milwaukee before long.

The recent 50-c. Kansas City advance in the price of Arkansas semi-anthracite, portending as it did, other advances to come, resulted in a few householders placing orders for their winter's supplies, but the increase was not sufficiently large to be reflected in the wholesale market. Industrial contracts are keeping the mines running one or two days a week, and there is a slight increase in the demand for threshing coal from the southern end of the wheat belt, but as a whole the market out here is as quiet as a midsummer Sunday afternoon.

Utah Market Improves Slightly

There is a slight improvement in the Utah coal market due to a cold snap. Production is about 35 per cent of capacity but is expected to increase at an early date when storage coal is bought. Up to date very few storage orders have been received. Prices remain firm. Labor conditions are satisfactory, except that 25 per cent, or thereabouts, of the men have drifted into the metal mines as a result of short time in the coal fields and labor may be scarce when the market improves.

Colorado operators have not made any statements regarding the recent drop in intrastate freight rates, other than that it would mean lower prices in the near future. The prices on all bituminous products have been increased 25c. per ton, effective June 1. A similar change has been made in the lignite fields. Trade is at a standstill.

Embargoes Steady Cincinnati Market

At Cincinnati the market has been held steady by embargoes placed against shipments to lake ports by the L. & N. Railway, which claims that 20,000 cars are between Cincinnati and Toledo and Sandusky. Spot market prices are indefinite but contract and quality coals continue to command good prices. Steam trade at Columbus was quiet. Buying was limited to current wants, with no apparent intention of increasing reserves although it was said some buyers are accumulating reserve stocks. Domestic trade was quiet although some consumers are laying in Pocahontas and other fancy grades believing that prices may go higher. Production in the eastern Ohio field was within 35,000 tons during the week ended June 2, which included a holiday, of the previous week's output. Demand for lake coal subsided somewhat because of accumulations at the lower lake ports. Demand for steam coal from industries was quiet.

Quotations for 2-in. West Virginia lump at Cincinnati range from $2.50@$3 and for Southeastern Kentucky 2-in. lump $2.50@$2.75, as compared with last week's quotations of $2.75@$3 for West Virginia 2-in. lump and $2.60@$3 for southeastern Kentucky 2-in. lump.

Requirements in the Pittsburgh district increased, due chiefly to the demands of the lake trade, which has been reflected in output. There was no change in the spot market. Demand at Buffalo is slow and the outlook poor. Consumers are buying only to meet current needs.

Production in the central Pennsylvania fields during the week ended June 3 was 15,700 cars, as compared with 17,588 cars the previous week. The output for May was 73,768 cars. Operators are receiving inquiries concerning contracts but are not eager to sign up at present prices. It is estimated there are 300 operations in the district where mining is suspended and that many others are working only part time.

New England Market Sluggish

In New England the current market is sluggish. Buying relaxed and none of the industries seems more than mildly interested in accumulating reserves. In spite of reasonably active buying a month ago there was no special advance in prices all-rail, and possible purchasers are inclined to wait now until well into the summer. While sales agents are still urging probable transportation troubles there is less reaction now to the argument than was the case early in May. Neither all-rail nor coastwise is there likely to be more than scattering business during June, and there are

those who expect the present dullness to continue through July.

The week measured a further decline in quotations at Hampton Roads. Reports show increased tonnages at the piers, and $6 per ton f.o.b. vessel is reported the latest selling price of No. 1 Pocahontas and New River. Dumpings coastwise are by no means heavy, however, and apparently there is little chance of firmer quotations for the present. Car movement would improve were coal orders forthcoming, but both west and east the agencies are hard put to it to move current output.

For distribution inland from points like Boston and Providence there is little change. Practically no coal is being forced on the market, and the factors who have facilities of their own are able to maintain prices about on the $8@$8.25 level previously reported. Certain of the quality grades from central Pennsylvania have been sold up for the next thirty days or so, and this condition makes it less necessary for rehandlers of smokeless coals to modify prices. Medium-grade Clearfields have not met with any strong demand in this territory, and quotations on coals of that character are still on a minimum basis.

Shippers of Pennsylvania coals who withdrew from the market a fortnight ago are now back soliciting business for the second half of June. This, of course, creates an unfavorable impression upon buyers, and it is no wonder there now is a pronounced feeling that quotations will recede in the near future.

Quiet at New York and Philadelphia

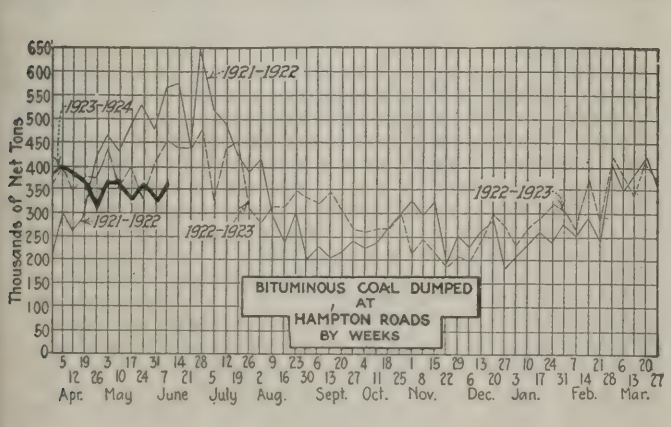
Demand in the New York market is quiet while inquiries are for the better grades. Receipts at the local docks are smaller, 1,731 cars being reported on June 8 with quotations for the better grades showing increases. The Philadelphia market shows no material change. Consumers are not expected into the market before July 1, when it is believed there will be a movement to stock more heavily around industrial plants.

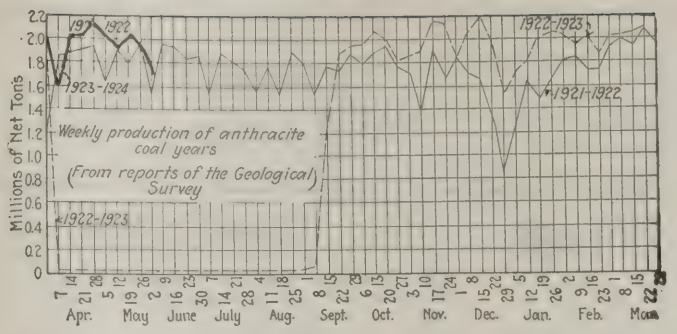
The market at Baltimore took an upward trend, due to the closing down of more mines supplying that market. There was a better demand for Pool 9 coals for export, whereas the overseas demand heretofore has been mostly for gas coals. Reports from West Virginia indicate that there is a strong demand for smokeless coals not only at tidewater but also from the west.

A dull and listless market was reported at Birmingham, Ala., with hardly any inquiry for spot steam coals and no disposition on the part of the railroads and contract interests to store fuel far in advance of current requirements. Production has decreased and the surplus coal is being gradually cleaned up.

Lake Shipments Disappoint

Lake shipments received at Duluth during May totaled 205,716 tons of anthracite and 1,636,628 tons of bituminous coal. Dock men are becoming nervous because of the small anthracite arrivals. Shipments from the docks at Duluth during May amounted to 7,964 cars, which was disappointing to shippers. During the week ended June 11 there was dumped at lake ports 1,072,416 net tons of cargo coal and 50,632 net tons of fuel coal, making the dumpings for the season 6,371,780 net tons of cargo coal and 288,098 net tons of fuel coal.





Domestic Anthracite Moves Rapidly

Domestic sizes of anthracite continue to move rapidly. There is a heavy demand in all sections as well as in Canada and most independent producers as well as the larger companies are well booked ahead. So far retail dealers have not been able to start stocking, and most dealers claim to have sufficient orders on their books to keep them busy for the balance of the summer. The steam sizes are easier, some companies storing considerable tonnage of these sizes while some independents were disposing part of their output in connection with the larger coals.

The Geological Survey report says: "Production of anthracite in the week ended June 2 decreased 25 per cent from the hitherto current rate of about 2,000,000 net tons a week. The principal carriers of anthracite reported loading 30,700 cars, from which it is estimated that the total output including mine fuel, local sales, and the product of dredges and washeries, was 1,606,000 net tons. No loadings were reported on Memorial Day and on the three following days of the week loadings averaged 10 per cent less than for the same days of the previous week.

"Preliminary reports on car loadings during the first three days of the week June 4-9 show increased rate of production, which if continued through the balance of the week will bring production up to about 1,950,000 net tons."

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to May 26, 1923 Inclusive	Week Ended May 26, 1923
U. S. Total	55.7	....	....	....
Somerset County	74.9	36.3	37.9	63.5
Panhandle, W. Va.	51.3	57.3	57.4	71.4
Westmoreland	58.8	65.8	58.1	70.9
Virginia	59.9	55.7	57.6	67.6
Harlan	54.8	22.1	21.5	31.2
Hazard	58.4	16.4	26.1	48.6
Pocahontas	60.0	36.6	39.7	54.8
Tug River	63.7	28.8	37.8	65.6
Logan	61.1	26.2	32.0	40.5
Cumberland-Piedmont	50.6	31.7	49.8	61.3
Winding Gulf	64.3	30.4	36.5	45.6
Kenova-Thacker	54.3	42.4	37.8	47.5
N. E. Kentucky	47.7	28.4	30.1	35.1
New River	37.9	31.6	37.8	46.6
Oklahoma	59.6	59.1	44.1	25.3
Iowa	78.4	75.9	70.9	56.1
Ohio, Eastern	46.6	40.8	39.2	64.2
Missouri	66.8	76.3	69.7	61.9
Illinois	54.5	49.9	43.0	32.6
Kansas	54.9	55.9	46.5	61.8
Indiana	53.8	37.7	46.9	35.0
Pittsburgh†	39.8	41.2	40.4	70.0
Central Pennsylvania	50.2	53.4	50.1	57.4
Fairmont	44.0	35.5	42.7	51.6
Western Kentucky	37.7	32.4	32.0	33.0
Pittsburgh*	31.9	56.1	64.3	87.2
Kanawha	13.0	15.6	23.5	27.3
Ohio, Southern	24.3	38.1	30.6	31.5

* Rail and river mines combined.
† Rail mines.

Car Loadings, Surplusages and Shortages

	Cars All Cars	Loaded Coal Cars
Week ended May 26, 1923	1,014,029	192,092
Previous week	991,797	181,599
Same week in 1922	806,877	90,730

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
May 31, 1923	32,443	3,953	16,277	11,392
Same date in 1922	305,198	195,439	....	....
May 22, 1923	22,700	2,776	20,585	14,620

Foreign Market And Export News

Holidays Reduce Great Britain's Coal Output; Export Demand Strong

Two holidays, Whit Monday and Queen Victoria's birthday, tended to reduce Great Britain's coal output for the week ended May 26 to 3,737,000 tons, says a cable to *Coal Age*. Production for the previous week was 5,797,000 tons.

Demand for early shipment from South Wales is easier but there was good inquiry for deliveries during the last six months of the year, particularly from France, Italy, Egypt and South America.

Trade Commissioner Alexander V. Dye, at London, informed the Department of Commerce at Washington, that during the first three months of 1923 bunker coal furnished in the ports of the United Kingdom was 4,568,320 tons, as compared with 4,403,262 tons for the corresponding period of 1922, the slight increase being in marked contrast to the large increase in the coal exports from Great Britain during the same period.

The principal reasons attributed by Commissioner Dye for the failure to increase the amount of bunker coal furnished at United Kingdom ports were the increasing use of oil as fuel, congestion at the docks, resulting in a long delay in loading, and the rise in prices of British coal.

Hampton Roads Situation Dull

Business at Hampton Roads was dull last week, with the market weakening and inquiries falling off. Shippers looked forward to little increase in activity before July, or, perhaps, August.

Coastwise movement was desultory, while bunkers held fairly strong, with export business holding its own. No new contracts were being made. Shipments were largely on orders placed a month or two months ago.

Domestic dealers showed a reluctance to make contracts, preferring to take their chances on what appears to be a steadily declining market. A campaign to encourage domestic consumers to lay in their supplies of coal for next winter is being made, and is stimulating business, to some extent.

French Coal April Imports and Exports

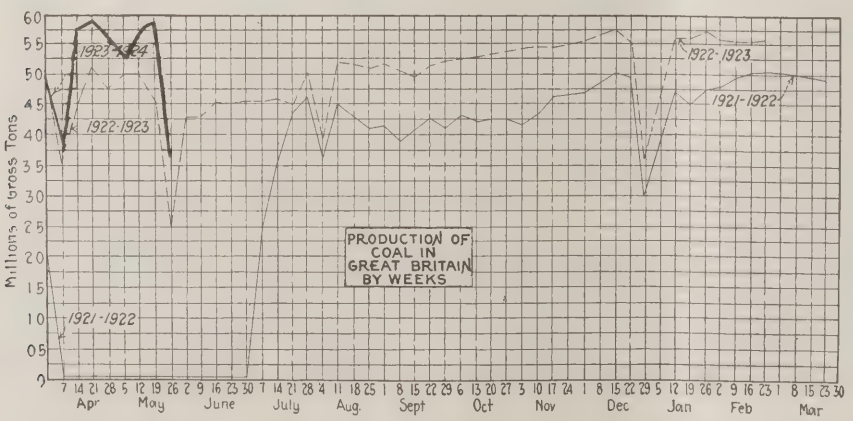
French coal imports and exports during April, according to French Customs returns, follow, in metric tons:

IMPORTS

Coal:	
Saar	877
Great Britain	1,526,742
Belgium	238,856
United States	18,780
Germany	63,307
Spain	2,500
Netherlands	72,377
Czecho-Slovakia	2,963
Various Countries	161
Total	1,926,563
Coke:	
Great Britain	65,499
Belgium	40,090
Germany	85,868
Netherlands	33,896
Czecho-Slovakia	2,402
Saar	5,204
United States	11,030
Total	243,989
Patent fuel:	
Great Britain	9,715
Belgium	27,377
Germany	4,731
Netherlands	2,736
Various countries	89
Total	44,648

EXPORTS

Coal:	
Belgium and Luxemburg	10,078
Switzerland	25,064
Spain	88
Italy	2,144
Germany	301
Saar	45,091
Bunkers { French steamers	9,570
Bunkers { Foreign steamers	3,658
Total	95,994
Coke:	
Switzerland	7,097
Belgium and Luxemburg	411
Spain	190
Italy	10,123
Various countries	3,477
Total	21,293
Patent fuel:	
Switzerland	19,614
Belgium	586
Algeria	3,932
Bunkers { French steamers	477
Bunkers { Foreign steamers	126
Various countries	2,677
Total	27,412



Swiss Coal Imports

Imports of bituminous coal by Switzerland during April last was 160,000 tons as compared with 137,000 tons during the previous month. There was also imported 32,000 tons of coke and 60,000 tons of briquets, as compared with 29,000 tons and 46,000 tons, respectively, during March. Of the coal imported England supplied 47,000 tons, Holland 35,000 tons, France 27,000 tons and Belgium, 24,000 tons.

Export Clearances, Week Ended June 9, 1923

FROM BALTIMORE

	Net Tons
For Algeria:	
Br. SS. St. Dunstan, for Algeria	7,594
For Argentine:	
Nor. SS. Landaas, for Argentine	6,399
For France:	
Br. SS. Pathan, for France	7,123
For Germany:	
Ger. SS. Eisenach, for Germany	3,809
Br. SS. Suveric, for Germany	10,789
For Italy:	
Nor. SS. Hallgrim, for Italy	10,307

FROM HAMPTON ROADS

For Algeria:	
Du. SS. Ary, for Algiers	6,609
Jugo Slav SS. Izvor, for Algiers	5,821
For Brazil:	
Br. SS. Hesione, for Rio de Janeiro	5,524
Br. SS. Pentwyn, for Pernambuco	5,594
For Canada:	
Dan. SS. Wien, for Gaspe	2,655
Nor. SS. Christian Krogh, for Gaspe	2,636
For Cuba:	
Nor. SS. Munorway, for Havana	3,518
For England:	
Swed. SS. Lygnern, for Land's End	7,448
For France:	
Du. SS. Parkhaven, for Bordeaux	6,842
Br. SS. Mongolian Price, for Marseilles	8,359
For West Indies:	
Nor. SS. Bur, for Fort de France	6,372
Nor. SS. Hundvaago, for Curacao	5,679

FROM PHILADELPHIA

For Cude:	
Nor. SS. Navarra, for Havana	
For Italy:	
Ital. SS. Piave, for West Coast Italy	

Hampton Roads Pier Situation

	May 31	June 7
N. & W. piers, Lamberts Pt.:		
Cars on hand	1,218	980
Tons on hand	74,173	59,228
Tons dumped for week	103,538	111,884
Tonnage waiting	13,875	10,400
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	974	1,578
Tons on hand	111,980	92,080
Tons dumped for week	111,375	134,235
Tonnage waiting	10,073	20,221
C. & O. piers, Newport News:		
Cars on hand	975	1,034
Tons on hand	55,235	57,920
Tons dumped for week	81,270	72,050
Tonnage waiting	23,110	2,550

Pier and Bunker Prices, Gross Tons

PIERS

	June 2	June 9†
Pool 9, New York	$5.25@$5.75	**$5.65@$6.00**
Pool 10, New York	4.50@ 5.25	**4.95@ 5.50**
Pool 11, New York	3.75@ 4.50	**4.00@ 4.75**
Pool 9, Philadelphia	5.80@ 6.15	*5.50@ 5.90*
Pool 10, Philadelphia	4.90@ 5.45	*4.60@ 5.30*
Pool 11, Philadelphia	3.90@ 4.50	*3.80@ 4.45*
Pool 1, Hamp. Roads	6.50@ 6.75	*6.35@ 6.50*
Pools 5-6-7, Hamp. Rds.	4.85@ 5.00	*4.85*
Pool 2, Hamp. Roads	6.25@ 6.40	*6.10*

BUNKERS

Pool 9, New York	5.55@ 6.05	**5.95@ 6.30**
Pool 10, New York	4.80@ 5.55	**5.25@ 5.80**
Pool 11, New York	4.05@ 4.80	**4.30@ 5.05**
Pool 9, Philadelphia	6.05@ 6.25	*5.90@ 6.10*
Pool 10, Philadelphia	5.05@ 5.80	*4.90@ 5.60*
Pool 11, Philadelphia	4.20@ 4.90	*4.05@ 4.75*
Pool 1, Hamp. Roads	6.50@ 6.75	*6.35@ 6.50*
Pool 2, Hamp. Roads	6.25@ 6.40	*6.10*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	June 2	June 9†
Admiralty, large	42s.6d.	*40s.@41s.6d.*
Steam smalls	32s.6d.	*31s.6d.*
Newcastle:		
Best steams	30s.@32s.	*27s.6d.@28s.6d*
Best gas	32s.@34s.	*32s.6d.*
Best bunkers	29s.@32s.	**30s.@32s.**

† Advances over previous week shown in **heazy type**, declines in *italics*.

News Items From Field and Trade

ALABAMA

Charges made in a recent complaint to the U. S. Coal Commission by J. R. Kennamer, president of District No. 20 of the United Mine Workers, that "gunmen" employed during a recent strike at Marvel, by the Roden Coal Co. had put oil in springs where miners and their families got water are denied in a letter made public June 8 by the Bituminous Operators' Special Committee. The letter, written by B. F. Roden, president of the coal company, states that "there are no springs at Marvel except small wet-weather springs of stagnant water, which are oiled to prevent malaria and contamination." His employees, Mr. Roden declares, are furnished free water. The company continued to furnish free water to strikers for three months, he added, but when the strikers refused to vacate the company houses so that other men could be put to work, it was no longer considered necessary to pump about 60,000 gallons of water daily to strikers whose avowed purpose was "to break the company."

ARKANSAS

The Southwestern Coal Commission was recently organized at Fort Smith, in compliance with the terms of a contract previously signed in Kansas City covering operation of coal mines in the Southwestern territory. The commission was organized at a joint meeting of coal operators and miners from District 21, United Mine Workers. John L. Britton, of McAlester, Okla., president of the district, was elected chairman of the commission. Other members are: Representing the miners, Dave F. Frampton, Moberly, Mo., organizer, and W. C. Dockerman, Huntington, Ark. For the operators, J. C. Reid, general manager Cameron Coal Co., Williams, Okla.; Robert Boyd, Central Coal & Coke Co., Hartford, Ark., and P. R. Stewart, Fort Smith, Ark., commissioner for the Coal Operators' Association.

CALIFORNIA

Los Angeles harbor is to have a new 30,000-ton daily capacity coal-bunkering wharf to be second to none on the Pacific Coast. Announcement of this, which will increase the number of ships entering the Los Angeles harbor at least 25 per cent and will mean the expenditure of millions of dollars, was made by Edgar H. McKee, president of the harbor commissioners. It will cost approximately $2,000,000.

COLORADO

McNally & Thompson have opened a new mine, the Sunshine, at Maitland, Huerfano County, with Denver & Rio Grande R.R. connections. This company also operates the Maitland mine at the same location.

ILLINOIS

Stout opposition is still raised by the City of Cairo and other southern Illinois communities to the building of the Illinois Central's proposed 172-mile cut-off from Edgwood to Fulton, Ky., shortening the main line 21 miles and eliminating many heavy grades. The railroad now pays the state a freight tonnage tax under a franchise granted in the early days. It is argued that the state will lose much revenue if the new cut-off is built because the traffic over that line will not be subject to the old franchise terms. The appeal of the towns on the present line is now before the I.C.C. at Washington.

Scranton mine, located five miles northeast of Marion, **broke its own record twice within one week.** On one day 1,028 dumps, or 2,609 tons of coal, were brought to the surface. In one single hour 180 dumps were hoisted. In eight hours fifty-nine railroad cars were loaded. The mine employs 250 loaders and 118 shift men. The company recently installed new locomotives whose service made this tonnage possible.

Breaking all Central Illinois Records, Peabody No. 6 mine near Springfield hoisted 3,255 tons of coal or more than 6.78 tons a minute one day early in June. This surpasses by 133 tons the record established at this mine May 4. The superintendent of the mine is T. W. MacMurdo. Oney Melkush is mine manager and the work was performed by 435 men actually at work in the mine for the day.

INDIANA

Organizers of the United Mine Workers probably will be sent to Boonville in **an effort to unionize all mines in that section,** according to announcement there. A bulletin received there asserted there are 14 non-union mines, employing about 235 miners, with a production of 1,000 tons per day in the territory. It asserted that the wages paid are 20 per cent less than the union scale.

Damage estimated at $25 000 to $30,000 resulted from a fire at the Riley Coal Co. mine, eight miles from Terre Haute recently. The entire plant above ground, consisting of the tipple, engine room, blacksmith shop and wash house, was burned. The fire had gained good headway when discovered and the lack of means of fighting the flames rendered it impossible to save the property. The origin of the fire is not known. Charles J. Kintz is president of the company owning the mine.

Three miners entombed by a cave-in of The New Coal Co.' shaft near Bicknell June 2, were rescued at 10:30 o'clock June 5, after having been imprisoned for more than 79 hours. The men, beyond showing marks of the terrific strain under which they had been laboring while awaiting the outcome of efforts of the mine rescue team to reach them, were little the worse physically for their experience. Fresh air had been forced into the shaft and food lowered to them through a 2-in. casing which had been bored to the bottom of the pit shortly after the cave-in. The mine-rescue squad's work was slowed up considerably when earth in the new shaft they were digging gave way. In addition they were menaced constantly by the possibility of the hastily made shaft caving in. As the rescuers neared the roof of the mine it was necessary for them to work while suspended from the top of the shaft by ropes.

IOWA

The Red Rock Coal Co., of Des Moines, has taken over the four Lucas County properties of the Central Iowa Fuel Co. and will operate them from the headquarters at Red Rock.

KENTUCKY

The Southern Coal Co., Louisville, on June 1 received a contract to supply 75 cars of western Kentucky nut and slack at $1.80 a ton to the Eddyville penitentiary.

Amended articles have been filed by the **Cassidy Coal Co.**, of Lexington, **increasing the capital stock** from $25,000 to $50,000.

Attacks upon the management of the Lynch mines of the United States Steel Corporation are featuring the **campaign of Judge A. W. Barkley for the nomination for governor.** He is charging that the company maintains the community of Lynch in a condition bordering upon slavery and that the votes of the community are controlled by the company and cast at the company's direction. He would levy a heavy tax upon "foreign" owned coal properties but declares his tax campaign is not aimed at the majority of Kentucky coal owners.

The United Mine Workers' organization for District 19, comprising eastern Kentucky and eastern Tennessee, at a recent convention in Middlesboro **charged the operators of the Harlan and Hazard fields with employing deputy sheriffs** to circulate among the miners and **hunt out union men that they might be discharged.** The convention sent a resolution of International headquarters of the union urging that a strike be ordered in all the non-union mines in District 19 in order to bring the operators to their senses.

MINNESOTA

Receipts of coal at Duluth and Superior docks from the opening of navigation on May 5 to June 1 as compiled by K. A. Scott & Co., Duluth vessel agents were:

Dock	Anthracite	Bituminous
Northwestern	55,200	174,700
Berwind		30,500
Pittsburgh	34,500	240,000
Carnegie	26,600	138,400
Hanna	9,500	81,700
Boston		57,400
Inland		195,700
Clarkson		105,500
Northern	15,600	74,100
Zenith Furnace		93,800
Phila. & Reading		8,300
U. S. Corporation		261,200
Reiss	23,000	100,400
Pursglove		8,600
Lehigh	42,400	
Great Lakes		61,100
Total to June 1	207,600	1,631,400

Bituminous receipts in excess of last year, 1,501,200 tons.

Anthracite receipts in excess of last year, 202,600 tons.

MISSOURI

Governor Arthur B. Hyde has vetoed **the "Mine wash house bill."** The Governor declared that the present wash house law is better than the proposed one. The bill would have required owners and operators of mines where 50 or more miners are employed to construct a suitable wash house, large enough to accommodate all of the men employed. The wash house would have individual lockers for employees, would be lighted and equipped with steam driers, and with at least one shower bath for each 10 miners. Plumbing for hot and cold water under pressure would have to be provided, with a separate room and bath for negroes.

NEW YORK

The contract for furnishing **300 cars of slack coal to the city water works** of Buffalo, 100 cars during this and the two following months, **was awarded to the Queen City Coal Co.**, of Buffalo, on its bid of $1.45 per net ton, on a $2.24 freight rate.

The Bituminous Coal Association of Buffalo has elected J. Q. Clarke and H. B. Alderman trustees, with J. T. Roberts (retiring president), C. F. Westfall and E. T. Bline holding over. From this number, according to rule, Mr. Westfall is elected president, Mr. Bline, vice president and Mr. Alderman, secretary and treasurer.

Dividends declared and awaiting payment, as reported currently in the *Annalist*, include the following coal companies:

Company	Rate	Per.	Pay.	B. Close
Glen Alden Coal				
L. V. Coal Sales.	$2	Q.	July 2	June 14
N. E. Coal & Coke	5%	—	May 31	May 29
Penn. Coal & Coke	$1	Q.	May 10	May 29
Co.	$2	—	June 20	June 1
Acme Coal Mining Co.	20c.	—	June 5	May 26
Cen. Coal & Coke	1½%	Q.	July 15	June 30
Cen. Coal & Coke pf.	1¾%	Q.	July 15	June 30
Texas & P. Coal & Oil	25c.	Q.	June 30	June 6
T. & P. Coal & Oil	25c.	Q.	June 30	June 6

OHIO

The damage suit brought by the Rice-Hocking Coal Co. against the Carbondale Coal Co. for $303,000, claimed on the grounds that coal lands of the plaintiff had been damaged, **has been settled for $56,000.**

The Dana Coal Co. has been incorporated with a capital of $10,000 to deal in coal and other commodities. Incorporators are Edward Meyer, Charles E. Chamblin, G. Jolly, W. W. Helmholz and J. A. Culbertson.

The Wester Coal & Supply Co. has been chartered with a capital of $50,000 to deal in coal among other things. Incorporators are Hulda Wester, Anna Wester, J. Walter Wester, Ernest W. Wester and George Wester.

OKLAHOMA

Andy McGarry, of Tahona, **has been elected president of District 21,** United

Mine Workers, according to announcement made by the executive board of the district. The election was held some time ago, but election returns have just recently been canvassed. The election resulted on the first ballot, and it is declared to be the first time in a number of years that a president has been chosen on the first ballot. The district comprises the States of Oklahoma, Arkansas and Texas.

The O. & O. Fuel Co. has been incorporated in Ada, with a capital stock of $750,000, by Orel Busby and Lowrey H. Harrell, both of Ada, and Fred W. Whitney of Middletown, Ohio.

PENNSYLVANIA

Governor Pinchot on May 31 approved the Bidelspacher bill providing for the appointment of a board of examiners to examine applicants for certificates of qualification as mine foremen, assistant mine foremen and fire bosses in bituminous-coal mines. The new law provides that upon petition of the mine inspector of any district the court of common pleas in any county in the district shall appoint an examining board of three persons, consisting of a mine inspector, a miner and an operator or superintendent, all of whom shall be citizens of the state. The miner must have had at least ten years' experience in the bituminous mines of the state and be in actual practice as a miner. Applicants for certificates of qualification as mine foremen and assistant mine foremen shall be citizens of the United States, at least twenty-three years of age and shall have had at least five years' experience as miners or mining engineers or men of general work inside the mines. Applicants for fire bosses' certificates must have had five years' experience also as miners or men of general work in bituminous mines that generate explosive gas. A fee of $2 is to be paid by all applicants and each successful applicant must pay an additional fee of $3 before receiving a certificate.

J. Hayden Oliver, of counsel for the Glen Alden Coal Co., Scranton, said that "passage of mine-cave bills now before the state Legislature will mean that the Glen Alden Coal Co. will no longer repair properties damaged by the company's mining operations. It is a good bill for the Glen Alden Coal Co.," Mr. Oliver continued, "but a poor one for the people. While it will save the coal company thousands of dollars now being spent in mine-cave damage repairs, it will not give the people of Scranton relief equivalent to that now being furnished by the Glen Alden."

Official notice of tri-district convention of the United Mine Workers to be held in Scranton on June 26 says the **purpose of the convention will be to consider and take appropriate action concerning conditions of employment** to become effective after Aug. 31; also to consider basis of representation for future tri-district conventions and such other matters as may properly be brought before the convention. Representatives to this convention will be elected directly by the local unions they represent and shall have one vote for 100 members or less and one additional vote for each 100 members or majority fraction thereof. No delegate will be allowed more than five votes. It is recommended that no local send no more than five delegates.

Governor Pinchot has signed the Williams bill, providing for a survey of the water and fuel resources of the state. The new law creates a power survey board, consisting of the Governor, the Attorney General, the Commissioner of Forestry, the secretary of the Water Supply Commission, the chairman of the Public Service Commission, the Secretary of Agriculture, the Commissioner of Labor and Industry, the State Geologist and a Deputy Attorney General, which is to undertake an outline survey of the water and fuel resources available for Pennsylvania and of the most practicable means for their full utilization for power development. The board also is empowered to recommend in outline a policy which will best secure for the industries, railroads, farms and homes of the commonwealth an abundant and cheap supply of electric current for industrial, transportation, agricultural and domestic use. The Governor is empowered to employ an engineer for the board and fix his salary, but the members of the board will serve without compensation. An appropriation of $35,000 is made, and the board is to report to the 1925 Legislature.

Fire, following an explosion in which six men were burned and overcome by gas, threatened serious damage to a section of the Dorranceton mine of the Lehigh Valley Coal Co. on May 25. At one time it was thought it might be necessary to flood that section of the mine in order to extinguish the flames.

Mrs. Fannie Sellins, organizer for the United Mine Workers, was leading a charging mob of men and women armed with clubs and bricks when she was killed by a volley of shots fired by guards at the plant of the Allegheny Steel Co., according to witnesses for the defense June 7 at the trial of Edward Mannison and D. J. Riley, deputy sheriffs, charged with the murder of the woman union leader. State witnesses had previously testified that there was no disorder at the mine until after the deputies fired into the crowd. R. J. Schrandt, one of the deputies on duty at the time, testified that after a small group of men had been driven back, Mrs. Sellins organized a mob of men and women and led the charge against the line of deputies.

At a meeting of the boards of the Central Pennsylvania Coal Producers' Association and the Association of Bituminous Coal Operators, held in Altoona on June 1, **W. Clark Miller, a prominent Clearfield County lawyer, was chosen permanent umpire to adjust differences** between the operators and the United Mine Workers in the district **arising from the scale agreement.** Mr. Miller succeeds the late Ex-Judge Allison O. Smith. Mr. Miller is not identified with the coal industry.

The Suffolk Anthracite Collieries has issued $1,000,000 first (closed) mortgage 7 per cent sinking fund gold bonds, due in 1938. The Suffolk Anthracite Collieries are being organized to take over the property and assets of the Suffolk Coal Co., including 525 acres of anthracite lands held partly in fee and partly under lease, the property being near Scranton. The mortgage will provide a sinking fund of 30c. per ton on all coal mined and shipped with minimum payments of $67,000 annually to be used to retire bonds quarterly at not above 107½, these minimum payments being sufficient to retire the entire issue at or before maturity.

The American Civil Liberties Union and various affiliated labor organizations are carrying on a determined movement in nearly every state of the country against so-called criminal syndicalism laws, Harry Ward, of New York, president of the union, declared in a "free speech" and "right of public assembly" meeting at Pittsburgh June 3. Many of those who attended the meeting were delegates to the Progressive Miners international committee, which had just ended a two days' conference. **The miners' international formally launched its campaign to force nationalism of the coal industry** and to gain control of the United Mine Workers' organization. The movement, it was said, will be financed by voluntary subscription and a publication will be established, to be known as the *Progressive Miner*, and printed in five languages, to spread the doctrine of mine nationalization and its kindred objectives.

Joseph Williams, of Altoona, inspector of the tenth bituminous inspection district, announced the results of a series of examinations held recently for the positions of mine foremen, first and second grades, assistant mine foremen and firebosses. Twenty-five passed the test for foremen of the first grade, thirty-three for the second grade, twenty-seven for assistant foremen and thirty-seven for firebosses.

A bill which would compel all municipal bodies, councils, school boards and poor boards et al., to file with the clerk of the courts plans and specifications for all proposed public improvements passed the House at Harrisburg and advanced to third reading in the Senate, where it was sent back to Senator Joyce's committee.

Lightning struck the coal tipple at the workings of the Altoona Coal & Coke Co.'s mines at Delaney, Cambria County, six miles west of Cresson on June 2. The tipple was totally destroyed by the fire that resulted, entailing a loss of $11,000. **The tipple will be rebuilt at once.**

The Davis-Fowler mine-cave bills providing for a return of 12½ per cent of the anthracite coal tax to the counties in which it originated and the distribution of this money by two commissions for mine-cave relief and public improvement, were placed on the House calendar June 5. The bills had been held in the Committee on Mines and Mining and Representative David Fowler, Lackawanna, joint sponsor with Senator Davis, of the measures, made the motion that the committee be discharged from further consideration of the bills. **The bills were passed on first reading June 6.**

The Jeddo-Highland Coal Co. is erecting a first-aid hospital at Jeddo for the use of anthracite miners hurt at the operations of the company. It will be equipped with all the requirements for first-aid treatment.

Anthracite companies will be exempt from the provisions of the Armstrong net profits tax bill under amendments adopted by the Senate Finance Committee at Harrisburg June 7. Representatives of the anthracite industry contended that it was unfair to include them in the bill because of the fact that they now pay a capital stock tax and a fifteen mill tax on the market value of coal produced.

A decision handed down by Dr. Charles P. Neill, umpire for the Anthracite Conciliation Board, in the case of a grievance of the locomotive and hoisting engineers of No. 5 colliery of the Susquehanna collieries, near Nanticoke, holds that **all employees who signed the 1916 agreement and are still in the employ of the company must abide by their agreement.** The decision, however, was in favor of a majority of the employees. The contract was signed May 5, 1916, when positions held by some of the complainants should have been considered as nine-hour positions, the occupants of which were working one hour overtime. The positions came under the first section of the 1916 agreement and the new rates should have applied, Dr. Neill holds. It has been established, however, that holders of the positions entered into an agreement with the colliery superintendent that all slope and locomotive engineers and brakemen working on a ten-hour basis prior to April 1, 1916, should be changed from ten hours to nine hours per day, and should be paid for a nine-hour day at the rate established under the agreement of May 20, 1912, for a ten-hour day, subject to an increase of 3 per cent. It was later discovered that this arrangement would not give the men as much as they would receive had they elected to work the nine-hour day under the terms of the 1916 agreement.

TEXAS

V. H. Williams, of San Antonio, and associates have **purchased a bed of lignite** in McCullon County, and will construct an electric power plant there, using the lignite for fuel.

VIRGINIA

The transfer of the offices of the Consolidated Coal Co. from Roanoke to Norfolk is practically completed.

WEST VIRGINIA

The Fairmont-Chicago Coal Co. is about to spend $100,000 more in making improvements to properties recently acquired. Several months ago this company purchased the Chesapeake mine of the Chesapeake Coal Co. as well as about 2,200 acres of Sewickley coal land in Marion County, which will be developed on a large scale. After making the purchase the company expended about $200,000 in erecting additional dwellings for miners and a storehouse, in buying locomotives, installing mining machine and other equipment and in making many other improvements all with the object of insuring a daily output of about 2,500 tons. The latest plans call for the construction of a steel tipple at the Chesapeake mine, near Barrackville, a contract for the construction of the tipple having been awarded to the Pittsburgh Coal Washer company of Pittsburgh. This tipple will be equipped with shaker screens, loading booms, etc., and additional sidings will be constructed to permit the additional loading of prepared coal without delay.

The Reese Creek Coal Co. which was only recently incorporated, has begun the production of coal in the vicinity of Barboursville, on the edge of the Logan field. This concern has a capital stock of $50,000. Approximately 300 acres of coal are under lease and the company also has obtained an option on about 500 acres additional in the same district. Newly elected officers of the company are: F. W. Cline, of Milton, president; Homer Heck, Milton, vice president; Robert J. Lockey, general manager. Directors of the concern are J. W. Cline, Virgil L. Hall, Clyde Harshbarger, James Jackson and Robert J. Lockey.

Operators of the Greenbrier County coal field have joined in defraying the cost of construction of a $60,000 modern school house for children of employees of the various companies in the field. The Greenbrier

field is one of the newer smokeless coal fields of West Virginia.

The Morris-Enochs Coal Co. has just been launched by Charleston people, having a capital stock of $25,000 and with offices at Charleston. Chiefly interested in the new enterprise are S. V. Morris, F. L. Morris, I. F. Sommerville, and L. W. Bowers, of Charleston, and W. S. Enochs, of Ranger.

The Echo Smokeless Coal Co. has been organized by Charleston capitalists, having a capital stock of $50,000. Headquarters of the new concern will be at Charleston. Among those interested in this company are W. D. Guyer, G. O. Stacy, A. S. Guthrie, R. R. Perry and C. A. Brockman.

WASHINGTON, D. C.

Strikes were rife in the northern part of the state for a time after the beginning of the new contract year all without the sanction of district or sub-district officials. It is understood that those who participated in these walkouts were fined as provided in the contract. That has appeared to have had a tonic effect on miners inclined to strike on the slightest pretext, for **there have not been many illegal strikes in recent weeks** in the northern part of the state.

Encouragement of the plan to buy and store coal during the summer months in anticipation of fall and winter needs, not only to overcome the seasonal demand for coal but in order to avoid railroad congestion, is contained in an **appeal made by W. J. Harahan, president of the Chesapeake & Ohio Ry.** Mr. Harahan asks that coal shipments to the Great Lakes be made early in the season.

Fire on June 5 destroyed the tipple and slack bin of the West Virginia Coal & Coke Co. at Junior, in Barbour County, entailing a loss of about $25,000. It is not intended to rebuild at present, owing to general market conditions, but later on a newer and more modern tipple will replace the one destroyed, which had been in commission for the eighteen years. The first may have been of incendiary origin, as some of the mines at Junior are operated open shop, others closed shop. The Junior plant is in the former category but had not been in operation since June 1.

The American Fund for Public Service, known unofficially as the Garland Fund, has **voted $2,000 to the members of District** 17, United Mine Workers, in response to appeals from miners' representatives, who informed the committee that the strikers had been out for fourteen months in Boone and Kanawha counties. In a statement Norman M. Thomas, chairman, and Roger N. Baldwin, secretary of the fund, said that "ordinarily the American Fund does not give strike relief because we regard that as a union function exclusively and because the amounts required are beyond our means. There are, however, exceptional situations when even a little money will help at a critical juncture and when moral as well as financial support means something to men struggling for their rights."

An offering of $1,200,000 Richland Coal Co. first mortgage 6½ per cent serial gold bonds maturing $60,000 on June 1 of each year from 1924 to 1943 inclusive, at prices to yield from 6½ to 7 per cent according to maturity is being made. The proceeds of the issue are to reimburse the company for capital expenditures and to provide additional working capital. The property of the company is located in West Virginia and consists of 7,951 acres of unmined coal lands. Net earnings of the company available for depreciation, depletion, interest and federal taxes for the five years ended Dec. 31, 1922, have averaged $406,298, or five times the maximum interest charges on the new issue of bonds.

The Norfolk Southern Ry. has bought 150,000 tons of coal from three dealers, but the prices paid cannot be made public at this time, according to L. M. Jones, purchasing agent, because other contracts are now pending. The Cabin Creek Consolidated Coal Co. and the Leckie Coal Co. each got 30,000 tons of this order, while the Dixie Splint Coal Co. got 90,000 tons.

Some interesting addresses were delivered at the annual banquet of **the mining extension schools of the Fairmont District held** in Clarksburg during the latter part of May, including those of R. M. Lambie, chief of the West Virginia Department of Mines; Prof. A. C. Callen, of the mining engineering department of West Virginia University; Dean C. R. Jones of the college of engineering; Harold C. Schwarm, president of the Fairmont class; C. K. Brown, of Morgantown, assistant director of the mining extension department; Walter Miller, of Mount Clare; Harold Mason, Carolina; Andrew Henry Shinnston, and state mining inspectors A. L. Lafferty, of Wheeling; C. W. Stuart and Thomas Jarrett, of Weston, and Evan L. Griffiths, of Clarksburg. There were fully two hundred present at the banquet, over which E. W. Laubenstein, of Clarksburg, presided.

UTAH

The Department of the Interior announces that leases of two tracts of coal lands in Utah will be offered at auction at a date to be fixed by the Salt Lake Land Office. The land in question comprises two tracts involving 840 acres and located 40 miles northeast of Richfield.

WASHINGTON

The coal miners in the employ of the Pacific Coal Co., and a number of smaller companies, operating in the Carbonado and Wilkeson coal fields, Pierce County, Washington, **have decided to call off the strike and accept the operators' terms.** The strike which affected some 2,000 men, was called on March 31, 1921, so **it has been in progress for more than two years.** There appears to be some doubt as to whether the operators will take the men back on the terms offered two years ago.

WISCONSIN

John Sweeney, Vice President of the Valiel Coal Co., Milwaukee, **was married** in Chicago on Memorial Day to Miss Grace Fleming. Mr. Sweeney is a nephew of Baron Thomas Shaughnessy, of Canada.

Hereafter the city Milwaukee will purchase its annual coal supply on a basis of estimated heat value. The contracts for the yearly supply will be let about July 15, instead of June 1, as in past years. Contracts will include oxygen content requirements, and contracting dealers must agree to keep on hand at all times a sufficient quantity of coal to supply the needs of the city institution for 30 days.

CANADA

T. M. Grindley Co. is the new name of the organization handling the sale in the Province of British Columbia of the products of the Conveyors Corporation of America, Chicago, Ill. The address of the Grindley Co. is 1158 Homer Street, Vancouver, B. C. The Grindley Company was the western office of Gormans Limited, Edmonton, and operated under that name up to May 1, but after that date Mr. Grindley took over the business, organized his own company and enlarged his selling staff.

Several wage adjustments have been effected by the U. M. W. executives and the officials of Scotia near Sydney Mines, which apply to machine work in narrow places and the handpick men of the Florence Colliery. The machine men have been asked to accept an advance of 10c. on the ton, and the latter class of employees 3c. The U. M. W. local decided to accept the offer under protest and will keep after the company until their full demand is met. The machine runners claim that because of paying a helper a fairly decent wage, they stand to lose themselves on the present rate of wages. All the U. M. W. locals are pressing for more money for datal men.

The Northern Alberta Coal Operators' Association, embracing all mines in the prairie country north of the Red Deer River, **has been organized** at Edmonton with C. W. Leonard, of the Chintook Coal Co., as president, and C. W. Cupples, of the Great West Coal Co. as secretary. The new organization, which represents about 25 mines, will deal with the Canadian Federation of Labor, the charter of which forbids any affiliation with the United Mine Workers of America.

A Dominion charter has been granted the **Price & Murray Coal Co., Ltd.,** head office, Toronto, with a capital stock of $100,000. The provisional directors are: W. W. Vickers, R. P. Locke, D. Magle, R. Hatton and A. Black, of Toronto.

The Toronto Board of Education has contracted for steam coal at an average price of $9.30 per ton, as compared with an average price of $8.90 last year. Contracts have been let for hard coal at $15.50 per ton as compared with $14 per ton last year.

The coal, output of the British Empire Steel Corporation for the month of May, 1923, was 457,125 tons, as compared with 308,439 tons in May, 1922. The total output of the corporation for the five months ending May 31, 1923, was 2,309,143 tons, compared with an output of 1,381,551 tons to May 31, 1922.

According to the report of the City Auditor **Toronto lost 86.3c. a ton, or a total of $6,962.93, on the 8,068 tons of emergency coal sold at $15.50 a ton.** The total amount purchased was 11,630 tons at a cost of $141,913.90. The cost of handling was $48,388.49.

A special commission of five members of the United Mine Workers of America have arrived at Sydney, N. S., from Indianapolis, authorized by John L. Lewis, international president of the U. M. W., **to make a thorough investigation of the affairs of District** 26, which includes all the Nova Scotia coal mines. The commission is instructed to take any action deemed necessary to bring the district back in line with the U. M. W. should it be found that its policies have been radically departed from.

Fire recently destroyed the boiler house and wash house at the North American Collieries plant at Evansburg, Alberta, with an estimated loss of $25,000.

MEXICO

Extensive development operations of the Rosita coal field, near Sabinas, have been started by the American Smelting & Refining Co., which purchased the property some time ago. It is reported that the company will expend more than $4,000,000 United States currency in constructing coke ovens and other improvements. According to the statements of engineers who have been exploring the coal field, there are approximately 100,000,000 tons avaliable for converting into high-grade coke. The output of the coke ovens will go to supply the smelters of the company at Monterey, Asarco, Chihuahua and Aguas Calientes.

Association Activities

West Virginia Coal Association

The annual meeting of the West Virginia Coal Association has been so timed that members may attend it and the annual convention of the National Coal Association. The annual gathering of the West Virginia Association will be at Atlantic City, Tuesday afternoon, June 19, at 2:30 o'clock, when the association will elect directors, who will select the officers of the association for another year. The usual routine business will be transacted and the policy of the association during the convention of the National Coal Association formulated. W. H. Cunningham, secretary of the West Virginia Association, who also is chairman of the convention committee of the national association, is urging all members of the local association to attend both meetings.

Obituary

Harry P. Mahaffey, 45, assistant superintendent of the Wilmore Coal Co., Windber, Pa., died on May 24th, of pneumonia, leaving a wife.

Angus Ralph Crow, widely known in the Ontario (Can.), coal trade, died at his home in Chatham, Ont., where he was for many years engaged in the wholesale coal trade. He was 63 years of age.

James D. James, 60, of Clinton, Ind., who has been in the employ of the Clinton Coal Co. for 27 years, much of that time as mine superintendent, died recently at his home. At the time of his death he was superintendent at Crown Hill mine No. 2.

John M. Manson, 55, secretary of the Deep Vein Coal Co., Terre Haute, Ind., died June 3 at St. Anthony's Hospital, Terre Haute, of injuries received four years ago when his motor car was wrecked by a street car. Mrs. Manson also suffered injuries which caused her death. Mr. Manson apparently had recovered and was active in business until two weeks before his death.

Traffic News

State railroad commissions have no authority to order intrastate rates lower than interstate rates on the same commodities even when the commodities specified are consigned to a governmental agency if by so doing there is a tendency to create a monopoly, according to a decision of the U. S. Supreme Court rendered May 21. The case at issue involved stone and gravel for public road work in Tennessee. The Interstate Commerce Commission in July, 1920, ordered a 25 per cent increase in interstate rates. The Tennessee Railroad Commission ordered similar increases on intrastate rates excepting carload shipments of stone and gravel for use in public highway construction and consigned to the State, a county or a municipality, or an agent of one of these. The railroads appealed to the Interstate Commerce Commission, which directed an increase in accordance with its first order. The Tennessee Railroad Commission applied for an injunction in the federal district court, claiming that preference to government shippers expressly was provided by Sec. 22 of the Transportation Act. Three judges hearing the case declared that discrimination in such a case was not necessarily unlawful, and granted the injunction, whereupon the Nashville, Chattanooga & St. Louis R.R. and other companies appealed the case to the Supreme Court because of the importance of the principle involved. The Supreme Court held that the facts in this specific case made it appear that certain quarries within Tennessee would be benefited by the difference in rates to an extent which would give them practically a monopoly of stone and gravel for use on road work within the state and that under these circumstances a lower intrastate rate was not proper, hence the decision was reversed.

Coal rates from Castlegate, Utah, to Malad, Idaho, on the Oregon Short Line R.R. have been reduced to $2 on slack and $2.60 on other grades. The old rate for all grades was $3.35.

Charges collected on coke in carloads from various points in the United States destined **to Cananea, Mexico, have been found by the I. C. C. not to be unreasonable.** As a result the complaint of the Greene-Cananea Copper Co. has been dismissed.

The Interstate Commerce Commission has **approved a reduced schedule of rates on nut and slack coal from mines on the St. Louis & San Francisco Ry. in Oklahoma and Arkansas** to certain destinations on that line in Texas.

During the last few months **the coal-carrying capacity of the Pennsylvania Railroad System has been increased by what is equivalent to the addition of 2,308 new coal cars** to the service. Last October orders were placed with the railroad's Altoona works to substitute 70-ton trucks for 50-ton trucks under 10,188 cars then operating in the coal service. To date there have been 6,173 cars turned out of the shops with this work completed, their carrying capacity being increased 31 per cent each by the substitution of the heavier trucks. The additional capacity thus obtained is naturally of greater advantage from an operating standpoint than if it had been secured by placing additional cars in service, as there is no corresponding increase in the number of car units to be handled in trains. When these cars were built, 70-ton capacity bodies were placed on 50-ton trucks and the load restricted to 50 tons because of insufficient strength of certain bridges on branch freight lines to carry the heavier loads. The correction of these conditions now makes possible the operation of the heavy equipment, loaded to full capacity. It is expected that work will be completed on all the cars by autumn. When this is accomplished, the coal-carrying capacity of the system will have been increased by 190,516 tons, which is equivalent to placing 3,810 new cars in the service.

The hearing in the case of the Avrshire Coal Co. vs. the Southern Ry., which was assigned for June 30 at Terre Haute, has been postponed indefinitely.

During the month of May **2,622,357 net tons of soft coal and 241,460 net tons of hard coal passed westward through the United States and Canadian canals at Sault Ste. Marie.** Of this amount 19,045 tons of soft coal and 2,100 net tons of hard coal passed through the Canadian Canal.

A report by the Car Service Division of the American Railway Association shows that **on May 15 210,243 freight cars were in need of repair. This was a decrease of 262 compared with the number on May 1.** The number in need of repair on May 15 represented 9.3 per cent of the total number of cars on line compared with 9.2 per cent on May 1.

Authority has been granted the **Virginia Railway Co. to issue $5,700,000 equipment-trust certificates.** This amount will be applied on the purchase of equipment which includes fifteen Mallet superheated freight locomotives to cost $1,208,700; 1,000 120-ton steel flat-bottom gondola cars to cost $5,000,000 and 500 steel 70-ton hopper bottom coal cars to cost $1,477,500.

In order to determine the number of cars to which mines on its system are entitled, **the Baltimore & Ohio R.R. is utilizing the services of twenty-four operators and coal-company officials** as a preliminary step toward rerating mines on that system. C. L. Chapman, for instance, general superintendent of the West Virginia Coal & Coke Co., heads a group which is engaged in inspecting the mines of the Somerset field. It will require in all about seven weeks to complete the preliminary steps toward rerating the mines. Every mine is being visited and its facilities for loading coal inspected. In making such an inspection, information as to the amount and condition of equipment, trackage, height of seam, previous performance, man power and other conditions is all being compiled.

Rates on coal from the mines of the Slogo Coal Corporation at Johnston City, Ill., to various destinations in Michigan, Iowa, North Dakota, South Dakota, Missouri, Minnesota and Wisconsin **are unreasonable,** in the opinion of John B. Keeler, an Interstate Commerce Commission examiner. In a report to the Commission, he recommends that these rates be declared unduly prejudicial to the extent that they exceed the joint rates on like traffic from the mines on the Southern Railway in the Southern Illinois group or the mines on the Baltimore and Ohio Railroad in the Belleville group, by more than the current differential between the Southern Illinois and Belleville group.

Freight rates on coal from the southern and western fields in Colorado to eastern points in the state have been slashed and slight reductions have been made in the rate from the northern fields to Denver by the Colorado Public Utilities Commission. The reduction also means lower rates to eastern points outside of Colorado. Anthracite rates from the western Colorado field reduce the spread between hard and soft coal from $1.18 to 50c. A reduction of 7c. a ton on lump and 9c. per ton on slack and pea from the northern fields to Denver has been ordered. The prevailing rate was upheld between the southern field and Denver. Substantial reductions were ordered in the rates between the southern fields and eastern Colorado. Rates from southern fields and the Canyon City district to Greeley and other Weld County points were cut from $3.40 on lump and $3.15 on nut to $3; on pea and slack from $3.03 and $2.93 to $2.70. Trinidad carries a differential of 25c. on lump and nut and 10c. on pea and slack over the Walsenburg tariffs. The present charge of $2.25 from the southern fields to Colorado Springs was lowered to $2. The rates to Pueblo and Denver, $1.76 and $2.34, were declared reasonable basic rates. Rates to Cheyenne Wells, on the Union Pacific, will now be $3.90, almost $1 lower than the old rate. To Kumer the new rate will be $3.05, and to Fort Morgan, $3.20. On the Colorado & Southern the rate to Fort Collins and adjacent points will be $3. It is ordered that shipments east of Denver must bear rates not exceeding by more than 50c. those on Walsenburg shipments. The order applies to the Union Pacific, Colorado & Southern, and C. B. & Q. railroads. A differential of $1.20 is allowed on the Rock Island line.

April net railway operating income on Class 1 railroads totaled $83,197,800, representing a return, on an annual basis, of 6½ per cent of the Interstate Commerce Commission's tentative valuation, according to a statement by the American Railway Association. In April last year the same carriers reported a net operating income of $49,979,000, equivalent to 3.99 per cent on the tentative valuation, while the net operating income for March this year was $83,487,000, or 5.96 per cent. The April rate of 6½ per cent is the highest return earned in any months since the passage of the Transportation act of 1920. Operating revenues in April were $522,955,700, an increase of more than 25 per cent, compared with the same month of last year. Operating expenses totaled $403,869,000, an increase of more than 20 per cent over the same month of last year.

The report for the Lehigh Valley R.R. for the year ended Dec. 31 shows that the company carried 23,071,515 tons of miscellaneous freight as compared with 26,377,743 tons in 1921. E. E. Loomis, president of the company, says in his report that the year 1922 will be remembered in history, from the standpoint of the railroads at least, because of the serious and continued difficulties with union labor. The miners' strike, he says, not only tied up anthracite production, but forced a considerable reduction in bituminous operations, reduced transportation earnings, and the higher price for bituminous coal greatly increased operating expenses. The strike of the shop-craft employees had its effect upon practically all carriers. Mr. Loomis says that upon the ending of the miners' strike the company concentrated its efforts upon the handling of fuel, and was able to furnish a full supply of cars at the mines served by its road every day after the resumption of mining, with the result that the anthracite loadings up to the end of the year amounted to 4,139,014 tons, an increase of 758,375 tons over the same period in the preceding year.

Coming Meetings

Iron and Steel Exposition at Buffalo, N. Y., Sept. 24-28. Association of Iron and Steel Electrical Engineers, Empire Building, Pittsburgh, Pa.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

National Coal Association will hold its sixth annual convention June 19-22, at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting lill start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Ninth National Exposition of Chemical Industries at the Grand Central Palace, New York City, week of Sept. 17. Manager, Charles F. Roth, Grand Central Palace, New York City.

West Virginia Coal Association will hold its annual meeting Tuesday afternoon, June 19, at Atlantic City, N. J. Secretary W. H. Cunningham, Huntington, W. Va.

Mine Inspectors' Institute of America will hold its 13th annual meeting July 10-12 at Pittsburgh, Kan. Secretary, J. W. Paul, 4800 Forbes St., Pittsburgh, Pa.

COAL AGE

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C. E. LESHER, *Editor*

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Day Versus Tonnage Wage

AT A meeting of the Illinois Mining Institute the use of loading machines was vigorously discussed. It appears that the introduction of mechanical loaders in the Middle West, as elsewhere, is well on its way. John Garcia declared that mining practice will have to be made to conform to the machine, for the machine cannot be made to meet present loading conditions satisfactorily.

Its introduction, however, depends just as much on so adapting haulage conditions to the needs of the machine that there will be no delays. Expensive machines should not be held waiting for uncertain deliveries of cars. The operator must be prepared to keep the cars in constant supply. If he pays his men by their tonnage he has every reason to be slack in delivering cars, for prompt service is expensive. Only when the operator gets a profit from such service will he be induced to afford it. Till then he must put his interest in transportation first and his interest in the mining and loading of coal second.

If the railroads of the country owned the coal mines or the mines the railroads, the operator would get his gondolas on time every morning. The railroads would be run so that there would be no uncertainty as to this, for a steady run and a full day would be necessary if a maximum profit was to be assured. In consequence of the divorce between these elements in coal handling the railroad finds it profitable to run the business with a callous indifference to mine operation. In fact only by regarding transportation as a business in itself to be run on the most economical basis regardless of the needs of the coal mines can a profit be made from railroading.

Likewise, the mine operator with his day men runs his underground and, where he has it, his surface transportation as an end in itself. The loader can load only when he has cars. He is interested therefore in receiving car service; the operator is concerned only with the cost of transporting cars to the face, and he puts that first and service second. It is the only way to make a living. Interest him by allowing him to operate his mechanical loaders by day-wage employees and he will co-ordinate loading and transportation. He will be willing to haul wastefully to make the savings in loading that can come only by prompt and regular car service.

Today the operator no longer runs his whole mine. He has sub-contracted the mining and loading part of it. Haulage he keeps in his own hands. As sure as day follows night, the operator must run his transportation plant economically and from purely a transportation angle, which is not economical from the point of view of mining and loading. Co-ordinated interest is the only hope for co-ordinated industry. There can be no common interest where part of the business makes profit for one man and the other part makes it for another.

Realizing this and also that the speed of the machine is based on its capacity and not on the energy of its operatives and that therefore there is no longer need to hold out an incentive to them, the operator is disposed to pay his men by the day for loading, and in this his decision is good. So long as he thus pays his men he will run his transportation to suit both of his interests—his old interest in cheap haulage and his new interest, that of low-cost coal production at the face.

No one can doubt that a thoroughly mechanized mine should be on the day basis. The stationary engineer is not paid by the horsepower generated but by the hours on the job. The engine is regulated and the pressure of the steam is adjusted to provide a certain power, and though skill might be encouraged by a scale of payment rated on the power produced, as there is no labor involved, payment advisedly is made by the day and not by the kilowatt or horsepower.

In the running of a loader one man may need to be skilled and may have to use judgment to keep up the flow of cars to the machine, but there is no more need to pay him on the tonnage basis than the foreman, and as for the other men, they provide little labor and less skill. They merely remain on the job watching the machine do the work, always closely under the supervision of the boss loader and higher officials. Where, as in Orient No. 2 mine in Illinois, four machines can load out 500 tons, the work of supervision is greatly reduced and can be thoroughly performed. The work is concentrated and every item of management accordingly is simplified. No longer will mining be a work of seclusion; no longer will it pay its men on a basis of performance, for supervision will be the guarantee for faithfulness and the ease with which the work is performed will make shirking of no advantage to the indolent.

Can't Eat Your Cake and Have It Too

WHEN rates on coal were increased in 1920 the Interstate Commerce Commission ordered that differentials between competing fields be preserved. Thus when the 40-per cent increase was put into effect the amount in cents per ton was determined for one group and applied to all others meeting in the same market. As between Ohio and the so-called inner and outer crescent groups of West Virginia shipping coal into Michigan the 40-per cent increase was applied to the inner crescent and the 81c. as to Detroit on coal from Kanawha became 36 per cent on coal from Pocahontas and 50 per cent on coal from Ohio. To this the Ohio shippers, particularly those in southern Ohio, have taken serious exception, saying that no longer does the dollar buy as much transportation on Ohio coal as on that from West Virginia. The railroads originating West Virginia coal have given scant consideration to Ohio's plaint.

They have recently come to a realization, however, that they cannot eat their cake and have it too. The

advantage, by comparison, of a lower freight rate has aided their shippers, but the gain has not all been velvet. These carriers, too, notably the C. & O. and the N. & W., do not deliver coal to Michigan destinations, some 6,000,000 tons of which they originate each year. They must divide with destination roads as the P. M. and the Ann Arbor. It is on this division that the tale hangs.

The split has always been on a flat percentage basis, the originating carrier taking some 52 per cent of the base rate on *Ohio* coal. Thus when the rate on Pocahontas coal to Bay City, an average point, was increased from $2.80 to $3.84, or $1.04, the originating carrier got but $2.39 as its share, which is nearly 11c. less than the proportion formerly going to the roads south of Toledo. It has been estimated that the Southern roads thus lost nearly a million dollars per year, which the Michigan roads received, of course.

The Southern roads are asking the I. C. C. to allow them to retain as their share the same percentage not of the Ohio rate as advanced 50 per cent but as it would be if it had been advanced 40 per cent and not so many cents per ton. Ohio coal shippers are watching the outcome with pleased interest.

What Makes a College?

MANY of our big colleges are grievously overrated because they are classed solely on the quality of their product. Without attempting in any way to deny the superiority of their faculties and facilities, it seems only fair to point out that they receive good material and from it they naturally make a good fabric. Their final product is good because they start with goods of excellent quality. If to your school or college you can draw the sons of distinguished successful men you are more likely to deliver a product that will, at least, have the ability to succeed in business and in the world than if you admit men who are impelled to take up the curriculum solely because they delight in study and have a flair for learning. It is because of the quality of the men attending Yale, Harvard and Princeton, Oxford and Cambridge that these universities have such a wonderful hold on our imagination.

They draw men of character and intelligence, men who go to college only because in their station of life it is the right course to pursue. If they learn only a little, if they gain only a half of what your real night-oil student learns, it is of advantage in their after life; the quality of their character and the brightness of their intelligence will do the rest. They are quite usually not naturally students. They attend college for the companionship and the sports, because tradition has said that it is not yet time for them to dig for a living, but they have the right qualities of mind, and the education they get rounds out what they already have. In all this, however, it must not be forgotten that many sons of unsuccessful fathers nevertheless have qualities that in a sense almost predestine them to financial success or to distinction. They are, however, quite exceptional.

To those not surrounded by tradition of college attendance, who rather loathe study, we would say as forcefully as language permits, Go to college. If you have neither character nor mental brilliance, education will serve to find you a definite if not an extremely lofty place in life. If you have both and loathe study, college will give you what you will never get without it. Education is not of as much value as what you have, but it will be of inestimable value in giving you what you lack.

The wholly scholastic trend of the "plug-hard" college is perhaps to be regretted. It drives away the man whose genius is companionship, originality, intellectualism. The Gradgrind parasite who lives on other people's thoughts will never be a leader in the world no matter how many "ologies" he masters. The man who will make those "ologies" yield their power will be the man of active mind who does not live for them but makes them live for him.

What we would have the young man who does not want to go to college realize is that he is the man that needs a collegiate education and that it is just such a man that the colleges need. No curricula on management, cost accounting, history or debating will make a leader and vice-president out of a follower. Given, however, a man of leadership, a vital, inspiring, healthful, brilliant man, no matter from what origin drawn, and education will give him tools for his hand, methods for his operations, plans for his future. College for him will not come amiss. If it were not for the college campus, the river to row on, the college papers, the debating society and the glee club one may well wonder if the life at the university would appeal to any men of broad executive ability whose genius is in action rather than in study.

After all, success in business and in world affairs is only one kind of success. The lesser colleges do translate from school to lifework a wonderful quota of men of intellect, whose work in research advances the progress of the world. But the average college, especially in America, has today a somewhat different aim. Perhaps it is a little unwilling to acknowledge it, but the fact remains that it seeks to graduate men for successful business and is not satisfied unless it does, and it largely weighs itself in that balance. Moreover, the man who considers the question of going to college or of sending his sons there weighs the institution in the same way. It is not a very worthy measure, but so long as it is used for the appraisal of merit colleges must seek to attract to their halls men having the characteristics of financial success if they would graduate men whose careers will bring great business profit.

If you want to install a motor having certain characteristics you must choose one that has them. That may not be the best of motors but it is the one you are needing, and so long as you need it do not complain if a motor of other characteristics picked up at random will not give you what you want. It is so easy to recognize that all motors—series, shunt, induction, synchronous, repulsion—are not the same, but how hard it is to hold the same of men when we have tried so doggedly and so long to believe that with favorable circumstances, proper environment and intensive education we can make a man of parts and of business ability out of anyone. The ultimate redemption of the unfit by education is a pious hope that none of us can give up without a struggle.

ANOTHER EXPLANATION is that the people's representatives have no definite instructions, while the lobbyists have.—*Marion Star.*

IT IS WELL TO REMEMBER that Adam's fall came before and not after he learned to sweat for a living.—*Rochester Times-Union.*

Anthracite Workings in Western Middle Field Are 148 Per Cent Deeper Than in 1872*

Operations in That District's Seventeen Seams Grow More Difficult as Old Workings Are Reopened to Extract Coal Spurned in Early Days—Costs Steadily Mount

By D. C. Ashmead
Kingston, Pa.

A HALF century of mining Pennsylvania anthracite in the Western Middle field—a narrow territory extending from a point east of Mahanoy City westward through Shamokin to Trevorton—has proved the well-known facts that anthracite workings are growing swiftly deeper and thinner, that output per miner is growing steadily less and that the introduction of modern methods and machinery in haulage, ventilation and hoisting is reducing the number of the inside company men while greater care in coal preparation is increasing the number of men working outside.

The depth of the seventeen beds in the Western Middle field has increased no less than 148 per cent from 224 ft. in 1872 to 555 ft. in 1921 and difficulties of extraction are great not only because of this but because it is now necessary to reopen old and badly caved workings to extract coal that was left by hasty methods in effect prior to 1907. The decrease in production per man since 1872 in this district, however, is only 9.1 per cent, which is the smallest drop to be noted in any district described in this series of articles.

Data are available for more collieries in this district than in any other district described in this series. A large number of collieries in the early periods of the last century operated only a short time and then were abandoned. Evidently they mined only the cream of the coal. The large number of collieries in the early days is well brought out in the diagram in Fig. 62. In 1872 there were at least 127 collieries reported, and as the records are a little uncertain in this district in the first three periods, probably a great many more operated than are shown in this diagram. From 1872 to 1921 there is a steadily decreasing number of collieries, due to abandonment and consolidation.

In the period between 1877 and 1882 the proportion of the collieries used in the tonnage calculations is less than that of any other period. This is because a number of the collieries were so small and their data so incomplete that the available information was worthless.

From 1882 the proportion of the collieries whose data was of value is greater and as a result the tonnage curves show nothing surprising. Even in the first two periods the number of unreported collieries in proportion to the total number having complete information is so small as to have little effect on the curves, for the reasons previously set forth.

Unfortunately it was not possible to obtain from the larger companies much information regarding the thickness of the beds and the depth of the working. Therefore the depth and thickness curves give only an indication of what has happened in this region and are not at all conclusive. Only sixteen collieries in any one year furnished the data requested.

TABLE I—NUMBER OF COLLIERIES IN WESTERN MIDDLE FIELD

	Total as Reported by Department of Mines	Having Depth and Thickness Data	Having Tonnage Data
1872	127	12	
1877	110	12	78
1882	101	12	81
1887	84	15	66
1892	80	13	67
1897	71	14	61
1902	66	15	60
1907	65	15	55
1912	63	16	55
1917	61	15	55
1921-2	59	16	54

In this region the geological conditions show a marked variation from those of previously described districts. Here there are the same steep pitches that are found in the Panther Creek district and in the Eastern Middle field, but instead of the basins being V-shaped, as in these fields, the bottoms are broad and flattened out as shown in Fig. 63, which is a general cross-section of the region. This makes the section look

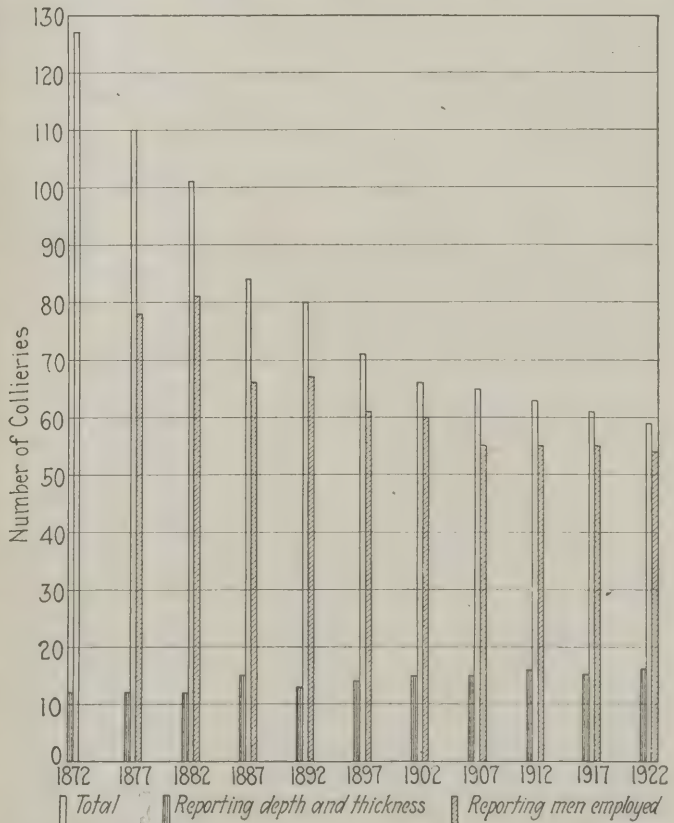


FIG. 62—NUMBER OF COLLIERIES IN THE WESTERN MIDDLE FIELD

This diagram shows the number from which statistics on depth and thickness of coal mined were available, and from which data was secured on men employed and tonnage produced, as compared with the total.

*This is the sixth in a series of articles by Mr. Ashmead describing conditions in the seven sections of the Pennsylvania anthracite region. Previous articles appeared in *Coal Age* for Feb. 22, March 22, April 5, May 10 and May 31. The seventh will appear soon.

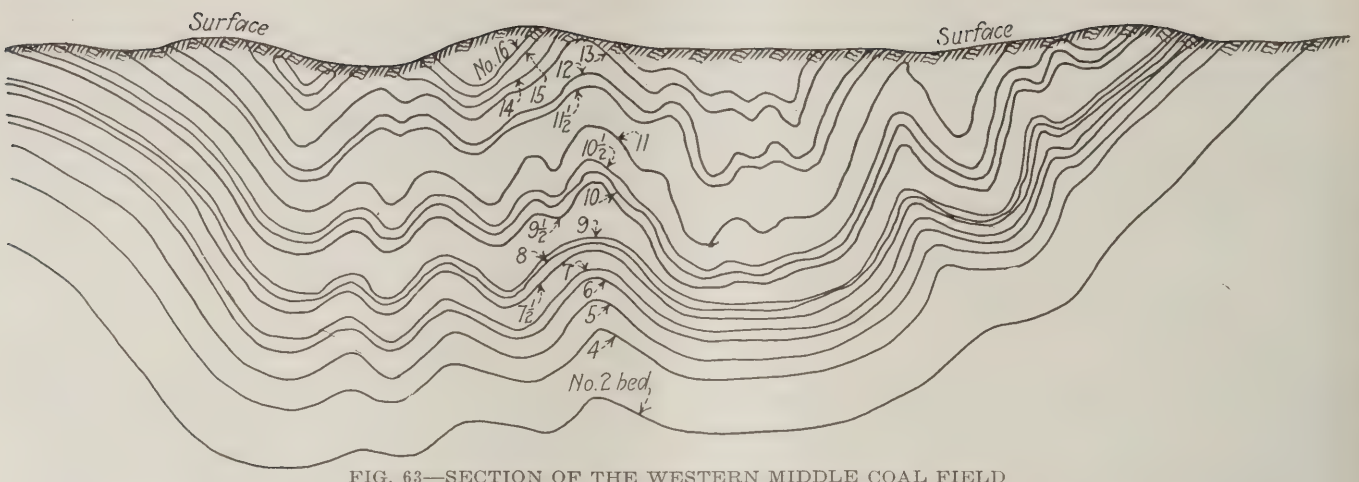


FIG. 63—SECTION OF THE WESTERN MIDDLE COAL FIELD

This section shows that the measures are generally steeply pitching, but that at the bottom, the basin, instead of having sharp angles, is flattened out.

something like two "U"s standing side by side with the middle members extending only half way to the top.

Coal beds in this region are more numerous than in either the Eastern Middle field or the Panther Creek district but are thinner. In the sixteen collieries reporting on thickness only two reported beds as thick as 30 ft.

The names of the beds from the surface downward are as follows: Little Tracy or No. 16, Big Tracy or No. 15, Diamond or No. 14, No. 13½, No. 13, Orchard or No. 12, Primrose or No. 11, Top Holmes or No. 10½, Bottom Holmes or No. 10, Mammoth or No. 9, No. 8½, No. 8, No. 7½, Skidmore or No. 7, Seven Feet or No. 6, Buck Mountain or No. 5, and Little Buck Mountain or No. 4. Although the basic information is not complete, the thickness curve in Fig. 64 takes the same general shape as the thickness curves of the previously described districts. This indicates but does not prove that the thickness of the beds has decreased. In 1887 the data from some of the collieries reporting were not complete but the available data were from collieries which had reported thick beds in 1882 and in 1892. Therefore it is reasonable to suppose that the curve really decreased as shown in the dash line instead of the solid line.

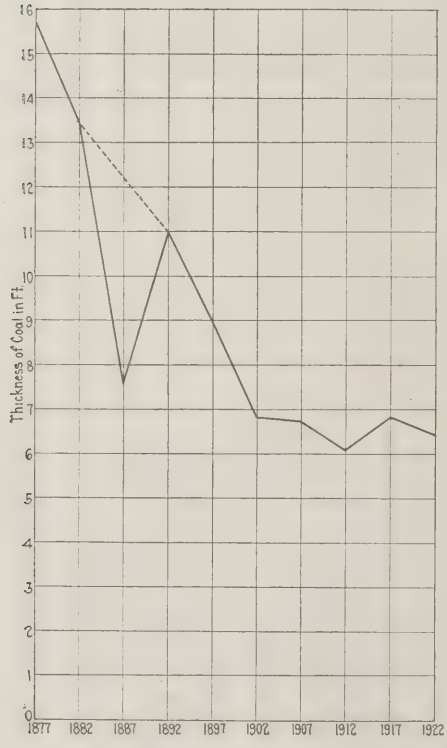


FIG. 64—AVERAGE THICKNESS OF COAL MINED IN THE WESTERN MIDDLE FIELD

The methods used in the calculation were explained in the caption under Fig. 3 in the issue of *Coal Age* for Feb. 28, 1923.

In studying Fig. 65 it will be seen that even in 1872 beds of coal as thin as 2 to 3 ft. were mined. Evidently the mining of this thin coal was not considered profitable, for in 1877 it was not reported. In 1902, however, over 11 per cent of the beds were less than 3 ft. thick, and this percentage increased to 13 per cent in 1922. Although there are comparatively few observations used in the preparation of this curve, the general tendency is for thick beds to decrease in number and thin beds to increase.

The general shape of the curve for depth of workings is like the teeth of a saw. There were not a sufficient number of observations to smooth out the curve, but the general characteristics are shown. Here the curve shows that workings steadily grew deeper, and if a general curve were drawn to do away with the irregularities, it would be found that in 1877 the depth was 224 ft. and by 1921 this average depth had increased to about 555 ft., an increase in depth of 331 ft., or about 148 per cent. In the earlier periods, particularly during the seventies, when the easily procured coal in each mine was extracted the colliery was abandoned. This accounts for the rapid increase in the depth of

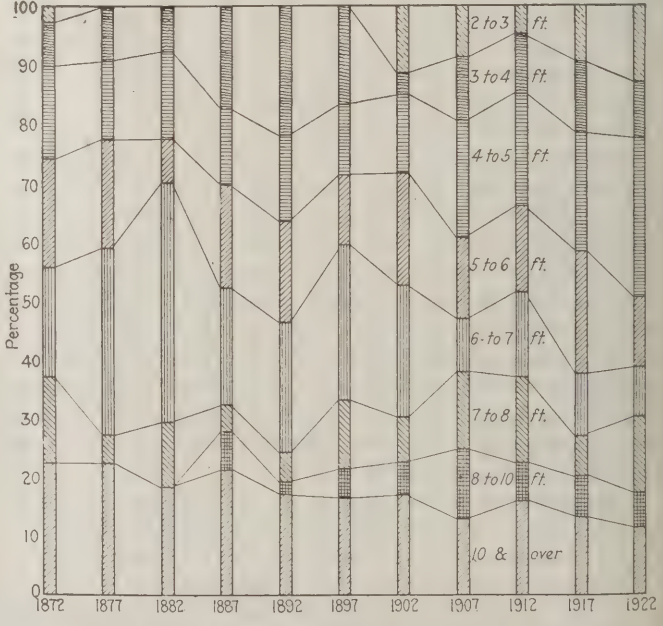


FIG. 65—PERCENTAGE DISTRIBUTION OF NUMBER OF BEDS WORKED BY THICKNESS IN WESTERN MIDDLE FIELD

A description of the methods used in calculating this curve are shown in the caption under Fig. 4 in the first article of this issue, appearing in *Coal Age* for Feb. 22, 1923, on page 324.

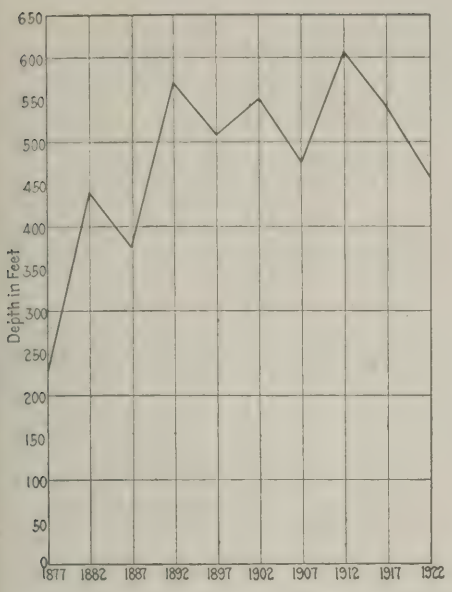


FIG. 66—HOW DEPTH OF WORKINGS HAS CHANGED IN THE WESTERN MIDDLE FIELD

The description of the methods used in the calculation of this curve will be found in the caption to Fig. 5 in the Feb. 22, 1923, issue of *Coal Age*, on page 325.

the workings for the early periods. If the imaginary curve is considered it will be seen that from 1887 such a curve would flatten considerably, for in that year the average depth was about 420 ft. as against 555 ft. in 1921. This was an increase of 135 ft., or only 32.1 per cent, as against an increase of 148 per cent for the full period covered by the curve. Fig. 67 shows the percentage of workings at various depth intervals. A continual increase took place. In 1872 the deepest workings lay in the 400 to 500 ft. interval, but by 1922 workings were reported as deep as 1,400 ft. and in 1912 one colliery reported workings between 1,600 and 1,700 ft. deep.

The change in bed thickness at various depth intervals is shown in Fig. 68. Even though there were insufficient data available, the thickness curve is downward almost uniformly. The thickness of the beds is less than that of the Eastern Middle field and the Panther Creek district.

Reports of state mine inspectors of the amount of boiler-horsepower installed go back only to 1887, the first year that the electric locomotive was used in anthracite mines. In the period 1887 to 1897 inclusive there was produced daily about 0.9 ton of coal for each boiler-horsepower. But in the periods ending 1902 and 1907 there was a considerable drop in this figure. This probably was due to the increased depth of workings and the extension of underground workings as well as to increased production. But from 1907 onward production remained practically constant. This was in spite of the fact that the depth of workings continued to increase and the thickness of the beds continued to decrease. It can be explained by pointing to the introduction of electricity. During this period there was a considerable increase in the use of electric power. This resulted in power economies. Further, a number of the coal companies, instead of installing modern boiler houses and power plants at their collieries, discontinued the old out-of-date plants and purchased their power from central stations. As a result, power consumption per ton of coal did not change materially.

TABLE LI—AVERAGE DEPTH AND THICKNESS OF COAL MINED IN THE WESTERN MIDDLE FIELD, IN FEET

	Average Thickness Of Beds	Average Depth of Workings		Average Thickness Of Beds	Average Depth of Workings
1877	15.77	223	1902	6.84	552
1882	13.4	441	1907	6.74	684
1887	7.53	375	1912	6.55	608
1892	11.02	570	1917	6.81	543
1897	9.00	518	1922	6.47	459

TABLE LII—POWER USED IN THE PRODUCTION OF COAL IN THE WESTERN MIDDLE FIELD

	Boiler Horsepower Installed	Engine Horsepower Installed	Tons Produced Per Boiler Horsepower	Tons Produced Per Engine Horsepower
1887	48,570	.....	0.853	.....
1892	53,250	.....	0.944	.....
1897	70,000	.....	0.946	.....
1902	89,044	120,884	0.722	0.532
1907	107,395	106,660	0.560	0.564
1912	112,745	178,011	0.557	0.353
1917	115,850	195,149	0.566	0.336
1922	106,388	.....	0.540	.....

Data on haulage is incomplete for the periods previous to 1887, so it is impossible to use these data for the early years. Since 1887 the daily average hauled per mule shows a steady increase; this, however, is not due to any increased efficiency on the part of the mule but entirely to the introduction of the electric locomotive. Part of it, however, may be due to better track layout and maintenance, the introduction of heavier rails and increased use of roller bearings. All of this would tend to increase the amount of coal hauled per day either by mule or locomotive.

Sometime before 1902, according to Fig. 70, the electric locomotive was first used in the Western Middle field, and the increase in its use has been steady, as is shown in the curve and the figures given in Table LIV. The tonnage hauled per locomotive, however, has gradually decreased as the electric locomotive has changed from exclusively main-line haulage to gathering. Both cable-reel and storage-battery locomotives are in this service.

From a study of the mine inspectors' reports from 1872 to date one comes to the conclusion that there have been three distinct divisions in the history of the past 50 years of the Western Middle field with the dividing points in 1887 and 1907. In the early division a colliery was opened for a short time, the best coal mined and the operation then abandoned. This division seemed to end at about 1887. Then came a time of adjustment. Mining methods changed, colliery operation became more stable and the consolidation of collieries began.

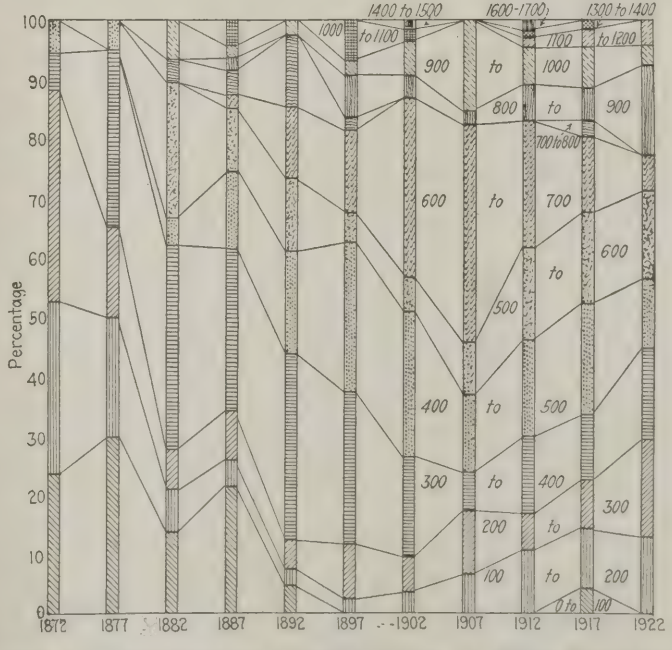


FIG. 67—PERCENTAGE DISTRIBUTION OF BEDS WORKED AT EACH 100-FT. INTERVAL OF DEPTH

In the caption to Fig. 6 on page 325 of the Feb. 22, 1923, issue of *Coal Age* will be found the description of how this curve was obtained.

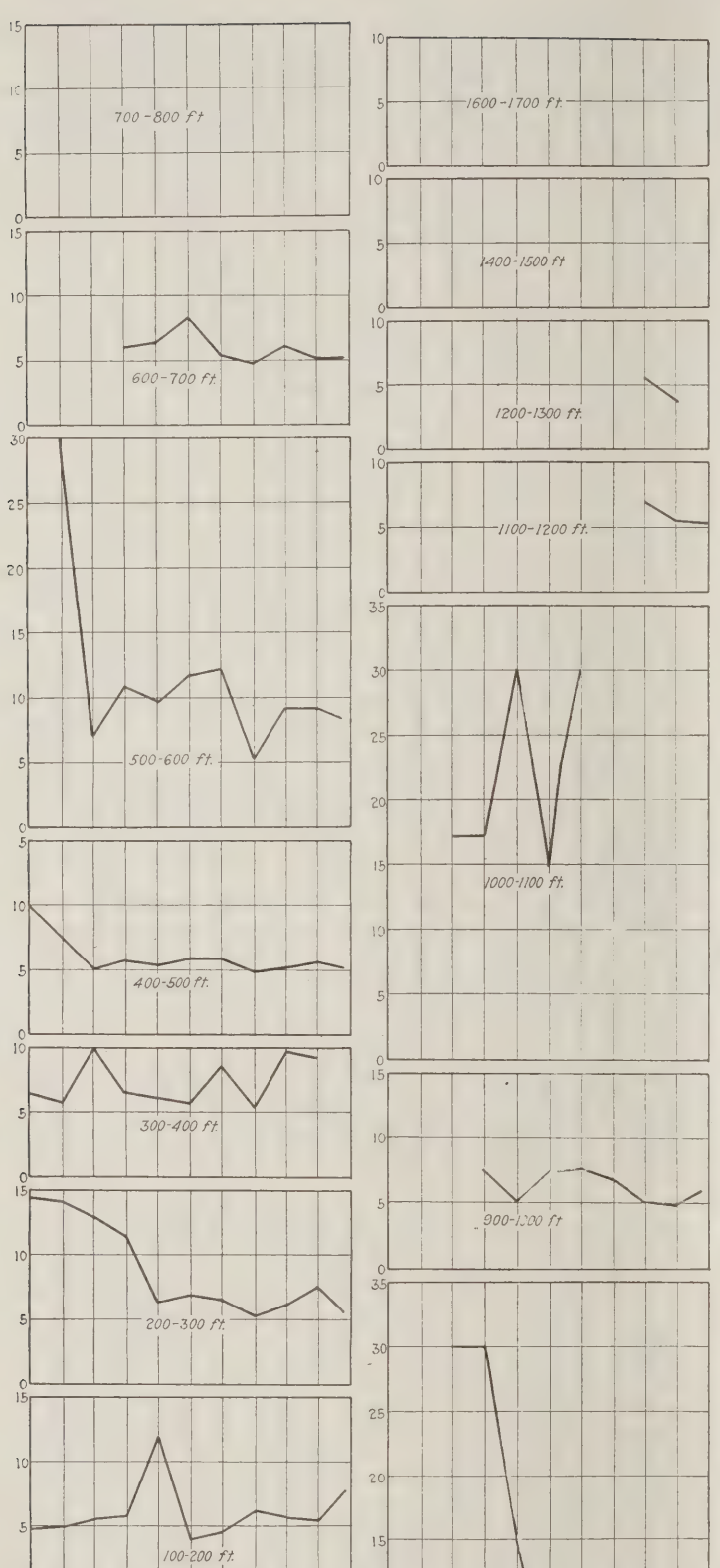


FIG. 68—AVERAGE THICKNESS OF BEDS AT EACH 100-FT. INTERVAL OF DEPTH IN THE WESTERN MIDDLE FIELD

A description of the method used in preparing this curve will be found in the caption to Fig. 7 in Part I of this series, on page 326 of *Coal Age* for Feb. 22, 1923.

This seems to have lasted until about 1907, when the time of modern mining began. Of course all of these divisions overlapped but the dividing dates are accurate, taking the field as a whole. One of the indications that these general changes took place is the curve for the daily average production per employee. The final curve, which is the dot and dash line in the bottom group of curves in Fig. 71, shows a decided drop in the period 1877 to 1887, but from 1887 to 1907 the line is practically level but showing a slight downward tendency if the 1897 figures are omitted because of errors that year in state inspectors' reports. The drop in output per man is only 0.04 ton a day. Then from 1907 to 1921 there is a considerable increase in the production per man from 1.50 tons to 1.80 tons.

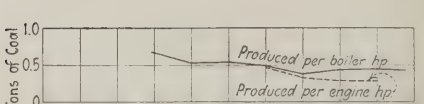


FIG. 69—DAILY PRODUCTION OF COAL PER BOILER HORSEPOWER AND ENGINE HORSEPOWER INSTALLED

The method of calculating these curves is found under the caption to Fig. 8 in the issue of *Coal Age* for Feb. 22, 1923, on page 327.

The total change in production from 1877 to 1921 is a decrease of 0.18 ton, or 9.1 per cent. This decrease in output is less than in any of the previously described districts, for the Lackawanna County district shows a decrease of 31.2 per cent, the Wilkes-Barre district, 30.2 per cent, the Nanticoke district 21.1 per cent, the Eastern Middle field 30.6 per cent and the Panther Creek district an increase of 1.6 per cent, or—if 1892 data is used—a decrease of 12.5 per cent.

The dot and dash line in the middle group of curves in Fig. 71 is the final corrected line showing the average daily output per inside employee. This curve shows a steadily decreasing output from 1877 to 1907 but an increase after that. The decrease before 1907 is in conformity with the results in previously described districts, but the increase in the last three periods in the production per man does not compare with what has been shown before. This increased production has been influenced to some extent by the introduction of electric haulage underground and also slightly by the increased use of mechanical mining devices. The uppermost set of curves in Fig. 71 shows the average daily output per outside employee. Here, as is to be expected, in the earliest years there is a decrease in production, and then as preparation of coal gradually turned from hand work to mechanical there was a marked increase. This increase begins with 1892 and extends to 1921.

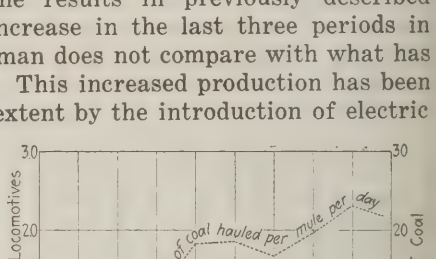


FIG. 70—AVERAGE DAILY TONNAGE HAULED PER MULE AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS IN THE WESTERN MIDDLE FIELD

A description of the methods used in the calculation of these curves will be found in the caption to Fig. 9 in Part 1 of this series of articles, appearing in *Coal Age* of Feb. 22, 1923.

In Fig. 72 the lowest set of curves shows the average daily output per miner and miner's laborer. From 1877 to 1887 there was a sharp drop. If 1897 is ignored, for reasons explained in preceding articles in this series, then from 1902 to 1921 there is a slight decrease in output, discounting also the production during

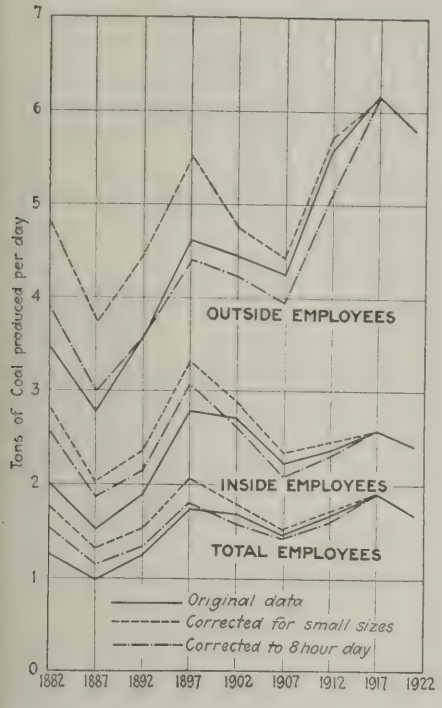


FIG. 71—AVERAGE DAILY PRODUCTION OF COAL PER EMPLOYEE IN THE WESTERN MIDDLE FIELD

This curve gives the average daily production per outside employee, per inside employee and per total employee. A short description of the methods used in the calculations of these curves will be found in the caption to Fig. 10 in the first article of this series, appearing on page 327 in the Feb. 22, 1923, issue of *Coal Age*.

the war year of 1917. Then this curve conforms with the results that have been found in the districts previously described. In fact this district comes close to the average of the other districts in the amount of the decrease in the production per miner and miner's laborer. In the Lackawanna County district the decrease in output was 43.7 per cent; Wilkes-Barre district, 42.9 per cent; Nanticoke district, 54.2 per cent—the greatest decrease in the anthracite region—Eastern Middle field, 37.9 per cent; Panther Creek district, 27.9 per cent—the lowest decrease in the whole region—Western Middle field, about 41.9 per cent, which is close to the average.

As an example of the change in mining conditions from old to new there exists a condition at one of the collieries in this district which is typical. According to the mine maps, the Mammoth bed of coal had been completely worked out and robbed. While making an estimate of the coal remaining in the property an investigation showed that this bed was about 24 ft. thick over the property and that in the old mining they had taken only 8 ft. of the best coal and the rest had been left behind as valueless. In this whole area not only had first mining been done in the 8 ft. of coal but also second mining had been completed and the top brought down.

The Mammoth bed has been opened up again and the remaining 16 ft. of coal is now being removed. It is more difficult to remove this coal than if there had been

TABLE LIII—AVERAGE DAILY TONNAGE HAULED PER MULE AND NUMBER OF UNDERGROUND LOCOMOTIVES PER 100,000 TONS OF ANNUAL PRODUCTION

	Tons Hauled Per Mule	Number of Underground Locomotives Per 100,000 Tons Annual Production		Tons Hauled Per Mule	Number of Underground Locomotives Per 100,000 Tons Annual Production
1887	15.01	....	1907	17.18	0.23
1892	15.62	....	1912	21.50	0.54
1897	18.60	...	1917	25.02	0.86
1902	18.85	0.08	1921	22.90	1.17

TABLE LIV—MULES AND LOCOMOTIVES IN THE WESTERN MIDDLE COAL FIELD

	Number of Mules	Number of Locomotives		Number of Mules	Number of Locomotives
1887	2,759	...	1907	3,496	41
1892	3,219	...	1912	2,923	102
1897	3,559	...	1917	2,608	682
1902	3,412	16	1921	2,503	202

TABLE LV—PRODUCTION AND DAYS WORKED AT ANTHRACITE COLLIERIES IN THE WESTERN MIDDLE FIELD

	Production in Gross Tons	Average Days Worked		Production in Gross Tons	Average Days Worked
1877	5,160,200	187	1902	6,846,900	116
1882	7,694,100	234	1907	15,004,600	265
1887	9,249,300	220	1912	14,014,000	228
1892	9,743,300	204	1917	17,145,500	278
1897	9,042,500	149	1921	16,333,593	282

TABLE LVI—COMPARISON OF AVERAGE OUTPUT PER MAN BY CLASSES OF EMPLOYEES

	Per Total Employee			Per Inside Employee			Per Outside Employee		
	Reported	Corrected for Small Sizes	Corrected for 8-hr. day	Reported	Corrected for Small Sizes	Corrected for 8-hr. day	Reported	Corrected for Small Sizes	Corrected for 8-hr. day
1877....	1.63	2.32	1.98	3.00	4.27	3.85	3.54	5.04	4.03
1882....	1.56	2.17	1.87	2.75	3.83	3.50	3.58	4.97	3.98
1887....	1.43	1.77	1.54	2.41	3.40	3.11	3.55	4.39	3.51
1892....	1.47	1.79	1.54	2.40	2.94	2.68	3.46	4.22	3.37
1897....	1.80	2.10	1.82	2.93	3.42	3.18	4.64	5.42	4.34
1902....	1.71	1.82	1.58	2.76	2.93	2.68	4.46	4.74	4.22
1907....	1.57	1.62	1.50	2.40	2.49	2.36	4.53	4.71	4.19
1912....	1.74	1.77	1.65	2.55	2.60	2.46	5.52	5.74	5.10
1917....	2.00	2.00	2.00	3.00	3.00	3.00	6.06	6.06	6.06
1921....	1.80	1.80	1.80	2.65	2.65	2.65	5.70	5.70	5.70

no mining done in the seam. This therefore means that the production per miner and miner's laborer is lower in this bed than it would be if the coal had not been touched or if first mining had been completed only in the full bed.

Conditions like these are found in many parts of not only this district but others. Areas of coal have been left behind because the coal was not of a sufficiently high quality or because it had become thinner. The coal surrounding it had been completely mined and the roof caved, the virgin coal left behind being rendered much more difficult of recovery. All of these things tend to reduce the production per miner and miner's laborer and therefore per employee. The curve for average daily production per inside company employee presents a saw tooth appearance. If 1897 reports are considered valueless, however, and the average for 1892 and 1902 is taken instead, the curve assumes a more natural

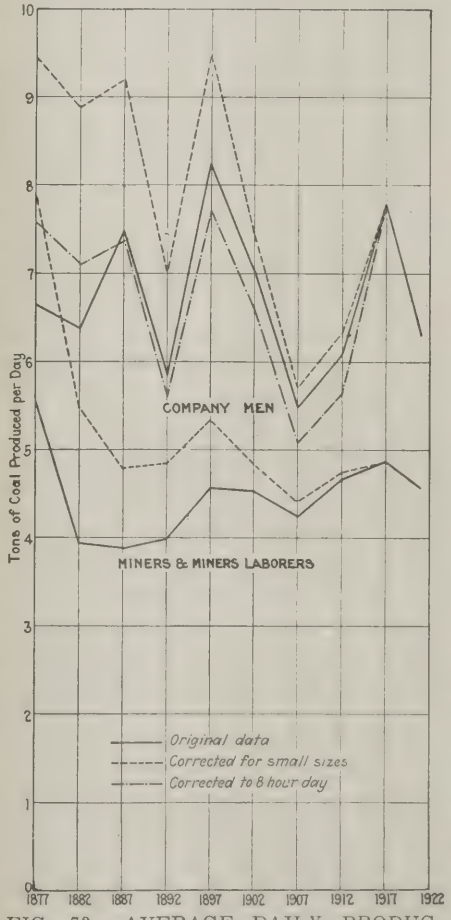


FIG. 72—AVERAGE DAILY PRODUCTION FOR INSIDE EMPLOYEE IN THE WESTERN MIDDLE FIELD

In the issue of *Coal Age* for Feb. 22, 1923, on page 328 the description of the method used in the calculation of these curves is given.

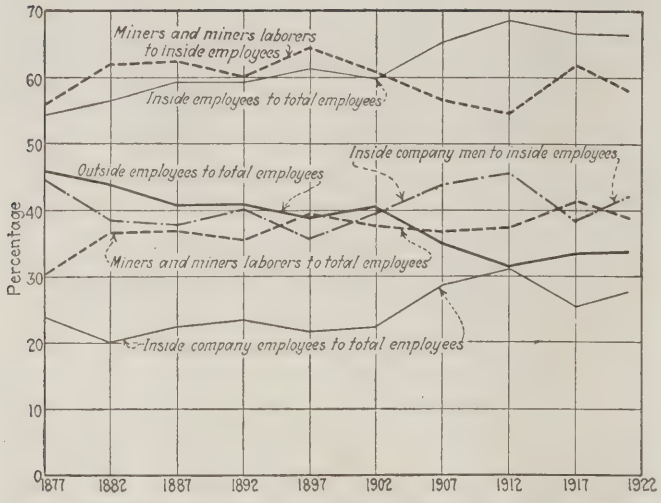


FIG. 73—PERCENTAGE OF EMPLOYEES BY CLASSES IN THE WESTERN MIDDLE FIELD

The data for these curves were obtained from the mine inspector's reports of the Pennsylvania Department of Mines.

shape. Here then we have a generally decreasing average daily output per man from 1877 to 1907. But from 1907 to 1921 it increases if the production for the war year 1917 is properly discounted. This increase in the production per man probably is influenced to a considerable extent by the introduction of underground electric-locomotive haulage. This naturally tends to decrease the number of mules and consequently, the drivers.

With the introduction of underground mechanical haulage it has become possible to haul the coal underground longer distances with more convenience than on the surface. This has led to consolidation of mine openings and therefore hoisting engines for numerous slopes and shafts have been abandoned, thus decreasing the number of engineers.

Another cause for the decrease in the number of underground employees is the use of mechanical means for caging mine cars. At some mines it is possible by the use of such mechanical caging devices to cut in half the number of men required for this purpose. At some mines the introduction of the automatic mine door has done away with a number of door boys which otherwise would be needed. The construction of overcasts has to some extent done away with a number of door boys in the mine. The design and construction of central pumping plants has reduced the number of pumpmen. Each of these factors in itself effects only a small saving but all together they substantially reduce the size of company payrolls.

Fig. 73 shows the relationship between the different classes of employees. As in all previous cases there is a steadily increasing proportion of inside employees to total employees. For the same tonnage the number of outside men required is steadily decreasing as new improvements are made in the methods of preparing coal for the market. For a long period the proportion of inside company men, miners and miners' laborers increased, but in the last few years the increase has been confined to the miners and miners' laborers, whereas the inside company men have decreased. This has been brought out in detail previously in this article.

TABLE LVII—AVERAGE DAILY PRODUCTION OF INSIDE MEN IN GROSS TONS

	Miners and miners' Laborers		Inside Company Men		
	Reported	Corrected for Small Sizes	Reported	Corrected for Small Sizes	Corrected to 8-Hr. Day
1877.....	5.54	7.86	6.64	9.44	7.56
1882.....	3.94	5.48	6.38	8.87	7.10
1887.....	3.88	4.80	7.48	9.20	7.36
1892.....	3.99	4.86	5.84	7.00	5.60
1897.....	4.57	5.34	8.22	9.50	7.70
1902.....	4.53	4.83	7.04	7.49	6.57
1907.....	4.25	4.42	5.48	5.71	5.08
1912.....	4.66	4.75	6.09	6.34	5.64
1917.....	4.86	4.86	7.82	7.82	7.82
1921.....	4.57	4.57	6.31	6.31	6.31

TABLE LVIII—MEN EMPLOYED IN THE PRODUCTION OF ANTHRACITE COAL IN THE WESTERN MIDDLE FIELD

	Total Employees	Inside Employees	Outside Employees	Miners and Miners Laborers	Inside Company Men
1877	17,020	9,208	7,812	.....	.....
1882	21,099	11,926	9,205	.....	.....
1887	29,432	17,439	11,823	10,828	6,611
1892	33,736	19,926	13,810	11,959	7,967
1897	33,720	20,651	13,067	13,283	7,368
1902	34,658	21,371	13,216	13,004	8,367
1907	36,216	23,610	12,515	13,300	10,310
1912	35,420	24,286	11,124	13,192	11,094
1917	30,729	20,558	10,171	12,669	8,889
1921	32,177	21,836	10,141	12,662	9,174

TABLE LIX—PERCENTAGES OF GIVEN CLASSES OF EMPLOYEES TO TOTAL EMPLOYED

	Inside	Outside	Miners and Miners' Laborers	Inside Company Men	Miners and Miners' Laborers* (A)	Inside Company Men (A)
1877....	54.1	45.9	30.1	24.0	55.6	44.4
1882....	56.4	43.6	36.3	20.1	61.8	38.2
1887....	59.2	40.8	36.9	22.3	62.2	37.8
1892....	59.1	40.9	35.5	23.4	60.0	40.0
1897....	61.2	38.8	39.4	21.8	64.3	35.7
1902....	59.7	40.3	37.6	22.1	60.9	39.1
1907....	65.2	34.8	36.8	38.4	56.4	43.6
1912....	68.6	31.4	37.3	31.3	54.4	45.6
1917....	66.8	33.2	41.2	25.4	61.7	38.3
1921....	66.7	33.3	39.0	27.7	58.0	42.0

* Percentage to inside employees.

How Roller-Bearing Wheels Reduce Operating Costs*

By P. B. Liebermann
Industrial Engineer, Hyatt Roller-Bearing Co., Harrison, N. J.

PROMINENT among the claims of the present users of roller-bearing trucks are that they afford an economy in power. Roller bearings will use only 50 per cent of the power that would be needed to haul plain-bearing cars of the same gross weight. As cars with roller bearings are easily pushed by hand the men who have to handle them are better contented and more productive, and where mules are used for haulage their general condition and endurance measured in cars hauled is observed to be bettered.

By the introduction of roller bearings more trips have been hauled and more cars per trip. The easy-running roller-bearing trucks have decreased the maintenance charges of haulage and of gathering locomotives. Mine trucks equipped with roller bearings of the flexible type have been found to start with an expenditure of about one-fifth of the power needed to start plain-bearing cars of the same size. All this means that the strains on cars, motors, storage batteries, mules or miners—whichever furnish the motive power—are greatly reduced. Where mechanical power is used the repair bills are much lowered.

The cost of lubricating roller-bearing trucks is one-fifth of that of lubricating an equal number of trucks equipped with plain bearings, for roller-bearing trucks require lubrication as an average only three or four times a year. The lubricant stays in the wheels and does not leak onto the ground. This efficiency is aided by the fact that wheels equipped with roller bearings

*Article entitled "Roller-Bearing Mine Trucks," read before Illinois Mining Institute.

cannot gauge out in the hub. In consequence they do not get wobbly. Hence, wrecks due to worn wheels are practically eliminated.

Where correctly housed and handled with reasonable care roller bearings give satisfactory service over an extended period. Some which have been in operation from twelve to fifteen years are still in serviceable condition.

The power-saving advantages which roller bearings afford have been recognized in a practical way for many years, but in order to have absolutely authentic proof of their value the Hyatt Roller Bearing Co. several years ago constructed a dynamometer car by which tests were conducted at a number of coal mines under actual operating conditions. The average power saving was shown to be 53¼ per cent on level track, under average haulage conditions.

The adoption of roller-bearing trucks in general and the dynamometer tests in particular had a highly educational effect in so far as they emphasized the importance of related subjects, such as the keeping of mine tracks in good condition with rails fairly clean, and the arrangement of grades so as to get the greatest benefit out of the use of roller-bearing equipment.

Equal Tractive Effort Going and Returning

As far as grades are concerned the consumption of power naturally is least under "equalized conditions" of drawbar pull—that is, when the grades are such that the same effort is required to move a train of loaded cars out of the mine as it takes to move an empty train in. Under these circumstances the capital invested in the whole haulage system is a minimum. By comparing the train resistance for the different types of wheels it is obvious that different grades are needed, depending upon the type of bearing used. The "equalizing grade" for plain-bearing cars is about twice as steep as the grade for roller-bearing cars and the necessary size of locomotive as well as the power consumption is correspondingly greater.

It is evident that not every mine can be laid out for the ideal grade but at the same time it is surprising what can be accomplished by the gradual elimination of existing steep grades. These are a continual source of trouble and expense and it is frequently less costly to accomplish a permanent remedy than to drag along day after day under adverse conditions.

It can easily be seen that a power saving can be accomplished by the use of roller-bearing cars on any grade which may occur in a mine, but the steeper the grade the more the bearing friction becomes overshadowed by the effect of gravity. Consequently, no great increase in train length or production can be expected when the loaded cars must be hauled up a continuous steep grade, but where the gradients do not exceed 5 or 6 per cent roller-bearing cars readily show the gain which their easier running qualities afford.

Assuming that roller-bearing trucks are adopted and that full advantage is sought from the ideal grade that goes with them, the question then arises what that grade is. This can be determined from the formula given on page 1,057 of Bulletin No. 127, July, 1917, American Institute of Mining Engineers, namely:

$$G = \frac{(W_L + R_L) - (W_E + R_E)}{20\ (W_E + W_L + 2M)}$$

Where, G = percentage of the desired grade; W_L = weight of a train of loaded cars in tons; R_L = train resistance of loaded cars in pounds per ton; W_E = weight of a train of empty cars in tons; R_E = train resistance of empty cars in pounds per ton; 20 = gravity force in pounds per ton per 1 per cent of grade; and M = weight of locomotive in tons.

In the same bulletin a typical haulage problem was solved which gave for the plain-bearing trucks an equalizing grade of 0.61 per cent and for the roller-bearing trucks a grade of 0.284 per cent. The roller-bearing grade is enough to allow of proper mine drainage and where it can be installed will be entirely practicable in all other respects.

As has been stated, the saving in power and lubrication effected by roller-bearings is appreciable. Furthermore, the lower roller-bearing grade will permit of the use of smaller locomotives, which in turn means lighter rails. This saving also affects favorably the electrical transmission line, transformers and power house. On account of the reduced drawbar pull, derailments are less frequent, the locomotives are operated with greater safety, car and tracks are subject to less wear and the size of the repair shops can be reduced.

The running gear of mine cars varies greatly. There are wheel hub bearings, bearings in outside boxes and bearings in inside boxes, depending on the location of the bearings in relation to the wheels. Besides this there are axles with two loose wheels, axles with one tight and one loose wheel, axles with two tight wheels and axles split in the middle with one wheel on each half.

These different arrangements of bearings and axles undoubtedly will affect the train resistance, particularly on curves. The dynamometer tests, for obvious reasons, were conducted on tangent track, and therefore information on the individual superiority of any one construction over the others was not obtained.

Generally speaking, wheel hub bearings are preferred by mine operators on light mine cars, say up to 3 to 4 tons' capacity, whereas bearings in journal boxes are specified for the heavier cars.

The application of roller bearings to mine trucks does not require any fundamental alterations in the construction of the wheels, axles, or truck body, nor does it involve any important changes in manufacturing methods for the mine-car builder. In their ease of installation, operation and inspection, the Hyatt roller bearing closely resembles plain bearings. It even allows a liberal side play to the axle, which it so much desired by operators because this play makes trains run more easily and with less wear and tear on cars and tracks and also with fewer derailments.

Wheels equipped with roller bearings differ from ordinary plain bore wheels by having a somewhat larger hub diameter. The front end of the hub is mostly constructed to form an enclosure for the bearing and it serves to retain the wheel on the axle by means of an open or enclosed linch pin or key block. The rear end usually is open, which allows machining from this side on a boring mill. Into the bore is inserted a lining of cold-rolled steel. The rollers are self-contained and after being placed in the hub the latter is closed by means of an end plate or cap of suitable design.

The side thrust on these wheels is taken in the same way as on plain bore wheels—that is, by means of one or more loose washers inserted between the rear end of wheel hub and the axle box. The loose washers have a tendency to reduce friction at this place and to equalize wear and reduce it to a negligible quantity.

When roller bearings were first applied to mine-car wheels they were installed according to the practice

followed in the installation of wheels having a plain bore. So, for instance, the center of the bearing was located perpendicularly over the center of the rail. It was soon found, however, that such a construction was faulty both for roller-bearing and plain wheels, inasmuch as it was observed that the bearings and axles showed signs of wear toward the rear of the wheel. The center of the bearing was then shifted until the load appeared to be distributed uniformly all over the bearing seat. In this event it was found that the center of the bearing coincided with the gage line of the track and therefore this arrangement has been followed ever since.

To obtain proper stability for the wheel itself the length of the bearing should have a certain definite relation to the wheel diameter. For instance, it has been found good practice to install a bearing 6 in. long in a wheel of 12-in. diameter, a bearing 7 in. long in a wheel of 14- or 16-in. diameter and two bearings 4 in. long in a wheel of 18-in. diameter.

The journal boxes should by all means be self-aligning in order to allow the box at all times to follow the axle unaffected by distortions of the truck body. The bearing is retained in a journal box in the same way in which it is housed in a wheel hub—that is, the box has one open and one closed end. The open end is covered by means of a plate or cap of suitable design. Some of the heaviest mine cars have springs put over the journal boxes which equalize the load on the bearings and greatly increase the life of the mine cars as a whole.

High-Carbon Heat-Treated Car Axles Favored

The axles which are recommended are of 0.40 to 0.50 per cent carbon-content steel. Low-carbon axles should never be used, for they will wear infinitely quicker than those with a higher carbon percentage. The slight additional cost of the 0.40 to 0.50 carbon steel is insignificant when considering the wonderful increase in the life of the whole equipment. The steel should preferably be cold-rolled, not machined, at the seat of the bearing. The limits of diameter within which such steel is furnished commercially are such as to make it possible to use the product of the mill with entire satisfaction without any machining operation except the cutting of the steel into proper lengths and the drilling or grooving of it for the retention of the wheels.

Much progress has been made of late in the use of heat-treated axles. These have quite an advantage over ordinary axles and are desirable for the following reasons: (1) They have many times the strength of an ordinary low-carbon axle. The chance of bending or breaking in service is comparatively remote. (2) They are ductile enough if properly tempered, to make them withstand the shocks and abuse of ordinary mine service. (3) On account of the thorough intermixing of the carbon with the iron, the wear at the journals is negligible without necessarily causing additional wear in the wheel hubs or bearing boxes.

The advantages to be derived from heat-treated axles for mine cars were not appreciated until a few years ago, when the ever-increasing demand for greater load capacity, for greater speed and quite often for longer trips set up a demand for better axle material. The advantages arising from their use are well illustrated by the experience of a prominent producing company which stated that "before using heat-treated axles, we sold about a car and a half of scrap axles every year, but since we have been using heat-treated axles we have not sold one in seven years."

Roller bearings must be lubricated in order to reduce the wear of the rolling surfaces to a negligible minimum and to prevent the formation of rust. The thinnest lubricant would be the most efficient, but on account of unavoidable leakage it would be the least economical and therefore heavier lubricants are recommended. Such heavier lubricants are really liquid greases. Lubricating greases are mineral oils which are artificially thickened by dissolving soap in them.

Lime, soda or lead soaps made with various fats and oils usually are employed for this purpose. The lime soaps are preferable for mine-car service because they can be used without harmful results when moisture is present. It is essential that a high-grade mineral oil be used in a grease for roller bearings and that there be present no free alkali or free acid. Most greases contain a trace of the latter. The maximum quantity of free acid should not in any case exceed 0.25 per cent. In general, a suitable lubricant should have the following requirements: (1) It must not produce any corrosive action either originally or through deterioration. (2) It must be liquid enough to flow between the rollers at ordinary temperatures and also at lower temperatures down to at least 10 deg. F.

The economy of a suitable lubricant applied to a correctly housed roller bearing is remarkable. Three or four fillings per year as an average are all that are necessary for Hyatt bearings.

If the cars are lubricated three times a year it means that the cost of grease will be about $1.20 per car per year, figuring on the application of one pound of grease to each wheel each time a car is greased, or, in other words, a total of 12 lb. of grease would be used, which can be bought at an average price of 10c. per pound.

The cost of applying the grease has been determined by mine operators as being in the neighborhood of 30c. to 40c. per car per year, so that the total cost of lubricating a car for a year would be approximately $1.50 to $1.60. Some operators lubricate their Hyatt-equipped cars for as little as 70c. a year.

Extended oiling periods—that is, the lubrication of cars once every nine or twelve months—are purposely not recommended for the reason that it is felt that the operator sacrifices several years of life in an endeavor to save a few cents per car per year. It is better to waste a little lubricant than it is to jeopardize the success of the equipment.

It has been developed by a number of operators that it costs in the neighborhood of $4.50 to $5 to lubricate a plain-bearing car for a period of one year. These figures include the cost of labor and black oil, which is the lubricant commonly used.

In conclusion, it is only fair to say that during the early stages of the use of roller bearings all the advantages claimed were not realized to the same degree as they are now. The construction of the bearings themselves, the wheels, journal boxes, axles, lubricants, etc., all had to be developed and improved to take care of the severest mine-haulage conditions and to keep step with the general progress in truck building that took place at the same time.

By persistent efforts all weak spots were eliminated to such an extent that during the past six or seven years nothing has happened to indicate that there is anything that could be done to improve the methods of manufacture and the subsequent operation of the trucks.

Quick and Simple Way of Testing for Carbon Monoxide In the Blood or in the Atmosphere

Qualitative Test Takes Three Minutes, Quantitative Fifteen—Blood Carefully Mixed with Water and Treated with Tannic and Pyrogallic Acid—Pollution Determined by Comparison of Color with Standards

By N. C. McLoud
Baltimore, Md.

SUCCESSFUL combat against carbon monoxide, the most insidious and one of the most deadly of poisonous gases, is involved in a momentous discovery just announced by the U. S. Bureau of Mines.

The greatest danger from this gas in the past has been due to the impossibility of detecting its presence. The gas is colorless and has no odor or taste in the percentages usually encountered. For this reason, victims of the poison have no way of knowing whether they are exposed to the gas until the toxic effects are well under way. Diagnosis of the poisoning has been difficult for the reason that carbon monoxide often appears in unsuspected places and may be absent where it might be expected, and further, because the symptoms of this type of poisoning are the same as those caused by other forms of ailment.

Through investigations conducted by technical experts for the government, detection of the gas and diagnosis of the symptoms have been greatly simplified. For some time past the Bureau of Mines has been conducting reasearch work on this subject. As a result, means have been found by which it is possible to discover within three minutes the extent to which a person has been affected by carbon monoxide. Formerly the presence of the gas could be diagnosed only after from 24 to 48 hours, even when the services of a hospital or well-equipped laboratories and a skilled chemist were available.

Under the new method the test is effected by the use of a simple and inexpensive instrument which may be carried in the pocket and which requires no special training for its operation. It is expected that many lives will be saved by a general adoption of this mode of finding gas poisoning, not only in the mining industry but also in other fields where this gas is a menace. With this quick method of diagnosis it is possible promptly to put in operation the proper emergency treatment, a course impossible without a rapid diagnosis.

The widespread danger from monoxide is clearly recognized. It exists in countless places, from coal mines to homes in which gas is used for heating and cooking. It is generated by the imperfect combustion of explosives. It is found in the atmosphere around coke ovens, in the smoke from burning buildings and in garages where poor ventilation permits the accumulation of the exhaust gases of automobiles. Citizens in all walks of life are subject to possible exposure to the deadly fumes, and because of this the new instrument is expected to be generally used by physicians, according to Dr. Hubert Work, Secretary of the Interior and a former president of the American Medical Association.

It is stated by the Bureau of Mines that the only infallible test for carbon-monoxide poisoning is by examining the blood. The instrument devised for this purpose and the method of its use have been evolved by Dr. R. R. Sayers, chief surgeon of the Bureau, with the collaboration of W. P. Yant, chemist at the Pittsburgh Experiment Station. For detecting the presence of the gas in air the method consists primarily of taking a sample of normal human blood, diluting it with water and shaking the mixture into equilibrium with the gas. By this means the amount of carbon monoxide in the air may be determined in low concentrations to an accuracy within one-tenth of 1 per cent. The same apparatus can be used for determining carbon monoxide in the blood of a supposedly poisoned patient. The apparatus is simple, portable and compact, and the making of determinations requires no special skill.

Many methods for the detection of carbon monoxide in the blood have been developed, but owing to their various individual disadvantages, they have never come into common use. Some of the quantitative methods are satisfactory from a standpoint of accuracy, but require elaborate and expensive apparatus, special technique and training, or are too delicate and cumbersome for field use. The Bureau's instrument overcomes all these obstacles and affords an apparatus which should not cost, at the outside, more than $25 or $30. A statement prepared by the Bureau says:

"It is of vital importance in all industrial and domestic accidents occuring at places where carbon monoxide might be suspected or where the symptoms are typical of carbon-monoxide poisoning, that a qualitative and, preferably, a quantitative determination be made to show the presence or absence of carbon monoxide. The latter is preferable because the extent of the poisoning is of importance in deciding whether carbon monoxide is a direct or contributory cause. This is, indeed, essential from a medical standpoint, as it aids in prescribing treatment, and, from a legal standpoint, to insure justice in the claims that are often unjustly decided for want of positive evidence.

"In view of the foregoing, an apparatus has been designed which gives accurate results in the field and

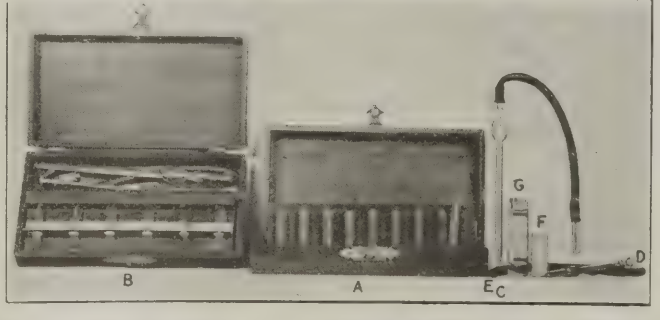


FIG. 1—KIT TO TEST FOR CARBON MONOXIDE IN BLOOD
A, tube of sample colors for comparison with that of the test sample; B, test tubes for preparing blood, dilution pipette (also C); hemospast (also D) and rubber hose (also E) for the binding of the patient's finger; F, capsules of tannic and pyrogallic acid, G, water bottle.

laboratory, yet is so compact that it can be carried in the pocket, though durable and sufficiently simple in operation to be used without special training. By use of the method to be described it is possible to detect the presence of carbon monoxide in the blood in three minutes and to determine the exact quantity present within fifteen minutes, and, on the basis of these findings, to administer treatment. The method and apparatus should fill the needs of hospitals, industrial surgeons, safety engineers, coroners, departments of public safety, boards of health and other allied agencies."

The method is based on the fact that a light brownish-gray substance is suspended in the liquid after a few minutes when normal blood is diluted with water and treated with a solution of tannic and pyrogallic acids. In blood having carbon monoxide in combination with all of the hemoglobin the suspension is light carmine. Carrying this a step further it is found that in any mixture of normal blood with blood containing carbon monoxide, the suspension which is formed will be a corresponding mixture of the two extremes of color. Consequently for tests according to the method installed by the Bureau a set of standards, or vitals are provided, variously colored to represent the different colors produced by varying, but known, percentages of carbon monoxide in combination with hemoglobin. By making comparisons, specimens of blood having unknown percentages of carbon monoxide can be matched with these standards and the degree of poisoning accurately appraised by mathematical formula.

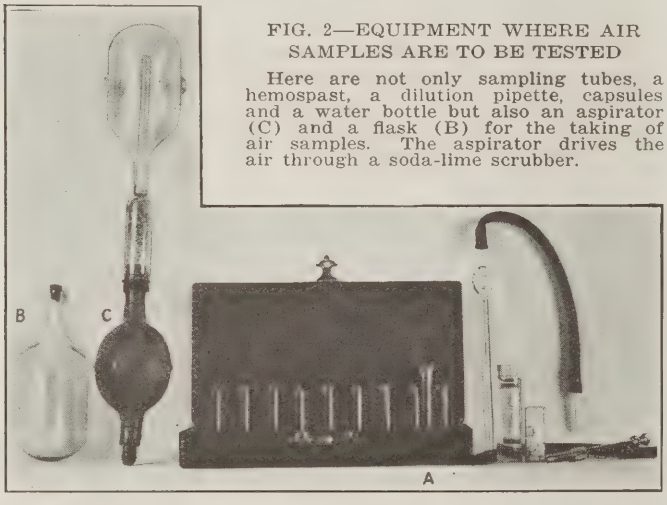


FIG. 2—EQUIPMENT WHERE AIR SAMPLES ARE TO BE TESTED

Here are not only sampling tubes, a hemospast, a dilution pipette, capsules and a water bottle but also an aspirator (C) and a flask (B) for the taking of air samples. The aspirator drives the air through a soda-lime scrubber.

"The former technique of making a determination was to prepare standards from blood, but these were not permanent, and the frequent necessity for making them was undesirable," says the statement. "To overcome this, standards have been developed and prepared from pigments, which have been found to be satisfactory for routing analysis. When not in use these standards should be protected from light. The former procedure also involved the use of chemical solutions which deteriorated on standing, and it was necessary to have them freshly prepared. This objection has been eliminated by preparing the chemicals in solid form. These changes, together with the adoption of a solution pipette, have lessened the number of operations and pieces of apparatus required for a determination. The apparatus at all times is ready for use."

The complete outfit is shown in Fig. 1, and consists of the following:

(a) Set of permanent standards made to match the color of blood having varying quantities of CO.HB (0, 10, 20, 30, etc., per cent), arranged in a rack with spaces between for interposing tubes of similar size containing specimens of blood for analysis. (b) Small test tubes (of the same size and glass as those used for standards) for preparing the specimens of blood. (c) A dilution pipette for measuring blood. The long capillary stem is calibrated with a 0.10 c.c. mark, and the total pipette has a volume of 2.0 c.c. This allows the dilution of 0.10 c.c. sample of blood with water to 2.0 c.c., or a ratio of 1 in 20. (d) A spring hemospast for making small puncture wounds from which blood is obtained. (e) Rubber hose for wrapping the subject's finger during the taking of the blood sample. (f) Tannic-pyrogallic-acid mixture (0.04 gram of a 1:1 mixture) for reducing the colored suspension in the diluted specimen of blood. (g) Small bottle of water for diluting the blood.

All of the above apparatus is arranged in a compact pocket case 3 x 7 x 1¼ in.

The procedure is as follows: A small puncture wound (approximately 2 mm. deep) is made with a needle or hemospast in the tip of the finger or other convenient part of the body of the supposed victim of carbon-monoxide poisoning. If the blood does not flow freely the finger may be wrapped with the rubber hose, beginning at the base and progressing toward the tip. Massaging the finger also aids the flow. If death has occurred it may be difficult to obtain liquid blood, but this can be done during the process of embalming. When the blood has been procured it is quickly drawn into the stem of the pipette to the 0.1 c.c. mark.

The pipette is then held in a horizontal position, and any blood on the exterior of the tip is removed. The tip is slightly raised to allow a little of the blood to flow into the diluting bulb, and, by inserting it quickly into the bottle of water, and using suction at the same time, it can be filled to the 2-c.c. mark to give the proper dilution. The blood solution is then discharged into one of the test tubes, a little of the solution being drawn back once or twice into the pipette to wash out any adhering concentrated blood.

The entire procedure of obtaining the blood specimen should be as rapid as possible to eliminate possible clotting. In case it is desired to take more than one sample the pipette can be rinsed out by using a little of the dilution water, being careful to blow the capillary stem free of water before taking the next sample.

Immediately after the blood solution has been discharged into the test tube, the contents of a capsule of the tannic and pyrogallic acid are added, and the tube is inverted three or four times to insure thorough mixing of the reagents. It is then placed in the rack and allowed to stand fifteen minutes at room temperature. It is then compared with the standards by interposing it between them and finding the standard which it most nearly matches in color, and then estimating the percentage of carbon monoxide-hemoglobin from the value of that standard. The value of the standards give directly the quantity of carbon monoxide in the unknown specimen of blood. If carbon monoxide is indicated, the tube should be allowed to stand fifteen minutes longer, taking the latter reading as being the more accurate. Observations may be taken after several hours without serious loss of accuracy, although this is not advisable except in case of necessity.

For determining the presence of carbon monoxide in

the air, some additional apparatus is provided, to be used in connection with the set of standards. The outfit includes, as illustrated in Fig. 2, the following: (a) Complete set of standards, as shown in Fig. 1; (b) air-sample bottles of at least 250-c.c. capacity, fitted with rubber stoppers; (c) rubber aspirator bulb with attached "scrubber" (a tube of soda-lime) for removing gases which might have an interfering effect.

In applying this test a sample of air is obtained by inserting the glass tube, on the end of the scrubber, into the sample bottle, as shown in Fig. 2, and then aspirating the air through the sample bottle long enough to purge it of its original contents—at least twenty-five squeezes of the bulb.

The blood to be used in making the analysis should be taken from a person who has not been exposed to carbon monoxide. The 0.10 c.c. of blood is diluted to 2 c.c. All of the 2 c.c. blood solution is discharged immediately from the pipette into the sample bottle.

The atmosphere thus introduced should be brought into equilibrium in a dimly lighted place. After replacing the stopper, the bottle is held horizontally and rotated constantly for fifteen to twenty minutes, violent shaking and agitation being avoided. As much as possible of the surface of the bottle should be covered with the blood solution. Every now and then the solution can be centrifugally thrown from the sides to the bottom of the bottle by a quick swinging motion, which allows a new surface to be formed and aids in reaching equilibrium.

When the equilibrium has been finished, the solution is poured into a test-tube, the tannic-pyrogallic acid added, and the determination of carbon monoxide-hemoglobin made according to the procedure already described.

To test the accuracy of the method, synthetic carbon monoxide-air mixtures varying from 0.01 to 0.15 per cent were carefully made by volume, and 150 c.c. samples were taken for blood analysis, and some of the higher percentages for combustion analysis by the Haldane method. The blood analyses were run in triplicate, using blood from a different subject for each. Observations as to the amount of carbon monoxide-hemoglobin were made by three men—one experienced, and two inexperienced—the latter having no knowledge of the origin of the sample. Since this test for accuracy was made the method has been used continuously as a check



FIG. 3—MATCHING SAMPLE WITH SCALE OF COLORS

An experienced man can readily place the sample where it belongs and so ascertain the approximate percentage of carbon monoxide in the blood being tested.



FIG. 4—EXTRACTING BLOOD WITH THE HEMOSPAST

Blood is taken from normal men for use when a test is to be made to find the percentage of carbon monoxide in the air. It will be noted that a rubber tube is entwined around the subject's finger so as to put the blood under pressure and cause it to pass more readily into the hemospast.

on the carbon monoxide found by analysis of mine and tunnel atmospheres and the products of combustion from gas stoves, by the Haldane combustion apparatus, and in all cases the results have been satisfactory.

When no carbon monoxide was present out of mine observations, on three samples, only one reported it as present, and then only 0.005 per cent. The greatest error reported was 0.005 per cent, with 0.01 per cent carbon monoxide in the gas, excepting one observer who reported 0.00 carbon monoxide for one of the samples. As the percentage of carbon monoxide increased, the error also increased, as would be expected from the nature of the dissociation curve; but in all events the results obtained are within the limits of error allowable from the standpoint of the purpose for which the method was devised.

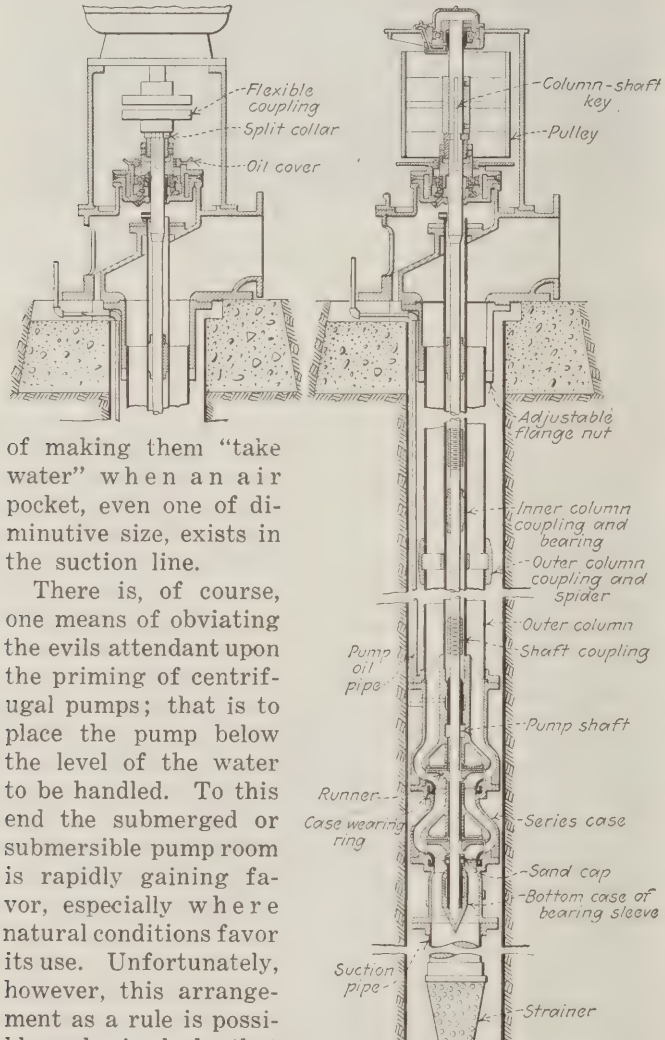
To sum up the matter: (1) A durable and compact laboratory or field apparatus for the quantitative determination of carbon monoxide in blood and air has been described. On account of the compactness, durability, and the ease with which accurate and dependable results can be obtained, it should be of great use in investigations pertaining to the cause, diagnosis and treatment of carbon-monoxide poisoning. (2) the percentage saturation of carbon monoxide in blood can easily be determined to an accuracy of 5 per cent. (3) The accuracy of the method for determination of carbon monoxide in air, even when used by inexperienced men, was found to be 0.005 per cent in regions of 0.000 to 0.05 per cent carbon monoxide; 0.01 per cent in regions of 0.05 to 0.08; 0.02 per cent in regions of 0.08 to 0.12, and 0.03 per cent in regions 0.12 to 0.18 per cent carbon monoxide.

COAL-PREPARATION STUDIES.—Thomas Fraser, assistant mining engineer, and H. F. Yancey, assistant chemist, attached to the Central District experiment station of the U. S. Bureau of Mines, Urbana, Ill., have completed a series of experiments on the cleaning of central Illinois coal screenings. A report on the subject has been prepared. Messrs. Yancey and Fraser have determined the forms of sulphur in the products obtained in washing tests on central Illinois screenings. The results show this coal to be high in finely disseminated pyritic sulphur as well as in organic sulphur. Work has been undertaken on samples of coal from Wyoming to determine whether it is amenable to improvement by the dry table cleaning process.

Deepwell Pumps Adapted to Mine Drainage; Submergence a Favorable Condition

OF THE many problems connected with mine drainage that of priming the pumps unquestionably is one of the most troublesome. This is particularly true of centrifugal machines. Priming a pump, as a rule, is not a difficult or expensive operation. It is, however, a vexatious one. Furthermore, everyone that has had experience with pumps of this kind knows the difficulty of making them "take water" when an air pocket, even one of diminutive size, exists in the suction line.

There is, of course, one means of obviating the evils attendant upon the priming of centrifugal pumps; that is to place the pump below the level of the water to be handled. To this end the submerged or submersible pump room is rapidly gaining favor, especially where natural conditions favor its use. Unfortunately, however, this arrangement as a rule is possible only in beds that pitch more or less steeply, such as those of the anthracite region and the mountain states of the West.



DEEPWELL PUMP

This pump relies on the principle of submergence, the water standing in the impellers when the pump is not running.

A type of pump that has been used to an appreciable extent in other industries and which overcomes the difficulty of priming has more recently found a place in the coal mines. This is known as the Byron Jackson deep-well turbine pump, made by the Byron Jackson Iron Works, of San Francisco, Calif. This pump is of the vertical-shaft type and is driven either by belt or direct by vertical motor. This arrangement allows almost any distance to intervene between the motor or pulley and the pump.

As a result the machine may be installed in a shaft with the pump submerged within the sump and the driving motor well above high water; or the pump may be placed in a borehole and the motor installed on the surface. Again the pump may be placed in a sump in one bed while the motor may be installed in a bed above, the shaft extending downward either through a borehole, a winze or an upraise.

Any one of the arrangements outlined possesses certain obvious advantages. Not only is the pump always submerged so that it is certain to take water immediately upon starting but the motor always is high and dry, where it will never be in danger of being flooded. In case the motor is placed on the surface and the water is discharged through a borehole the motor is in such a position that it can be cared for in a proper manner and be given the same kind of attention that is bestowed upon the rest of the surface equipment. Furthermore, when this arrangement is adopted the motor is not subjected to the dampness of the mine atmosphere.

Choosing a Permissible That Will Produce A Large Percentage of Lump Coal*

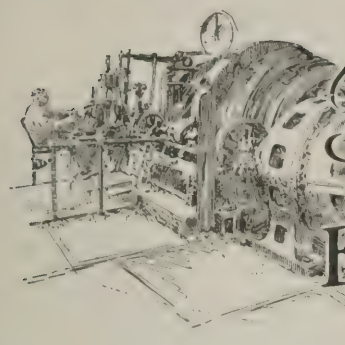
BY CHARLES S. HURTER

EXPLOSIVES users tend to inquire first as to the relative quickness of an explosive when they wish to break up material into large pieces, for they fear that an explosive that has a high rate of detonation will shatter that material, but it has long been known in rock work that the size of the product is governed by the strength per cartridge quite as much as by the quickness of the explosion. In tight work some dense, comparatively slow explosives have produced as large material as lighter and quicker explosives, because the charge, being held in, is enabled to gain its full strength before the material to be blasted gives way. Consequently its deficiency in quickness does not act to its disadvantage. On the other hand, a light, quick explosive has produced coarse-sized material when, by reason of its being relatively light, it is distributed over a greater length of hole. Hence there is not the explosive strength per foot of charge to give the smashing effect.

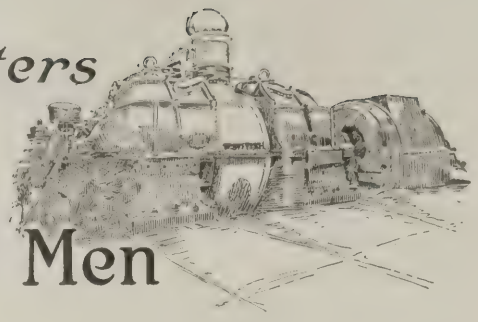
These principles apply also to blasting coal. Therefore in studying the Bureau of Mines list of permissibles to choose an explosive for producing lump coal, not only "Velocity of Detonation" but also the "Unit of Deflective Charge" (strength) and the "Weight of a 1¼x8-in. Cartridge" should be considered. The unit of deflective charge is the weight of explosive, in grams, equal in strength to ½ lb. (227g.) of 40-per cent straight nitroglycerin dynamite. This will make up into a cartridge about 1¼x8 in. Thus, the lower the figure in this column, the greater the strength of the explosive. With a given unit of deflective charge the lighter the cartridge, the less its strength and the more cartridges per case.

Even though an explosive has a low unit of deflective charge—that is great power per unit weight—and a high velocity of detonation, it will produce good lump coal if the weight of a 1¼x8-in. cartridge is low. This has been shown conclusively by the results obtained with the newer types of ammonium-nitrate explosives having a large number of cartridges per case. The cartridge or bulk strength of an explosive is of great importance in the production of lump coal from thin beds where the coal is undercut. When the strength and density are about the same, then the explosive having the lower velocity will probably produce the larger percentage of lump coal.

*From the *DuPont Magazine*.

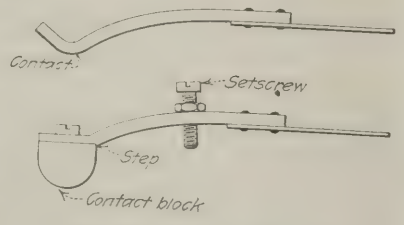


Practical Pointers for Electrical and Mechanical Men



Economy in Controller Maintenance; Repairs to Fingers

WITH production costs at the present high level, maintenance charges have to be kept at a minimum, and any suggestions with this object in view deserve consideration. Controllers for regulating the speed of motors in mines have to withstand exceptional usage. In addition to ordinary fair wear and tear, electrical apparatus generally is exposed to careless treatment, which in the case of controllers often leads to serious burning of contact fingers and drum segments. This involves frequent repairs and renewals. Makers usually are prepared to supply spare fingers and contacts, but much of this expense can be saved by making the spares at the mine and where necessary altering contact fingers so that repairs are facilitated and efficient operation maintained at a low cost. The upper portion of the figure shows a typical contact finger fitted to large numbers of controllers.



STANDARD FINGER AND ADAPTED FINGER

Burning tips attached to the standard finger cut down the maintenance cost of controllers. Contact blocks may readily be renewed or the finger adjusted.

It is obvious that when the contact portion becomes badly burned, the whole finger has to be scrapped. Moreover, during service the finger either must be filed in position or it must be entirely removed for the purpose. The first method is objectionable because of the filings getting into the oil in oil-immersed controllers, and causing short-circuits. Further, it is very difficult to file away the burnt surface with the finger in position. Taking out the finger often involves the removal of two small screws, which usually are difficult to replace because of the spring in that portion of the finger which supplies the tension when it is screwed home. Both time and money can be saved by fitting the fingers with contact blocks as shown in the lower part of the figure. Fingers that are not too badly worn can easily be altered and spares might be fitted with blocks ready for inserting in the controller when required.

The method of fixing the contact blocks is clearly shown in the figure, which is almost self-explanatory. The contact finger to be altered should be heated and the end flattened. Then it should be filed to form a step toward the heel against which the contact block rests when held in position by its screw. This prevents the block turning in the event of the screw becoming loose. The blocks can be cut from square copper bar which in lengths of, say, 1 ft. or 12 in. have been shaped in the machine shop. The bars should be marked off, drilled and tapped before being cut into blocks. Afterward they should be fitted to a standard finger so that they will be interchangeable. The fingers too should be made to a standard, for the same reason.

To allow for adjustment each finger should be provided with a set screw and a locknut, so that as the blocks wear, the fingers may be lowered to keep the contact portion of all blocks in perfect alignment. The block should be held in position by cheese-head screws, and if found desirable they may be fitted with locknuts. The advantage of these interchangeable blocks is that each controller can be provided with a spare set to replace those taken out for repairs. The block can be changed quickly, those taken out being filed up in spare time ready for replacing when further repairs are necessary. For controllers doing heavy service, allowing only short periods when repairs can be done, these block contacts are very convenient. R. F.—E.

A Simple Explanation of Dynamic Braking And Dynamic Lowering

RECENT developments in controllers for small hoists and mine locomotives have proved that dynamic braking and dynamic lowering are both economical and very practical. Economical because the wear and tear of brake shoes and brake rigging especially on mine locomotives is reduced to almost nothing. Practical because controllers are now designed which can be installed with very little extra cost and operated with very little extra maintenance and the number of repair parts hardly more than were required with the old type of controller.

Dynamic braking and dynamic lowering are not on and the same thing although both are mistaken one for the other. Dynamic braking, which is a system of braking whereby the load is actually retarded, is obtained by shunting a resistance around the armature and series field, making in fact a series generator, as shown in Fig. 1.

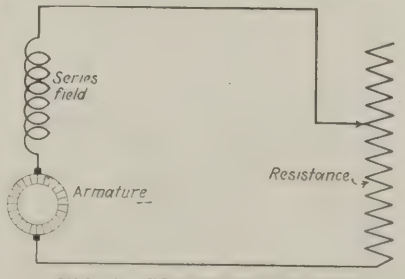


FIG. 1—CONNECTIONS FOR DYNAMIC BRAKING

With this arrangement of the circuit the series motor is used as a series generator, thus creating a counter torque to that of the descending weight. The series generator is loaded by means of the usual control resistance, which may be varied by the controller. When the armature stops, the counter torque of the generator is zero; therefore it is necessary to apply a mechanical brake to hold the descending weight at rest.

This connection will retard the load —i.e., slow up the

speed to a point where the current generated in the armature exerts a torque that is just sufficient to balance the load. This speed at which the load will be held constant is a function of the grade and the weight. Any increase in speed now would increase the current, which in turn would increase the torque, thus exerting a greater retarding effort. Any decrease in speed would decrease the current generated in the armature and consequently decrease the torque, exerting a smaller braking effort.

The foregoing is for any given value of resistance inserted in series with the armature. As mentioned in the preceding paragraph, for any particular grade and weight and with a particular value of resistance inserted in series with the armature there is a definite speed at which the load will move. With these same conditions of weight and grade the speed can be varied by increasing or decreasing the amount of resistance. Controllers are designed to do this and the maximum braking will occur when the armature is short-circuited through the series field and the minimum amount of braking will occur when the maximum resistance is placed in the circuit—that is, on open circuit. One thing must be noted and that is that when the armature stops revolving the braking effort is entirely lost. It is evident then that to bring the load to a standstill the mechanical brakes must be applied.

Dynamic lowering is a term applied to a system of retardation or the holding of the load at any given speed desired regardless of the conditions of grade or size of load. This is accomplished by making a shunt generator out of the motor and connecting it across the line. It will be well to note here that dynamic braking is applied on locomotives mostly, while dynamic lowering or a combination of the two is used on hoists. An understanding of dynamic lowering can be obtained from Fig. 2, which is a schematic diagram of a hoist controller which in the off position of the controller handle gives a dynamic braking connection and in other positions of the lowering position dynamic lowering. Fig. 3 is the actual connection diagram of the controller.

Referring to Fig. 2, in lowering, starting from rest the load will speed up as soon as the mechanical brakes are released and will be held automatically constant at some definite speed. Moving the controller handle now

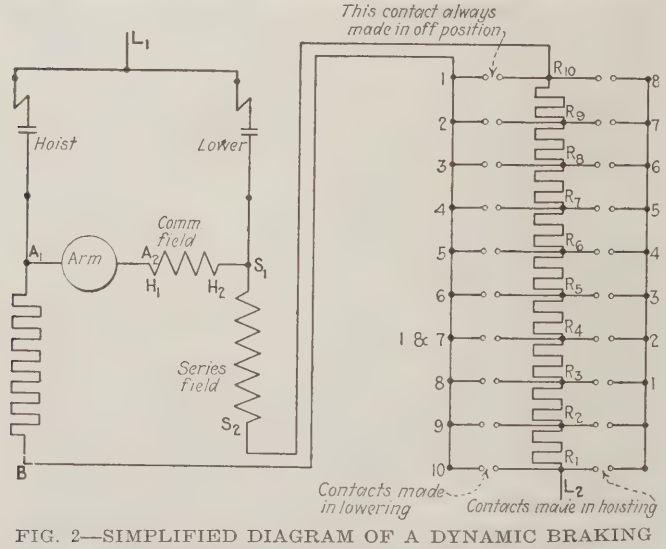


FIG. 2—SIMPLIFIED DIAGRAM OF A DYNAMIC BRAKING AND DYNAMIC LOWERING CONTROLLER

Most hoist controllers are arranged to give dynamic braking for making a stop and dynamic lowering for regulating the speed of the descending weight.

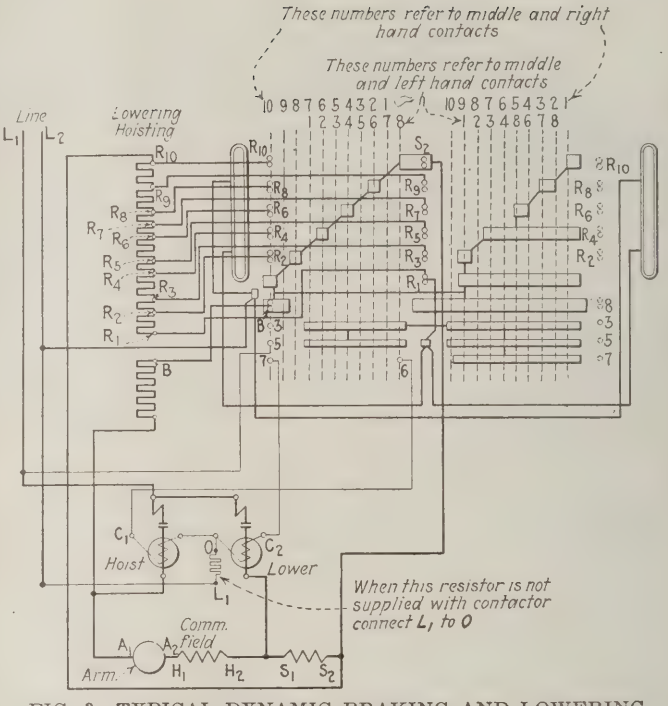


FIG. 3—TYPICAL DYNAMIC BRAKING AND LOWERING CONTROLLER

These controllers give ideal control of the load and aside from making the operation easier, permit safer handling and subject the equipment to less mechanical shocks and jars.

to the first notch, lowering, closes the main-line contactor and closes contact fingers 1 and 7 in the controller. This makes a shunt generator connected across the line. A condition of maximum current is now attained in the field. The second notch on the controller in lowering closes contact finger 2 in the controller, which weakens the field, allowing the load to speed up. Then closing successively fingers 3 and 4, etc., the motor speeds up until maximum speed is reached and contact finger 10 within the controller is closed. To retard the load the controller is swung to the off position, which, as before mentioned, makes a series generator short-circuited through a resistance. The motor slows down and finally the mechanical brakes are applied to bring the load to rest. Analysis of the diagrams will show that the wiring installation is no more complicated than with other types of controllers.

O. E. KENWORTHY.

Wilkes-Barre, Pa.

Useful Table for Construction Work

THE more general housing of electrical equipment in concrete or otherwise fireproof buildings frequently requires the drilling of holes for attaching equipment. I therefore wish to submit for publication the following table showing the dimension of drills to be used with expansion bolts which will no doubt prove valuable:

Diameter of Bolt	Diameter of Drill	Diameter of Bolt	Diameter of Drill
¼ in.	½ in.	⅞ in.	1 in.
5/16 in.	5/8 in.	1 in.	1⅛ in.
⅜ in.	⅝ in.	1⅛ in.	1¼ in.
½ in.	¾ in.	1¼ in.	1⅜ in.

A. J. KELLEY,
Construction Foreman.

UNFORTUNATELY, AN INTELLIGENT MINORITY doesn't always stay that way after it becomes a majority.—*Chicago Journal.*

Will Pulverized Coal Be Substituted for Fuel Oil in Smelting Operations?*

Freight Rates and Number of Heat Units Big Factors in Comparing Fuels—Pulverized Coal Has Higher Thermal Efficiency Than Mine-Run—Cheap Electrical Power from Water-Power Developments May Compete with Fuel Oil and Coal

By T. H. O'Brien
General Manager Inspiration Consolidated Copper Co.

CONSIDERATION frequently has been made of late by a large number of copper smelters of the advisability of replacing fuel oil with pulverized coal as a heat-producing medium for smelting operations. This matter has been, and is more so now than at any time heretofore, of great importance. Due to the intensive development of oil-producing areas of the world and the tremendous use of fuel oil for many purposes it seems that before many years the supply of oil will become so small as to prohibit its use for such operations as smelting. This may be caused by prohibitive prices, or even by government regulations as a conservation measure.

In the event that the use of fuel oil becomes out of the question, the copper companies have just two alternatives: the use of pulverized coal or electricity.

There is no doubt whatever that the consumption of copper is going to increase, perhaps for the next ten years. This means that more copper mines will be developed, and the mines that are now producing will be called upon for a greater production. This all tends to show that the mine manager who is looking ahead must develop some substitute for fuel oil in the event of its use becoming prohibitive, and all indications seem to point in that direction.

The only coal which is commercially available to the smelters in the Southwest must come from Colorado and New Mexico. These coals are high in ash and volatile matter and comparatively low in calorific value.

Distance from Mines an Economic Factor

The proximity of the smelter to the coal mines is a large factor in determining which fuel is more economical. Most of the smelters within two or three hundred miles of the coal mines find it more profitable to burn coal, while those at greater distance find that the higher freight charges on coal make the use of oil more economical.

The use of pulverized coal entails a much greater initial expense than does the use of oil. A small pulverizing plant is far from economical. There have been a number of small individual units put on the market in the last few years, but they have not been very successful either in the product which they have delivered or from the standpoint of operating expenses. This fact nearly prohibits the small operator from using coal.

The freight rate on oil usually is less than on coal, also the tank cars are owned by the oil companies, and it is up to them to provide cars in sufficient number to handle their output, while in the shipment of coal one is dependent on the railroads for cars.

Heavy construction expense would be necessary in changing the equipment of boiler plants from their present oil-burning system to a coal-burning system. In case the coal was not pulverized, overhead bins and mechanical stokers would be necessary. Also, the available coals would not burn with a high efficiency over grates. The consumption of coal by reverberatory furnaces is 50 per cent greater than by boilers in the Southwest, and to obtain a reasonable efficiency the coal must be pulverized for furnace work.

In a large reverberatory plant the cost of preparation of the coal should not be over 75c. per ton. This would include such items as local switching, weighing, unloading, crushing to slack size, drying, pulverizing, conveying, feeding, etc. Local conditions might vary some of the above items materially. In some cases, drying might not be necessary and in others it might cause an excessive expense. Also ash removal in some plants might be very expensive, especially if the plant were not built for powdered-coal burning.

Expensive Aspects of Coal as Fuel

Due to the uncertainties caused by possible labor and railroad strikes, it would be imperative for the copper companies to carry large stocks of coal, with the consequent heavy interest charges and constant danger of fire and deterioration.

Grinding and drying costs on coals high in ash and moisture are high. The freight charges on noncombustible materials would be a considerable item on these coals. Thermal efficiency on high-ash coals is greatly increased by pulverizing.

After a coal is satisfactorily pulverized and delivered to the burner, the regulation of the heat is as easy with coal as with oil. Coal in a powdered form is about as combustible as gasoline, and constant care must be used in its storage. A coal-pulverizing plant must always be kept scrupulously clean and dust in the atmosphere kept at a minimum. Even with the greatest precaution, there always is constant danger of disastrous explosions.

The cost of local switching, measuring, pumping, heating, atomizing and maintenance of fuel-oil equipment will range from 10c. to 20c. per barrel of oil, with an average of about 13c. in a large, well-managed plant.

Therefore, coal containing 10,000 B.t.u. per pound and selling at $2 per ton at the mine, with a preparation cost of 75c. per ton, will stand a freight charge of not to exceed $3.80 per ton, in order to compete with oil at $1.87 f.o.b. cars at point of consumption. Coal containing 12,000 B.t.u. per pound would carry a transportation charge of $4.55 per ton.

With oil costing $3 per barrel burned, or $2.87 f.o.b. cars at point of delivery, 10,000 and 12,000 B.t.u. coals would have an even break at a cost in the furnace of $9.70 and $11.65 per ton respectively. With prepara-

*Paper read before Rocky Mountain Coal Mining Institute.

tion costs of $1 and a freight charge of $5 per ton, the price at the mine should not exceed $3.70 and $5.65 per ton respectively. The above costs do not include capital charges, taxes, etc.

In a new installation the cost of storage and handling equipment for coal would to some extent be matched by that necessary for oil, but in the event of changing the present equipment from oil to coal, the coal would of necessity be required to carry the capital charges in excess of the operating costs. Recent estimates give the cost of a coal-preparation plant of 500 tons daily capacity at about $500,000. Assuming a ten-year useful life, the capital charge would amount to about 50c. per ton of coal.

It is quite probable that within the next ten years cheap electrical power will be available from the development of the Colorado River. Electrical smelting is not very far advanced in this country, but in some foreign countries, notably Sweden, it is used to a considerable extent. It is not inconceivable that by the time fuel oil becomes unavailable, cheap power and advanced methods will make electricity an active competitor of coal for smelting purposes.

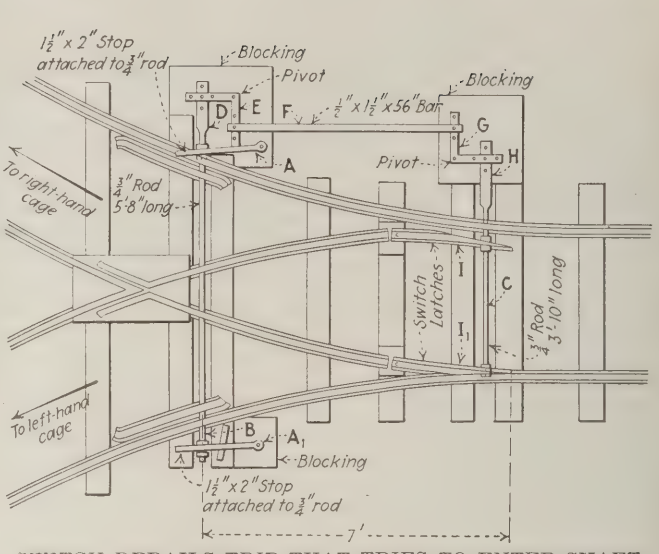
At the present prices of oil and coal delivered at any considerable distance from the mines, and the necessary cost of new construction for the use of coal, oil has a distinct economical advantage. Assuming that the cost of fuel oil increases to the point where the mining and metallurgical industries would discard it in favor of pulverized coal, the plants in the Southwest would require about 3,000 tons per day.

A Latch Which Passing Cars Reverse

AT THE foot of the Twin Shaft, Seneca Colliery, in the Marcy bed, is a switch operated by an ingenious device which by passing mine cars is manipulated in such a way that the cars are fed first to one shaft cage and then to another, the changes in the switch to that end being made entirely automatic. The mechanism was designed by D. J. Matthews, the inside foreman of the mine, the material from which it was made being gathered around the colliery and made up in the company's own shop. The device is described in a recent issue of the *Employees' Magazine*, published by the Lehigh Valley Coal Co.

When a trip of cars comes down the roadway the bottom cager, or "footman," sets the switch to guide the first car to either the right- or the left-hand side of the shaft, depending on which cage is at the landing. Let us suppose that the first car goes to the right-hand cage as denominated in the illustration. On its way the front wheels will strike the rail-riding latch, *A*, and force it off the rail. This will move the iron bar, *B*, toward the top of the page and pull the companion rail-riding latch, A_1, onto the rail. *D*, which is the flattened end of the bar, will move in the same direction and communicate that movement to the right-angle or bell crank, *E*, which accordingly will pull the rod, *F*, toward the mine shaft, thus tipping the bell crank, *G*, and moving the rod, *C*, through its flattened end, *H*, toward the top of the page. This closes the switch latch, *I*, and opens the switch latch, I_1, so that the next loaded car will go to the left-hand cage.

When another loaded car enters the switch and passes to the left-hand cage the front wheels push back the rail-riding latch, A_1, into the position shown in the drawing, and that shifts all the parts back into the first position, thus throwing the switch into place for the reception of a loaded car soon to be needed at the right-hand cage.



SWITCH DERAILS TRIP THAT TRIES TO ENTER SHAFT

When a trip of cars runs away on a heavy grade near the shaft bottom the automatic switch gets into action. Throwing the cars right and left it soon causes a derailment, preventing them from falling down into the sump.

From the description of the operation of the device, it would seem that its purpose was to expedite the work of the footman. Though in a sense this is true, yet it was not the sole purpose Mr. Matthews had in mind when he installed the device. In fact, his prime reason was the safety afforded by its manner of operation. At that point in the Marcy bed a sharp pitch and curve leads down to the cages. There are times when the coupled trip is so heavy, consisting as it often does of as many as thirty-five loaded cars, that the car runner is unable to sprag the trip, the result being that it runs through the open side of the switch and plunges down the shaft. This was what frequently happened before the installation of the automatic rail-riding latch. While it is true that there is a safety block designed and installed to prevent such an occurrence, still the weight of, and the force expended by, these loaded cars when they strike the block is so great that the "stop" is practically useless in that it fails to prevent the cars from plunging into the shaft and doing much damage to themselves and other equipment. There are, of course, many other secondary losses attendant on such accidents.

With the device in operation, should a long trip of coupled cars get away from the spragger upon approaching the shaft, the first car will pass over the switch and throw it in the opposite direction. The second car then travels in a different direction from the first and in doing so throws the switch so that the third car attempts to take the same direction as the first car. As a natural result the trip is derailed, throwing the cars against the rib to the right and left, but preventing them from plunging down the shaft. The feasibility of this device has been tested on several occasions when a loaded trip of cars got away from the runner and in each instance the cars were prevented from getting anywhere near the shaft.

J. C. BRYDON, CHAIRMAN OF THE BITUMINOUS OPERATORS' SPECIAL COMMITTEE, on June 7 announced the appointment of E. L. Douglass, vice-president of the First Creek Mining Co., Cincinnati, Ohio, as a member of the Special Committee in the place of E. C. Mahan, president of the Southern Coal & Coke Co., Knoxville, Tenn., who resigned because of a serious accident which befell him recently.

Book Reviews

Machinery Foundations and Erection

Another book of the Power Plant Series, just published by the McGraw-Hill Book Co., 370 Seventh Ave., New York, N. Y., is of special interest to electrical and mechanical men in the coal fields, rapid expansion and change in machinery used around mining properties having created a demand for a text dealing with foundations and installation of equipment. The new volume is "Machinery Foundations and Erection," by Terrell Croft.

The material in the book is a compilation of practical and theoretical ideas that have proved successful. Considerable of the text has been obtained from a wide range of technical and practical engineering journals devoted to all the important industries of the country. Conspicuous among these are extracts from *Coal Age, Electrical World, Power* and *American Machinist.*

The subject matter covers the whole field of foundations from anchor bolts, through excavating and masonry to erection of machinery.

Powdered Coal—Its Preparation, Transportation and Combustion

MANUFACTURERS and operators of coal-fired furnaces will find facts which they cannot afford to disregard pointed out in Bulletin 217, U. S. Bureau of Mines, by John Blizard, a paper giving an account of the methods, advantages and disadvantages of preparing and burning powdered coal. They will do well if careful estimates are made comparing their present method of burning coal on grates with a system for pulverizing and burning it.

Several systems successfully used are explained in the bulletin. There also is a generous description of various types of pulverizers and furnaces, together with test data on typical installations using all kinds of fuel from lignite to anthracite.

Powdered coal has proved an economical fuel for steam raising, cement making, metallurgical furnaces and many other purposes. For steam raising, with a properly constructed boiler and furnace, a continuous efficiency of over 80 per cent may be maintained.

A Ready Reference in Material Handling

AN EXHAUSTIVE compilation of definitions, descriptions, illustrations and methods of the use of material handling machines employed in our industries is contained in a book entitled "Material-Handling Cyclopedia," recently published by the Simmons-Boardman Publishing Co. It is divided into three sections; the definition section, illustrated section, and catalog section.

In the definition section are defined devices, accessories and terms used in material-handling machines which may be broadly classified as hoisting equipment and transportation equipment.

The illustrated section shows typical and special applications of various kinds of material-handling machines in a large group of industrial enterprises.

The catalog section gives specific information regarding the products and services of a large number of the leading manufacturers of such equipment.

As a book it is truly a cyclopedia for ready reference on any problem of material handling and no doubt will find a prominent place in the files of the managers and engineers of the industries.

Index to Proceedings of American Society For Testing Materials

THIS is a subject and author index of papers and discussions before the American Society for Testing Materials, of 1315 Spruce Street, Philadelphia, Pa.

The arrangement of the material gives ready access to such topics as belting, bearings, corrosion, wood preservatives, etc.; all of which are of vital interest to engineers and purchasing agents in the coal fields.

The subject matter of the articles referred to in the text is rapidly becoming authoritative and more generally used, thus creating a heavy demand for copies of the index.

Explosives and Equipment in Coal Mines

TECHNICAL Paper 333 of the U. S. Bureau of Mines has just been issued. It contains a table giving the brand names of all explosives now considered as permissible for use in dusty and gaseous coal mines, tested by the Bureau of Mines prior to Jan. 1, 1923. The list includes a total of 154 permissible explosives. In addition Technical Paper 333 includes lists of permissible explosion-proof coal-drilling and shortwall-mining equipment, permissible electric lamps, permissible flame safety lamps, permissible methane indicators, single-shot blasting units, storage-battery locomotives, mine-rescue breathing apparatus, and gas masks. Co-operation of the operator in maintaining the various lines of apparatus listed in a safe condition is earnestly solicited.

DESIGN OF FURNACES FOR BURNING POWDERED COAL.—Furnaces in which powdered coal is to burn must be large enough, and be correctly shaped, so that the coal may burn completely without impinging on the brickwork, and must be provided with facilities for removing the ash, states the Department of the Interior in Bulletin 217, just published by the Bureau of Mines. If the furnace is correctly designed, about 3 B.t.u. per second may be liberated per cubic foot of combustion space. This rate of combustion is sometimes exceeded, but if it is much exceeded the coal will not be burned completely. In many furnaces the temperature is so high that the ash fuses, and on settling in the furnace collects in a continuous mass. It has become expedient in some furnaces to cook the ash before settling and so prevent it collecting in a continuous mass, though generally this is not done, and the ash collects either on the hearth, whence it is removed when the furnace shuts down, or it is removed as a liquid slag. The ash that does not settle in the furnace goes off with the gases, and care must be taken to see that it may not be deposited in the flues and so impede the draft. When a furnace previously heated by coal burned on a grate, gas, or oil is to be transformed into a powdered-coal fired furnace, the furnace may or may not have to be modified in design to suit powdered coal. Except for boiler furnaces, very radical alteration of design is unusual. At most, the change consists usually in enlarging the furnace. But no furnace should be fired with powdered coal without the advice of experienced engineers, who will either approve the application of powdered coal to the furnace as it exists or carefully redesign it so that it may be economically operated with powdered coal, using the best means of disposing of the ash.



Problems of Operating Men

Edited by James T. Beard



Use of Water Gage in Estimating Power on the Air

Correct Position of Water Gage to Indicate Total Energy of Air Current—Sum of Velocity and Static Heads Determines the Power on the Air

READING the interesting article entitled "Developments in the Theory of Centrifugal Fans," by Henry Briggs, professor of mining, Heriot-Watt College, Edinburgh, Scotland, which appeared in *Coal Age*, April 12, p. 601, I fail to understand how the position of the water gage shown in Fig. 3 (a), p. 602, is correct, when estimating the power on the air.

In the position shown in that figure the end of the tube connected with the water gage is bent at right angles and turned to face the current. It is evident that the reading of the gage, in that case, will indicate the combined velocity and static heads, instead of showing the static head only, as indicative of the pressure producing the circulation in the airway. As I understand it, this is the principle on which all flow meters are designed, and I would ask, "How can the meters record the flow if the method here shown is correct?"

Cresson, Pa. ELECTRICAL ENGINEER.

The letter of this correspondent was submitted to Professor Briggs, who replied, in substance, as follows:

The meaning of the point raised by the correspondent is not clearly defined, and in attempting to reply I beg to refer to the accompanying sketches, which I hope will make clear the use of the water gage in estimating the power on the air flowing in an airway.

Our friend's difficulty, it seems to me, is that he has failed to comprehend the purpose for which the water-gage reading is taken, in this case. What is desired is to estimate the energy responsible for the flow; or, as we say, the power on the air. This is a different proposition from that involved in a flow meter, which has for its purpose ascertaining only the velocity of the current by measuring the velocity head only.

The principle of the flow meter is clearly shown in Fig. 1, where a water gage is connected with two tubes, *A* and *B*. The end of the tube *A* is bent at right angles and turned to windward, in which position it is exposed to the combined velocity and static pressures concerned in the flow. On the other hand, the end of the tube *B* is arranged normal to the current and is subject to the static pressure only. It is evident that, by this arrangement, the reading of the water gage will indicate the difference in these two pressures and represent the velocity head only from which the velocity of the current is ascertained.

WATER GAGE TO INDICATE ENERGY OF CURRENT

Now, in dealing with the subject of mine ventilation and the theory of centrifugal fans, discussed in my article to which reference has been made, it is necessary to obtain a water-gage reading that will represent the energy of the current, as determined by the product of the velocity and pressure.

To make the situation more clear, allow me to refer to Fig. 2, which represents an airway of varying cross-section. As indicated by the arrows, the ventilation is from left to right, and I have assumed an average sectional area of the airway at the extreme left; a contracted area at the center, and an expanded sectional area at the extreme right of the figure. Now, ignoring, as we may, the frictional resistance between these nearby points, it is clear that the power on the air, or the energy of the current, is the same at each of these stations.

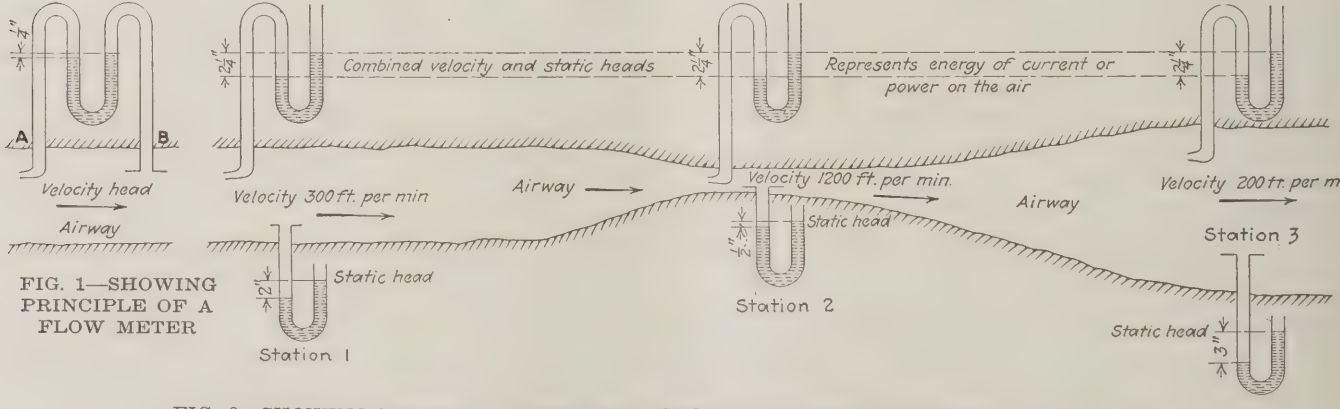


FIG. 1—SHOWING PRINCIPLE OF A FLOW METER

FIG. 2—SHOWING EFFECT OF CHANGE IN SECTIONAL AREA ON WATER-GAGE READING

On the other hand, for a constant power, as the velocity is increased at Station 2, by reason of the contracted area at that point, the static pressure is correspondingly decreased. Again, at Station 3, where the area is much enlarged, the velocity falls and the static pressure is correspondingly increased.

The three water gages shown above the airway, having the ends of the tubes bent to windward in each case,

give a constant reading, regardless of the sectional area of the airway, as indicated by the dotted lines showing the height of the several water gages. On the other hand, the three gages shown below the airway each give a reading that varies with the sectional area of the airway at the point where the reading is taken. These results can be verified by actual trial. In each case, the difference between the upper and the lower reading, at each station, gives the velocity head for that station. In the figures introduced this velocity head is assumed to be ¼ in., while the normal static head is taken as 2 in. The latter falls to ½ in. when the area is contracted and rises to 3 in. where the area is expanded.

In conclusion, let me express the hope that I have made it clear that the correct position of the water gage, for the purpose of ascertaining the power on the air, is as shown in the upper portion of Fig. 2, having the end of the tube facing windward, so that the reading will record both the velocity and the pressure head. Where the end of the tube connected with the water gage is arranged normal to the current, as in the lower portion of the figure, the reading of the gage will indicate the static pressure only. Finally, the difference between these two readings will represent the velocity head, as indicated by the arrangement shown in Fig. 1, which is common to the flow meter.

Edinburgh, Scotland. HENRY BRIGGS.

Coal Brokerage vs. Sales Agencies

Brokerage of coal not economic—Increases cost to consumer—The Broker not a salesman—Eliminate unnecessary transactions to reduce cost to consumer.

PARDON me for referring again to the question of brokerage in the coal industry. My previous article was with the express object of concentrating attention upon a class of business that serves no economic purpose, as I view the matter. Exception has been taken, by M. R. Atkinson, *Coal Age*, March 22, p. 493, to my classing the average coal broker as a parasite on the coal business, although he admits that there is a class who will rightly come under that appellation.

It is clear that the profit derived in the brokerage of coal represents either a reduction in the legitimate profit of the producer, or an increase in the cost of coal to the consumer. Almost without exception, the latter of these two alternatives is the result when the product must pass through the hands of a broker before it reaches the consumer.

Despite the claims urged by Mr. Atkinson in justification of coal brokerage, the simple fact remains that the more complex the nature of the transaction, the higher will be the ultimate cost of the product.

Applying an Old Axiom

By way of analogy, let me make mention of the mathematical axiom; namely, "A straight line is the shortest distance between two points." Nothing can be more simple than the application of this axiom to the transactions involved in the transfer of a commodity from the producer to the consumer. Each additional transaction adds its quota to the final cost of the product.

Now, the only justifiable excuse that can be offered for the existence of an intermediary between the producer and the consumer must be of a nature that an actual economy is effected through such agency. It must be shown that the same economy cannot be realized in a direct transaction that involves the two principal parties only.

In his defense of brokerage, Mr. Atkinson has suggested that the coal broker relieves the operator of the necessity of establishing and maintaining an organization for the sale of his product. This would class the coal broker as a salesman acting, perhaps, in the service of numerous producers.

Sales Agencies a Legitimate Business

Selling through agencies is a legitimate method of business, and there should be no occasion to question the propriety of its application to the marketing of coal through brokers if their activities are confined strictly to transactions of that nature.

It is well known, however, that a large portion of the business of the average coal broker is on a false basis, the broker assuming the position of producer, on a relatively small investment. Acting in this assumed capacity, a large class of brokers purchase and resell products many times in advance of production.

It is my contention that this class of brokers are nothing less than speculators whose business is illegitimate and whose activities are harmful to the coal industry. In other words, they are parasites on that industry.

Another claim made by Mr. Atkinson incidentally, though with much emphasis, is that the coal broker is in a position to assist the operator in financing his payroll and stating that this "is not the least portion of his service." The suggestion naturally implies that the coal broker is more than a salesman—he becomes an investor, a speculator; and the ability to do this presupposes a degree of control of the operator's business, in which the broker becomes a co-partner.

Effect of Market Control by Agents

It is interesting to surmise what such a control of the marketing of coal means to the general public and the individual consumer. Can it be expected that it will involve any tendency to the lowering of the price of coal to the consumer? Can it be claimed that the activities of brokers such as I have described are anything else than harmful? Certainly, the conditions are not those that would result from legitimate sales agencies, Therefore, I claim that the average coal broker is not a salesman.

In closing his letter, Mr. Atkinson says that had I carried out my logic to its rightful conclusion, I would have made the operators retailers of their own coal. Let me say that, with the exception of a domestic mine, the operator sells his coal in carload lots. Therefore, while he may and should sell to such customers as are able to handle coal by the carload, he cannot be classed as a retailer, under the usual accepted meaning of the term.

As a matter of economy, and a stimulant of trade, allow me to repeat that all products should reach the consumer at a minimum cost. It is to be hoped that the present Coal Commission will thoroughly investigate the channels of trade and eliminate all unnecessary transactions and devious methods in the handling and marketing of this necessity of life. If coal brokers create a direct channel by which the coal reaches the ultimate consumer, their business is legitimate and economical; if not, that fact should be positively ascertained and their business set aside.

Washington, D. C. I. C. PARFITT.

Explosion Results from Stoppage of Fan

Fatal mine explosion points to faulty ventilating equipment—Fan stops when electric current fails—Explosion occurs when fan is again started.

ALLOW me to express my deep feeling, after reading the brief account of the deplorable accident, recorded in *Coal Age*, May 10, p. 768, as having occurred in the Southwestern Mine of the Rocky Mountain Fuel Co., at Aguilar, Colo., May 5, causing the death of ten men at work in the mine. Had this not been an idle day the loss of life would have been greater.

The report states that investigation showed the electric current operating the fan had failed and the fan was stopped for fifteen or twenty minutes. It was during this interval, or when the fan was again started, that the explosion occurred. To my mind, this seems a very strange occurrence and points plainly to the fault of the management in failing to provide safe equipment for the ventilation of a gassy mine.

While the account does not state whether this was a gas or a dust explosion, it may be assumed that gas had accumulated, at some point in the workings, while the fan was stopped and that this body of gas was ignited either by the sparking of a live wire or other possible cause. Perhaps a booster fan, inside of the mine, was the immediate cause of the disaster; but this is only a surmise on my part.

Assuming that the mine was generating considerable quantities of explosive gas, safety would require that the fan producing the ventilation should be capable of continuous operation. Safety would have suggested providing duplicate fans for that purpose. The fact that this fan was electrically driven introduces another element of danger, due to the possible failure of the current and the stopping of the fan at any moment.

Steam Power and Duplicate Fans Safer

In respect to safe ventilating equipment for a gassy mine, my preference would be to provide duplicate fans operated by steam power, which is more reliable for continuous service than electric current, whether purchased or supplied by the power plant at the mine. My belief is that this is the only reliable source of uninterrupted service, which is the predominant feature in the ventilation of a mine generating gas.

Aside from failing to provide safe ventilating equipment, which seems to be largely responsible for this dread occurrence, allow me to state that the mine management made a still greater mistake in not withdrawing the ten men who were entrapped by the explosion and lost their lives, and the three other men who barely made their escape from the mine. All will agree that these men should have been notified at once when the current failed and the fan was stopped. They should have been ordered to come out of the mine, which is probably required by the mining law of the state. (Colorado Mining Law, Sec. 50.)

In closing, let me say it would be of great interest to know the full details of this explosion, and understand to what extent precautions were taken to avoid such a disaster, and whether the safety rules and regulations were strictly enforced in the mine. No doubt a thorough investigation has been made, or will be made, to determine the responsibility for the occurrence. Only by that means can we increase the safety of mining operations.

OSCAR H. JONES,
District Mine Inspector.

Wilder, Tenn.

Inquiries Of General Interest

Calculating Theoretical Grade in Economie Mine Haulage

Economic Grade Dependent on Gravity System—Gravity of Loaded Cars, Less Track Resistance, Equal to Sum of Grade and Track Resistances of Empties

WE HAVE had a number of arguments regarding the method of calculating the grade of a main haulage road, in a mine, such that the same power will be required to haul the loaded and the empty cars or trips, respectively. We are asking that this question may be answered in the columns of *Coal Age*, assuming that a single car is hauled at a time, the weight of the empty car being 1,000 lb., and its weight when loaded 3,000 lb. Also, assuming a track resistance of 15 lb. per ton.

My contention is that the ratio of the weight of the loaded car to that of the empty is equal to the ratio of the sum of the track and grade resistances to their difference, which gives the proportion.

$$3{,}000 : 1{,}000 : : 15 + 20x : 15 - 20x$$

In this proportion, x represents the per cent of grade. The grade resistance per ton, for each per cent of grade being 20 lb., makes the total grade resistance for the ascending car $20x$, which is also the gravity pull of the descending car. Finding the value of x from the above proportion gives a grade of $x = \frac{3}{4}$ per cent, which some claim is wrong.

STUDENT.

Pittsburg, Kan.

In calculating the theoretical grade for economic haulage, it is true that the ratio of the weight of the loaded car to that of the empty is equal to the ratio of the sum of the track and grade resistances to their difference, approximately, ignoring some minor considerations. This being a question of the *power* required to haul a loaded car, on a certain downgrade, being equal to that required to haul the empty car up the same grade; and the power being proportional to the weight of the moving load and the net resistance, in each case, we can write the equation

$$3{,}000(15 - 20x) = 1{,}000(15 + 20x)$$

The problem assumes that the grade is in favor of the loaded cars, and the track resistance of the downgrade is then offset, in part, by the gravity of the loaded car; while, on the upgrade, the track resistance of the empty is increased by the grade resistance. The solution of this equation, expressing the equality of power in the two cases, gives for the value of x, or the percentage of grade,

$$80x = 30; \text{ or, } x = \tfrac{3}{8} \text{ per cent}$$

This is a grade of $4\frac{1}{2}$ in. per 100 ft. The only error in the correspondent's work is in finding the value of x from the proportion he has given, his result being twice too great.

Examination Questions Answered

Examination for Mine Examiners, Springfield, Ill., Mar. 19, 1923

(Selected Questions)

QUESTION—*Two airways, one circular and the other square, each have an area of 81 sq.ft.; the length of each is 2,500 ft.; what is the difference in the rubbing surfaces of the two airways; and which will pass the greater quantity of air per minute with the same pressure?*

ANSWER—The perimeter of the circular airway is

$$o = \pi d = 2\sqrt{\pi}\sqrt{a} = 2\sqrt{3.1416}\sqrt{81}$$
$$= 18\sqrt{3.1416} = 31.9 \text{ ft.}$$

The perimeter of the square airway is $4\sqrt{a} = 4\sqrt{81} =$ 36 ft. The length of each airway being 2,500 ft. the difference in their rubbing surface is 2,500 (36 — 31.9) = 10,250 sq.ft. The circular airway having the smaller perimeter and rubbing surface will pass the larger volume of air, under the same pressure. The quantities passing in the two airways will be inversely proportional to the square roots of their perimeters; or as $\sqrt{36}:\sqrt{31.9}$; or 6:5.6484; or 1:0.9414; or 10,000:9,414 cu.ft. per min.

QUESTION—*Is the amount provided by law a sufficient circulation of air in all cases?*

ANSWER—The size of the airways and passageways, in thick and thin seams, materially affects the quantity of air necessary to insure the efficient ventilation of the mine. Also, conditions in the mine relating to gas and dust, together with the depth of the workings below the surface, seriously affect the quality of the mine air. Owing to these variable conditions, the mine inspector is often authorized, by law, to require more air in circulation in a mine than what is specified in the law.

QUESTION—*Which is the easier to clean out of a room, blackdamp or firedamp? Why is this?*

ANSWER—If the room is driven to the rise and blackdamp is generated, there will seldom be any accumulation of this gas at the face. Owing to the fact that blackdamp is heavier than air, its tendency is to gravitate, which causes it to find its way naturally out of the room. On the other hand, firedamp, or marsh gas mixed in varying proportions with the air, being lighter than pure air, tends to rise and its removal is more difficult where the room is driven on the pitch of a seam.

Again, if a room is driven to the dip, any blackdamp generated at its face will have a strong tendency to accumulate there; and its removal, under these conditions, will be more difficult than the removal of firedamp generated in such a room. The firedamp being generally lighter than air, will tend to rise and escape from the room, making its removal comparatively easy.

In a practically level seam, the comparative ease with which blackdamp or firedamp can be removed from the face of a room will depend largely on the relative temperature of the air current circulating at the face of the room and the gas accumulated there. An air current having a lower temperature than that of the mine will tend to travel along the floor and will then be more effective in the removal of any blackdamp accumulated there. On the other hand, if the air entering the room has a higher temperature than that of the mine its tendency is to circulate along the roof where it will be more effective in the removal of any firedamp that may be lodged there.

QUESTION—*If when making an examination of a mine you found a large body of explosive gas state what precautions you would take to prevent an accident from the same?*

ANSWER—No attempt must be made to remove or disturb the gas, until the men working in that section or on the return of the current and especially men working in the vicinity where the gas is found have been withdrawn. These must all be warned to extinguish their lights and withdrawn from the mine or any section where they would be in danger from the gas. When the men have been withdrawn from the mine and all entrances to the affected section and the main return airway have been safeguarded the fireboss, with a few competent men to assist him, must approach the accumulated body of gas from the intake side. If possible to do so without damage to the circulation in other parts of the mine the air current must be increased in the affected section. No open lights must be permitted in the performance of the work, which will consist in the erection of brattices to direct the air current so as to gradually sweep the gas from its lodgment, making careful tests from time to time to ascertain the progress of the work. Finally, the entire section must be thoroughly examined and reported safe, before men are again permitted to enter for work.

QUESTION—*Explain the symbols CH_4, CO_2, SH_2 and CO, stating what are their comparative weights.*

ANSWER—The symbol CH_4 indicates a molecule of methane or marsh gas, consisting of one atom of carbon combined with four atoms of hydrogen. Calling the weight of hydrogen 1, the weight of an equal volume of methane or marsh gas is 8.

The symbol CO_2 represents a molecule of carbon dioxide, consisting of one atom of carbon united to two atoms of oxygen and its relative weight or density, referred to hydrogen as unity, is 22.

The symbol SH_2, more commonly written H_2S, represents a molecule of hydrogen sulphide, or sulphureted hydrogen, as it is sometimes called. Its relative weight is 17.

The symbol CO stands for one molecule of carbon monoxide and its relative weight is 14, referred to hydrogen as unity.

QUESTION—*A current of 3,000 cu.ft. of air is at the explosive point; how much fresh air must be added to prevent a cap?*

ANSWER—The detection of a cap in a safety lamp will depend largely on the observer and the kind of lamp used. If the volume of air in this case is 3,000 cu.ft. and the mixture of air and gas is at its most explosive point, containing 9.46 per cent of gas, the proportion of air in the mixture is 100 — 9.46 = 90.54 per cent. The volume of the mixture is, therefore, 3,000 ÷ 0.9054 = 3,313 cu.ft. The volume of gas in this mixture is 3,313 — 3,000 = 313 cu.ft. Now, assuming that the first indication of a gas cap appears when the gas forms 2 per cent of the mixture, the volume of gas and air when the cap is first observed, is 313 ÷ 0.02 = 15,650 cu.ft. Finally, the volume of air necessary to be added to produce this condition is 15,650 — 3,313 = 12,337 cu.ft.

Gandy Finds Strong Midwest Sentiment for Maintenance of National Organization

No collapse of the coal market is in prospect, in the opinion of H. L. Gandy, the executive secretary of the National Coal Association, after an extended trip through the coal-producing centers of the Middle West and the Intermountain section of the country. Throughout his trip he heard much talk about plans for storing coal but he saw no evidences that more than the normal amount of storage has been made. While he is not convinced that large consumers will place more coal in storage this summer than they have during other summers, he points out that any effort to that end now necessarily must be confined to the latter half of the summer.

In his conversations with operators everywhere Mr. Gandy found that there is a keen realization that a national organization must be maintained. Many operators who at this time are not affiliated with the National Coal Association are looking with approval on the work that it is doing. There is wide appreciation, Mr. Gandy says, of the work being done by the Brydon committee.

Indiana Operators to Pay State for Coal Mined Under Wabash River

Controversy over the ownership of coal under the Wabash River, which has been before the courts, ended in a sweeping victory for the State of Indiana, June 11. Representatives of coal companies, in conference with the Conservation Commission, agreed to pay the state 4½c. a ton for all coal mined before the beginning of the suit to test ownership of the fuel. For all coal mined after the filing of the suit and for all coal mined in the future, the state will receive 10c. a ton.

John W. Holtzman, a member of the Conservation Commission, who acted for the commission, said that a survey will be made by the state engineering department and representatives of the companies to determine the amount of coal which has already been mined. Payment to the state will be based on the results of this survey, Mr. Holtzman said. In the future, all coal will be mined under permits received from the conservation department and payment will be made to the state under the terms of the agreement. It is estimated that more than 9,000,000 tons of coal was involved in the controversy. Representatives of the following coal companies participated in the conference: Western Indiana Coal Co., Coal Bluff Mining Co., Lower Vein Coal Co., Grasselli Co., Miami Coal Co., Ferguson-Spears Coal Co., and Jackson Hill Coal & Coke Co.

Southwest District Operators Pessimistic In Annual Meeting at Kansas City

Pessimism, deep dyed and malignant, characterized the annual meeting of the Southwestern Interstate Coal Operators' Association in Kansas City, June 12. So gloomy, in fact, was much of the discussion of conditions of the last year that its details are being guarded as might be the darkest secrets of an abandoned past. It was to the general effect that for twelve months the Southwest had been struggling in the wilderness and deliverance from out of the hands of its enemies was not yet.

Much blame for the situation was placed at the door of labor. The general sentiment was that, with the present high wage scale, the Southwest could not produce coal at a price to compete with other fuels. "The present scale may be fair enough in thick-seam fields," W. L. A. Johnson, commissioner, said, "but in our mines of from 20-in. to 48-in. seams, it is virtually confiscatory."

During the strike last year many industries and railroads turned to oil. Many more have changed in recent months. "The fact that they would be assured of a steady supply actuated most of these buyers to install oil burners," Mr. Johnson said. "Every day present conditions continue their remedy becomes more difficult," Mr. Johnson said. "Many smaller industries are being driven out of this district by the cost of fuel. They are being beaten by competitors in other districts who obtain their fuel more cheaply."

Anthracite Operators Submit Brief on Competition in Hard-Coal Industry

"Competition in the Anthracite Industry" is the subject of a 71-page statement submitted to the U. S. Coal Commission on June 13, 1922, by Walter Gordon Merritt, counsel for the General Policies Committee of the Anthracite Operators.

This brief sets forth "that conditions in the anthracite industry are highly competitive, and there is a notable lack of any dominating influence or power on the part of any one company or co-operating group of companies." It is pointed out that the popular impression of a combination in the anthracite industry grows out of past litigation forcing a separation of railroad and mine operations and dissolving intercorporate relations, which were held by the courts to be in restraint of trade. The impression, based on happenings in the past, has outlived the conditions to which it owed its origin, but the public is reluctant to surrender it or to give up the idea that some definite wrongdoing practiced by the operators explains the present high cost of anthracite.

The statement sets forth that there are no interlocking stock ownership or interlocking directorates and that "none of the suits or investigations involving the anthracite companies, at least in so far as they related to practices within the last twenty years, disclosed secret meetings, understandings or agreements or any so-called 'open-price plan' whereby price information was exchanged between competitors." To demonstrate how completely the company operators had discontinued the practices which, beginning in 1912, were challenged by the Supreme Court and later by the Interstate Commerce Commission, each charge is dealt with separately and each of the companies and principal anthracite railroads had included statements in regard to its business practices and history of its organization.

It is pointed out in Mr. Merritt's statement that there is no dominating interest in the industry since the largest company produces about 15 per cent of the total production. It is noted that the total output marketed by the independents has increased since 1902, that the 65 per cent contracts were discontinued in 1916. It is argued that "active competition with all of its symptoms—with its fortunate and unfortunate aspects—exists." There is no apportionment of territory, according to Mr. Merritt, in support of which is submitted a list of one thousand typical communities in the United States showing the shipments made to each and the number of Company and independent operators supplying trade in these communities. "No monopoly would tolerate such an unregulated method of distribution," says Mr. Merritt.

There is no curtailment of output except by the union and there is competition in price, it is stated. The steps taken to accomplish the segregation of railroads and coal companies is set forth fully in detail. Mr. Merritt remarks in this connection that "whether this national policy of dismemberment be wise or unwise we do not now discuss," and notes that "this requirement of segregation was a marked reversal of the established legislative policy in the past."

Referring again, in his conclusion, to the popular misapprehension regarding competitive conditions in the anthracite industry, Mr. Merritt said: "If this can be corrected and a fair understanding of the facts promoted, it will spare the industry much futile and misleading criticism and to that extent will serve to remove one of the barriers to better understanding in dealing with employees and the public."

IT IS REPORTED in Washington that the Interstate Commerce Commission has reached a decision on the assigned-car case and that its report and decision has been sent to the printer. Speculation is rife in Washington as to the direction of this decision and everyone interested in railroads and coal is awaiting release of the report, which is expected soon.

Coal Dealers, in Convention at Providence, Discuss Problems Affecting New England Trade

Disapproval of attempts by State Legislatures to set up local standards of preparation of anthracite and appealing to Congress to speedily enact a law that shall establish a standard of quality was expressed in a resolution adopted by the New England Coal Dealers' Association at its annual convention held on June 13, 14 and 15 at Providence, R. I. The association disapproved of the reported intention of the U. S. Coal Commission to include in its report a recommendation that the 2,000-lb. ton for coal be fixed. Other resolutions adopted included one for the sealing of barges, that a committee of three be appointed by the president of the association to bring about better relations between the retail dealer and wholesale distributors, and that a committee composed of three dealers from each state represented in the association be appointed to act in cases of emergency, especially relating to proposed legislation affecting coal.

It was the first time in its twenty-one years of existence that the association has held its annual meeting outside of Massachusetts. The convention was held in the State Armory, part of which was devoted to an exhibit of coal-handling machinery. W. A. Clark, of Northampton, Mass., president, presided. In his address of welcome Joseph H. Gainer, Mayor of Providence, asked that something be done so that coal consumers would be assured of a supply of coal in the summer.

T. L. Lewis, a former president of the United Mine Workers of America and now secretary of the New River Coal Operators Association, who spoke at the afternoon session of the first day of the convention, approving Mayor Gainer's suggestion for early summer buying, declared that the retail dealers occupy a position equal to that of the men who swing the pick and shovel. He said if the dealers acted as a unit no law would be passed by law-making bodies to regulate their business. He urged the dealers to induce their customers to put in at least part of their winter coal during the summer.

Mr. Lewis hoped that the U. S. Coal Commission would recommend some tangible proposition that will make strikes impossible and at the same time give a fair deal to both operators and miners.

He opposed any organization that can compel 110,000,000 persons to get down on their knees. Such an organization should be curbed, he said. Saying that soft coal is now being sold at less than cost of production, Mr. Lewis said that consumers of coal seem to the indifferent and if they do not buy at least a part of their requirements now they will pay the penalty in higher prices in the near future.

At the session on the afternoon of June 14 Dr. E. W. Parker, of the Anthracite Bureau of Information, told the dealers that ordinarily the six New England States purchase and consume something over 15 per cent of the domestic sizes of anthracite marketed in this country—that is, of the total production less shipments to Canada and small quantities exported to other countries. In the coal year 1921-22 the total domestic distribution of domestic sizes of anthracite was 38,118,952 gross tons, exclusive of shipments made by the Hudson Coal Co. Of these 38,000,000 tons the New England States took 6,429,471 tons. The allotments made to New England for the period from the time mining began, Sept. 11 to March 31, 1923, totaled 3,857,673 tons, this being on the basis of 60 per cent of the shipments made in the preceding coal year. The quantity of anthracite shipped against these allotments amounted to 4,083,066 tons, or more than 225,000 tons in excess of the allotments.

"Transportation" was the subject of an address by R. H. Newcomb, executive assistant to the president of the Boston & Maine Railroad Co. Referring to a previous statement that "fireproof" coal had been shipped into New England, he said that the Boston & Maine had purchased 400,000 tons of English coal which could have been named "fireproof" coal. He told the dealers that during the period from September, 1922, to April 1, 1923, his road had delivered more than 40,000 cars of anthracite.

President Clark said that those dealers who had not received the questionnaire sent out by the U. S. Coal Commission were lucky. He did not know exactly what is to be done with the information obtained from them. Mr. Clark was for the twelfth time elected president of the association. Others elected were: Treasurer, G. A. Sheldon, of Massachusetts; vice-presidents, James B. Gregory, of Connecticut; J. C. Miller of Maine; G. L. Miner, Providence; H. A. Osgood, of New Hampshire; N. E. Pierce, of Vermont, and E. A. Wilson, of Massachusetts; elected to the Executive Board (to serve for three years), J. F. Higgins, Vermont, and H. L. Miller, of Worcester.

Will Continue Strike in Somerset County

At a meeting of representatives of twenty-three locals of the United Mine Workers in Somerset County held in Johnstown on June 7 it was decided to continue the strike in that field. The meeting was attended by President John Brophy, Vice-President James Marks and Secretary-Treasurer Richard Gilbert, of District No. 2, and National Board Member John Ghizzoni, of Homer City. A resolution was adopted setting forth the grievances of the strikers, expressing appreciation of the assistance accorded by the union miners and voicing unanimous decision to continue the strike for a union contract and recognition of the United Mine Workers.

"It has been carefully estimated," said J. S. Brennen, secretary of the Somerset County Coal Operators' Association, "that it has been costing District No. 2 (central Pennsylvania) between $45,000 and $50,000 a month to support the Somerset outlaw strike since its abandonment by the national union organization last fall.

"There are in Somerset County 13,000 non-union mine workers employed at a scale of wages higher than the union scale. There are, by actual count, on strike in Somerset County, 1,157 men.

"Brophy is skillfully spotting these 1,157 strikers all over Somerset County in small groups. Each small group, some of them not numbering more than ten or twelve, constitute, under the United Mine Workers' constitution, a local union. All of these so-called locals, engaged in an outlaw strike, are being supported by Brophy, with union money.

"In this way, by spotting, Brophy continues to increase the number of delegates among the 1,157 Somerset strikers. It follows that when these 'mushroom' delegates attend the International Convention, having been living off union money handed out to them by Brophy, they will vote on all questions as Brophy men." According to Mr. Brennen, this is a part of Brophy's campaign to succeed John L. Lewis as president of the United Mine Workers.

At the Johnstown meeting a letter was drafted and sent to Governor Pinchot asking protection for strikers against hired guards and strike breakers at the plant of the Hillman Coal & Coke Co. at Jerome.

THE IMPORTANCE OF COAL STORAGE, not only to the railroads but to consumers generally, is stressed in a letter from Secretary Hoover to J. N. Clark, president of the International Railway Fuel Association. He recommends, however, that more attention be paid to the economic side, especially costs, investment charges and the general economic value of storage, a subject on which, he says, there is insufficient data. Referring to the work of the association on fuel conservation, Mr. Hoover says that there is still a large amount of it to be done in this field along the line of greater use of the lower-grade coals. The nation, he points out, has tremendous reserves of those coals. He also stressed the importance of closer co-operation on the part of the railways generally with coal producers, individually and with their associations.

Illinois Operators Present Five Briefs On Coal Problems of That State

Five briefs dealing with problems of the coal industry in Illinois were filed with the U. S. Coal Commission on June 18 on behalf of the Illinois Coal Operators' Association, the Coal Operators' Association of the Fifth and Ninth Districts and the Central Illinois Coal Operators' Association. The briefs were presented by a committee of Illinois operators and a representative of counsel for the Bituminous Operators' Special Committee.

The most important of the briefs, entitled "Union Mine Labor in Illinois and the Determination of Wage Scales and Working Conditions," states that there has ceased to be any real collective bargaining with the miners' union in Illinois, as there is a complete monopoly of coal-mine labor, controlled by a small, centralized body of union officials which is entirely irresponsible in a legal sense. This monopolistic control has placed the coal industry in Illinois on a most unstable basis. It is further pointed out that during the last 25 years the mines of Illinois have been idle on account of strikes called by the United Mine Workers for 8 per cent of the time, and such interferences with production are becoming more and more common. A classified list of strikes and violations of contract given covers 62 pages.

Some of the causes for which strikes have been called, according to the brief, are: Attempts to weaken the authority of the management and to control the working force in violation of contract, opposition to recommendations of state mine inspectors, opposition to the introduction of labor-saving machinery, and sympathetic strikes.

Two of the briefs deal with mining-machine differential in Illinois. The differential made between machine mining and pick mining the brief states, is only 7c., as contrasted with much higher differentials in other states, the result being a great increase in mining costs, so that Illinois operators have suffered greatly in competition with operators of other states. The fourth brief points out various ways whereby increased safety and economy in mining may be effected. It is stated as desirable that specially trained men be provided to undercut the coal and to place explosives and fire charges, thus reducing the cost of producing coal and promoting the safety of the miners.

The final brief, which is a reply to the statement made some time ago to the Coal Commission by the Northwestern Dock Operators' Association, states that more economical distribution of coal to parts of the Northwest can be made by rail from the Illinois fields than by rail and water shipment via the Great Lakes route. It also points out that the only way in which coal can be stored economically is by storage at the point of consumption, and that intermediate storage, such as is involved in rail and water shipment, results in serious deterioration of the coal.

Central Pennsylvania Tells Commission How To Cure Every Ill of Coal Industry

Suggestions offered as the cure of all the ills of the coal industry were given the U. S. Coal Commission by the Central Pennsylvania Coal Producers Association in their report to the commission June 18. In 100 pages these operators of a district employing about 60,000 miners and producing between forty and sixty million tons of coal a year give the commission six cures for strikes, four causes of overdevelopment of mines that should be removed, and ask that assigned cars be abolished. They deny that the industry is as badly overmanned as is alleged. The report is signed by B. M. Clark, Harry Boulton, A. M. Liveright, Charles O'Neill and W. A. Jones.

The brief deals with a large number of subjects now under investigation by the Coal Commission. It sets forth that since April 1, 1916, two general and 664 local strikes have taken place in this district in violation of contract on the part of the United Mine Workers of America.

To eliminate these strikes in the coal industry the operators recommend:

(a) Abolition of the check-off; (b) re-establishment of real collective bargaining upon the basis of district or sectional wage agreements; (c) collective and individual legal responsibility upon the members of the United Mine Workers of America for carrying out their contracts; (d) placing wage rates in the mining industry upon a parity with other industries employing the same classes of labor; (e) the absolute right to introduce labor-saving devices and machinery without interference by the union; (f) the inclusion of arbitration clauses in all wage agreements similar to those contained in the central Pennsylvania district agreement.

Facts are set forth to prove that collective bargaining has been destroyed by the United Mine Workers through their frequent violations of agreements, and to bring about a proper re-establishment of joint relations in the mining industry the union and its members must be made legally responsible for carrying out and enforcing wage agreements.

On the matter of overdevelopment the operators disagree with the commonly accepted statement that there are 200,000 too many men in the industry. To meet the requirements of the country for coal there is not more than 8 to 11 per cent excess development, they say. Likewise there are only 50,000 to 66,000 too many men in the industry.

The operators state that this overdevelopment in the industry is due to the following causes: (1) The accessibility of coal and the small initial investment required to open a mine. (2) The development of wagon mines, especially by war-time premium prices for their coal. (3) The contest between coal-carrying railroads for the development of coal fields to insure (a) their fuel supply, and (b) secure revenues. (4) The uniform and inflexible policy of the United Mine Workers of America in maintaining a fixed wage scale in the union fields for long periods in the face of changing conditions allowing the non-union coal operators to properly meet changing conditions by adjusting wages as conditions warrant.

The operators also ask for the abolition of assigned cars as unjust, inequitable and discriminatory. They say the abolition of this form of special privilege will do more to stabilize the bituminous mining industry than any other single proposition that the commission can recommend.

The brief also deals with the history of the district, wage rates, storage of coal, housing and cost of living, open-shop mines, intermittency, absenteeism, competition, and recommends the industry be granted the right to properly disseminate information concerning prices, production, etc., so that the public may be correctly informed as to the situation at all times. The operators suggest a public hearing on labor relations, and conclude with the statement that if their recommendations are carried into effect the operation of economic law "will adjust all of the evils supposed to exist in the bituminous-coal mining industry within a reasonable time."

Capellini Leads Brennan in Election for Presidency of District 1, Is Report

Rinaldo Capellini, so-called insurgent, has defeated William Brennan, Scranton, a conservative, for the presidency of District No. 1, United Mine Workers of America, leading Brennan by some 4,500 votes it is reported.

Brennan was the John L. Lewis candidate for office and it is expected by many that this change is likely to have a strong influence in governing the demands of the mine workers when negotiations for a new agreement are made on June 26 at Scranton.

Fewer strikes and better enforcement of union laws was promised by Capellini when he was told of his victory.

A DECREE FOR THE COMPLAINANTS, the States of Pennsylvania and Ohio, against the State of West Virginia was directed by the Supreme Court, June 11, in suits instituted to restrain West Virginia from putting into effect a law compelling natural-gas companies to serve consumers within the borders of West Virginia in preference to those outside that state, in the case of gas taken from within the state. The decision was by a divided court, the majority opinion being based on the public interest.



Wholesalers in Convention Decide to Set Up System Of Arbitration to Reduce Court Difficulties

No fighting issues faced the American Wholesale Coal Association at its seventh annual convention in Cincinnati on June 12 and 13, consequently attendance was only 105 on the registry, but never more than 75 of these assembled at any one time and discussions seldom waxed warm. However, the association took an important step in deciding to inject more arbitration into the business disputes hereafter; it displayed some interest in a better credit reporting service and in the doctoring of transportation ills hanging over harassingly from the war and it elected Charles L. Dering, of Chicago, president after a small disturbance in the nominating committee. Pittsburgh had hoped to land the presidency for Jay Johns, but finally yielded. The next convention city is to be chosen during the winter.

Arbitration of disagreements between wholesaler and either producer or consumer of coal may hereafter more often settle difficulties out of court. The association expects to create an arbitration bureau of its own through which the doctrine can be preached and turned into practice. Association members are expected to see that clauses are written into all contracts committing both sides to arbitration by a man representing each party plus a third man chosen by the two. A great deal of educational work along this line is to be done beginning at once.

The 1922 offer of Colonel Sanborn, of Chicago, to turn over his credit bureau to the association was considered, E. M. Platt of Chicago spoke convincingly of the need for more careful credit work, and it was resolved by the association that the Sanborn plan be given more complete support by wholesalers. A circular explaining it will be sent to all members; they will be encouraged to report credit experience on the Sanborn forms and those who do not will be questioned by the association's executive committee.

The officers for the new year are Charles L. Dering, president; Borden Covel, of Boston, vice-president, and George H. Merryweather, of Chicago, secretary-treasurer. The executive committee is W. W. Weller, Jr., of Birmingham, Ala.; J. W. Dykstra, of Detroit; Jay W. Johns, of Pittsburgh; Jean Astel, of Cleveland; Carl A. Owen, of New York; G. W. Hill, of Cincinnati, and Harry Courtwright, of Philadelphia. The board of directors is composed of the executive board plus C. G. McGill, of Toronto, Can.; C. L. Clark, of New Haven, Conn.; A. J. Cochran, of Indianapolis, Ind.; B. J. Read, of Baltimore, Md.; C. A. Weinhart, of Grand Rapids, Mich.; R. H. Lee, of Kansas City, Mo.; F. S. Martin, of Omaha, Neb.; C. F. Westfall, of Omaha; Mark A. Thompson, of Syracuse, N. Y.; J. A. Collett, of Pittsburgh, Pa.; W. J. Hamilton, of Columbus, Ohio; G. H. Snowden, of Pittsburgh, Pa.; W. J. Prescott, of Memphis, Tenn.; R. R. McFall, of Morgantown, W. Va.; W. C. Maas, of Milwaukee, Wis.; Allen Parks, of Uniontown, Pa.; Andres Johnson, of Toledo, Ohio, and one more to be chosen.

In his report reviewing the year, sounding a warning against blindness to the dangers threatening the coal industry and appealing for more hearty interest in association activities retiring president Seth W. Morton, of Albany, N. Y., had this in part to say about relations between wholesaler and the commission: "The largest single question before the association today is its relations with the U. S. Coal Commission. Since the creation of that body the association has sought to be helpful in disposing of the vast task confronting the commission. I am glad to say that from the outset to this hour our relations have been most happy and cordial. The one outstanding feature of the commission is its spirit of absolute fairness and its obvious desire to arrive at the facts. We look forward with hope to the potential good that can be accomplished as a result of this investigation."

Secretary-Treasurer G. H. Merryweather reported that the membership of the association is now 420 as compared with 422 at the time of last year's convention in Detroit and that the disbursements of the association have decreased $9,856 as compared with last year, when the commissionership at Washington was combined with the traffic managership.

At the opening session of the convention Tuesday, June 12, R. S. Bain, of Cleveland, speaking on the subject of better accounting, said that wholesalers lose much money every year by bad accounts, the making of unfair deductions, the unfair refusal of coal and the cancellation of orders on falling markets. He recommended the creation of bureaus of adjustment and inspection at all important coal centers,

to which shippers could report troublesome cases as soon as they arise. A bureau inspector could be put on each case.

"Send in that data," was the urgent appeal which C. A. Owen, of New York, made to the association at the opening of a sparsely attended Tuesday afternoon session. He was speaking of the information requested in the three forms for the U. S. Coal Commission. "Some day soon we are practically certain of having to appear before a congressional committee," said he. "We want to be prepared."

"The fear of God" might be a fitting title for what Franklin Bache, president of the Coronado Coal Co. and member of the Bituminous Operators' Special Committee, tried to put into the hearts of the wholesalers. He hoped to rouse his hearers to the danger that now besets not only the whole coal industry but all industry and business and to move them all to accept every opportunity to preach anti-government control.

Jay Johns, of Pittsburgh, at the Wednesday morning session declared forcefully for a discontinuance of a lot of railroad practices allowed to outlive their war-time usefulness. Permissive embargoes is the worst of them, he said. The system which allows a railroad to allot cars to a single mining company and even to a single mine for shipment of coal to some one or two coal-needy consumers during a period of embargo is wrong and is "the rawest thing yet pulled." This and the existing rules on reconsignment and diversion should be prohibited, he insisted.

Ira Cochran, commissioner and traffic man at Washington for the association, said the railroads hold that permissive embargoes are necessary even though admittedly unfair. By no other means thus far conceived is it possible to keep a distressed plant from shutting down in time of embargo. They admit the plan usually works to the advantage of only shippers who happen to "stand in" with the right railroad man. The association has asked attorneys if the practice can be stopped with injunctions, and the decision is that the remedy must be obtained through the Interstate Commerce Commission.

He said the association may soon get a hearing before the Interstate Commerce Commission on proposed changes of reconsignment and diversion rules. He told the association that the movement to get freight claims speeded up is advancing. Already the Baltimore & Ohio R.R., long considered backward—to use a term more charitable than is customary in the coal trade—is now at the forefront in the matter of auditing freight bills on coal. They all go through revision bureaus now working in such centers as Cincinnati and are audited before the coal reaches the consignee. The system catches many errors that otherwise would lead to claims rising to plague both shipper and carrier for two or three years.

Middle West Makes Progress Toward Mechanical Loaders

Further progress toward the recognition of mechanical underground loaders in the Middle West was made last week. The abortive strike at the new Orient No. 2 mine of the Chicago, Wilmington & Franklin Coal Co. was settled by the 300 strikers going back to work at the old terms, and in Indiana the union officials of District 11 agreed to meet operators in a joint conference to discuss fixing a wage scale for loader operators in that state. This movement in Indiana by no means indicates that a scale can soon be agreed upon but it is significant that the union is willing to negotiate. Both sides have chosen their representatives but no time has been set for the first meeting. It is expected before July 1.

For about eight months in Indiana loaders have been working in two mines. The difficulty of getting cars to them fast enough has been a constant problem. Other engineering difficulties have been many and many have been the schemes conceived to overcome them. Among these is a plan to load room coal at the neck of each room by spotting the loader there and dragging the coal to it by a dragline conveyor. While the loader stood in the neck, empty trips for loading could be drawn past it on the entry track. The machine could be moved from neck to neck, it is expected, thus widening its field, increasing its speed and generally overcoming many of the difficulties of using the loader in room work. At present, operators of loaders in Indiana are paid $12 a day.

In the Orient No. 2 mine in Illinois they had been receiving $8.56 and struck the mine to compel scales to be installed, and the mine shifted from a day-wage development basis to a tonnage rate. This would have compelled the fixing of a loader scale. The strike was unauthorized by the district union organization and the men last week, after having had a vacation, went back to work on the old basis.

But the battle over loader pay in that state is only postponed. The Orient No. 2 mine is rapidly growing beyond the development stage and will soon require a loader scale if loaders are continued in the property, as Illinois operators hope they will be. Meantime discussion of loaders goes vigorously on among every class of mining men in the Middle West. A discussion on the last day of the Illinois Mining Institute's boat trip up the Illinois River June 7 to 9 was typical. It followed a paper by L. E. Young, president of the Union Colliery Co., on the use of a Shuveloder on rock work in the Kathleen mine, at Dowell, Ill.

A discussion followed Mr. Young's paper which made it evident that mechanical loading of coal is recognized by engineers and mining men generally as the coming thing. Mr. Garcia declared it is forcing a general revision of methods in the coal industry all the way from face to tipple and even beyond, because of the speed, economy and general desirability of loaders are compelling use of the machine by the industry and because mining practices will be made to conform to the machine instead of *vice versa*. The mechanical loader to get out the coal and the skip hoist to rush it to the surface, he said, are a pair which will not be denied entry into the coal industry.

Other men present, such as John Land, mine superintendent for the Old Ben Coal Corporation; Douglas Corner of St. Louis; Mr. Tirre, Inspector English, President Millhouse, J. Milton Duff and F. F. Jorgensen, chief engineer of the Superior Coal Co., all contributed comment and suggestion proving beyond doubt the lively interest in loaders that exists in Illinois.

It was brought out that a type of loader in Pennsylvania gets out coal at an average loading cost of $1.40, but that in West Virginia the average in a loader mine with 6-ft. coal is only 83c. They reviewed something of the experience in Indiana, where $12 a day is paid operators in two mines, but where obstacles of every kind are put in the way of the machines and where great difficulties are encountered in getting empty cars to the machines speedily enough.

Labor troubles stirred up by loaders was much discussed, everybody recognizing that that is a vital factor in the problem of introducing the machines. It was stated that one of the principal reasons why the loader idea is now forcing itself swiftly into the whole industry is the obstreperousness and offensive independence of union labor.

"Two men will do the work of ten," was the common statement in the labor discussion. "The union will fight hard to save the other eight their jobs."

"But the industry will benefit in more ways than one if the eight go," contributed an engineer. "For one thing the two who stay to run the machine will be higher grade men and the low-grade element in mine labor will be reduced, thus possibly putting more intelligence and less radicalism into labor relations between operators and the union."

Can Steady Coal Industry by Early Buying, Says Columbus Chamber of Commerce

"If a large majority of domestic consumers of coal could be induced to purchase their coal supply during the summer months, they would benefit as individuals by getting their coal at a cheaper price and the movement also would tend toward stabilization of the coal industry," according to a report by the Chamber of Commerce coal committee appointed to investigate the coal situation in Columbus, Ohio.

Recommendations were made that an educational campaign be started, to teach the people the value of buying their coal early and that employers be urged to assist in this campaign in such manner as deemed by them most effective and advisable.

Coal Commission's July 1 Report Holds Deep Interest In Light of Recent Supreme Court Decisions

By Paul Wooton
Washington Correspondent of *Coal Age*

A vigorous expression of views in the matter of nationalizing coal mines may be expected in the anthracite report to be made July 1 by the President's Coal Commission. Chairman Hammond, of the commission, stated last Friday that the report will contain a discussion of the whole subject of nationalization. Another pronouncement expected in the report will deal with the basis of evaluating coal properties.

The soft-coal operators, in a statement dated June 14, contend that the only equitable method of establishing valuation would be on the present market value of the properties. They deny that original cost is of value in determining present worth. To support that contention, it is pointed out that an operator who has come into the business recently would have to have his valuation established on present market price, whereas an old-established adjacent concern producing the same quality of coal under the same conditions would have his valuation based on original cost. The operators also are opposed to the Treasury method of valuation, wherein the 1913 value plus actual additions since is used.

The whole matter of valuation has been illuminated by recent decisions of the U. S. Supreme Court, to which the commission is paying the closest attention. In the opinions rendered in connection with the Southwestern Bell Telephone Co. case an analysis is made of the Supreme Court's decisions bearing on valuation. In 70 of those cases the predominant element in valuation was reproduction cost. In 118 cases the predominant element was original cost modified in various particulars. In 28 cases the chief element was book value. In 12 cases the capital represented by bonds and stock was accepted. In 102 cases a prior valuation plus the actual cost of subsequent additions was accepted.

It is quite evident that the commission cannot undertake careful evaluation of coal mines after the fashion of public-service commissions in the case of public utilities. To undertake this would require years of time and not less than $2,000,000 in money. It is believed, however, that the commission will have something interesting to say as to methods of evaluating which best can be applied to coal mines. Incidentally any recommendations on that subject will be of great interest to those concerned with the resources of which there is only one crop.

Unquestionably the commission is giving close attention to the Supreme Court's decision in the Kansas Industrial Court case, in which a distinction is drawn between the mining of coal and the services coming under the head of public utilities. The decision also is certain to be considered by the commission in respect to its bearing on the settlement of disputes between employer and employee. The Court's position that the fixing of wages by a tribunal with compulsory powers is a denial of freedom of contract under the Fourteenth Amendment to the Constitution is certain to have a bearing on what the Commission may say in regard to improving the present conciliation machinery in the anthracite region. Apparently the Supreme Court has shut the door to any possibility of requiring operators and miners to submit a dispute to compulsory arbitration unless the commission should take the position that the production of coal is a public-utility industry.

All of the fundamental data on which the anthracite report will be based was in hand on June 15. That it is voluminous may be judged from Mr. Hammond's statement to the effect that the documents cover 200 sq.ft. to varying depths. All of the data on which conclusions will be based are to be made public. Proper safeguards will be employed to protect legitimate business secrets. Since some arrangement and summarization will be necessary to make all of this information readily understandable, it is probable that it will be released periodically following the issuance of the report itself.

Brydon to "Knock Hell Out of Facts That Are Not Facts" in Commission Reports

"If any facts which are not facts appear in the reports of the U. S. Coal Commission, we'll knock hell out of them," declared J. C. Brydon, chairman of the Bituminous Operators' Special Committee, to the Fayette-Green Coal Producers' Association in Pennsylvania June 14. The vitriolic-tongued chairman of the special committee wasn't threatening the commission itself but only "facts that are not facts." If the threat has to be carried out, he said, the special committee will then present to the commission a statement of facts which must be found. In case of a disagreement over these between the committee and the commission, the Brydon committee will demand public hearings, and "will get them." Thus was the calm of the Fayette-Green association meeting enlivened in the Summit Hotel, six miles east of Uniontown, in the Allegheny Mountains. About 250 men were present, representing 87 per cent of the coal mined and 90 per cent of the coke produced in that part of Pennsylvania.

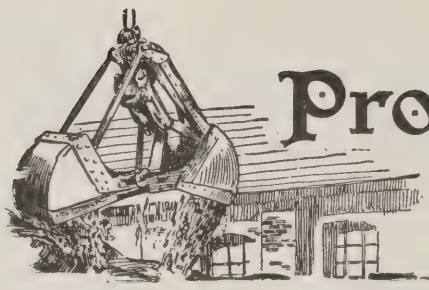
What Mr. Brydon had to say regarding the work of the Bituminous Operators' Special Committee was of particular interest to the operators. His talk dealt entirely with the history, policies and activities of his committee. Mr. Brydon said that the Coal Commission in a period of twelve months can only begin to arrive at an understanding of the industry. A thorough study would require as many years.

He said the vacation trip of John L. Lewis is suspected to have been a ruse to get the sympathy of English miners to support the propaganda for 100 per cent unionization in the coal industry of this country. This is Lewis' dream of world empire, which if consummated would give him complete control of all industries. The special committee, consequently, authorized two men to go abroad to study labor conditions in Europe so that plans might be made to thwart the future steps of Mr. Lewis.

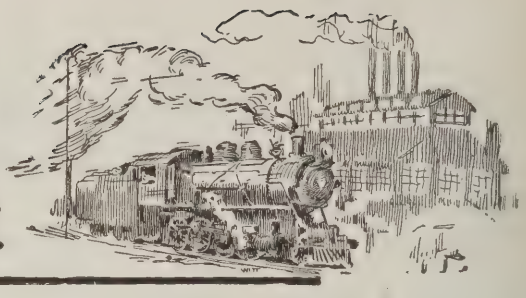
T. W. Guthrie, president of the Hillman Coal & Coke Co., spoke first, emphasizing the necessity among coal operators for co-operation, which is best realized through association. Industry is best protected by combined efforts because soundest advice does not come from an individual but rather from joint counsel. Moreover, the first line of defense in fighting the antagonistic moves of enemies of the coal industry is the local operators' association, while the last ditch is the National Coal Association.

Because a movement is on foot to bring about the nationalization of the coal industry as well as the railroad industry, the two should join forces to avert disaster which would certainly follow such a law, according to H. C. Clevenger, coal freight agent for the Pennsylvania R.R. W. G. Curren, general superintendent of transportation of the Baltimore & Ohio R.R., said that the interest of railroads in the present coal situation is secondary only to that taken by them in the problems which confront the carriers. The outcome of the present coal situation will be reflected upon the railroads in that 40 per cent of all tonnage handled by rail is coal and because the railroads now consume 28 per cent of the yearly production of coal.

Rebutting a statement made by Mr. Clevenger that present freight rates need no adjustment, J. D. Battle, traffic manager of the National Coal Association, said that coal men were vitally interested in the matter and would favor certain changes. The railroads are facing a crisis as serious as that of the coal industry, said Colonel H. C. Nutt, president of the Monongahela R.R.



Production and the Market



Weekly Review

Declining prices on soft coal have not affected demand and the production of bituminous coal continues at a level little short of 11,000,000 tons per week. That this country should have a production of 227,780,000 net tons of soft coal during the first five months of this year—exceeded only by the same period of 1918—with conditions in the market as quiet as they are is attributed to the productive capacity of the industry and evidence of its willingness to perform when it has abundant labor and even fair car supply.

A few probably appreciate that the production of anthracite at the end of May is the highest ever recorded in the corresponding period. May 31 this year the production of anthracite was 42,504,000 net tons, which is at the rate of 103,000,000 tons a year, as compared with the previous annual record of 99,000,000 tons in 1917. That there has been no need for a drive to induce householders and retail dealers to take in anthracite for the possibility of a strike on Sept. 1 is quite generally appreciated.

Railroads Increase Stocks of Fuel Coal

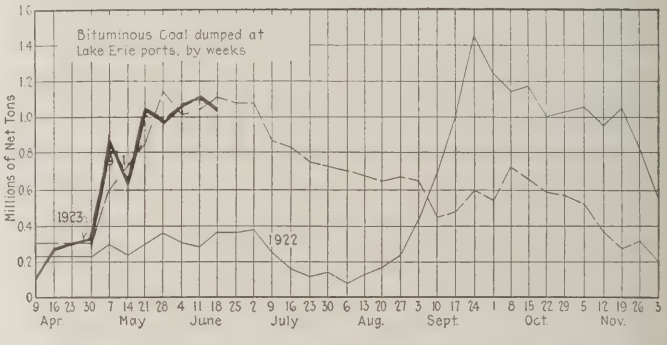
The drive behind the high rate of bituminous coal production comes from two sources: The Secretary of Commerce in Washington and the railroads. Railroads, for instance, have increased their stock of fuel coal from about six and three-quarter million tons in cars and on the ground on Jan. 1, when normally they carry large reserves, to eight and a half million tons on June 1. About a million tons of this was added in May. Working through associations and every form of organized industry the Department of Commerce has urged the storage of coal this summer.

As the railroads offer better transportation service to the soft-coal mines, reports of lost time because of no market increase. *Coal Age* Index of spot prices of bituminous coal dropped 5 points last week to 210 on June 18, which corresponds to an average price of $2.54. Slight advance in eastern Kentucky and Hocking were more than offset by declines in western Kentucky, Ohio No. 8, Pittsburgh and the eastern low-volatile fields, while Western coals stood still.

The principal markets for soft coal—railroads, the coke plants, the Northwest trade—all reported gains in May over the previous month. Overseas exports are on the decline.

Demand was practically at a standstill in the Middle West, but prices held steady. Production in Illinois and in Indiana has been reduced to a point where some producers bought coal to fulfill their own contracts. In New England, buying except in small lots is almost negligible, due in part to an easing up in the cotton industry.

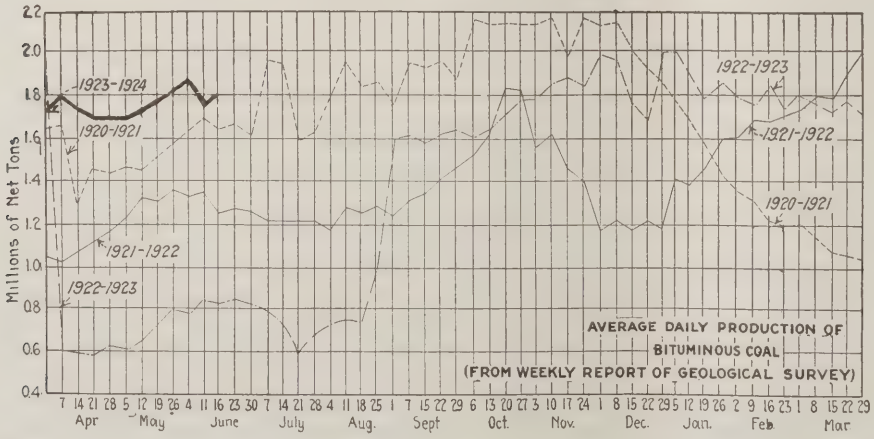
Shipments from Baltimore during the first ten days



of June amounted to 106,860 tons of cargo and bunker coal in fourteen steamers and one schooner, as compared with 107,719 tons of cargo and bunker coal in fourteen steamers during the corresponding period of May.

"Preliminary estimates of soft coal produced in the week ended June 9," says the Geological Survey, "indicate a total, including coal coked, lignite and mine fuel, of 10,708,000 net tons, an increase of 617,000 tons over the revised estimate for the week preceding.

"Early returns on car loadings during the week June



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
May 26	4,889,000	11,049,000
June 2 (*b*)	4,616,000	10,091,000
June 9 (*a*)	5,136,000	10,708,000
Daily average	856,000	1,785,000
Calendar year	172,248,000	241,850,000
Daily av. cal. year	1,266,000	1,778,000

ANTHRACITE

May 26	10,000	1,956,000
June 2	8,000	1,606,000
June 9	13,000	2,046,000
Calendar year	21,855,000	45,192,000

COKE

June 2 (*b*)	97,000	395,000
June 9 (*a*)	99,000	416,000
Calendar year	2,887,000	8,861,000

(*a*) Subject to revision. (*b*) Revised from last report

11-16 indicate a slight increase in the rate of production and a probable total output for the week of 10,800,000 tons."

Total dumpings of bituminous coal over Lake Erie piers from the opening of Lake navigation to June 10 was 6,841,488 net tons, as compared with 6,903,274 tons in the corresponding period of 1921, says the Geological Survey. Shipments of anthracite from Buffalo during the week ended June 12 was 98,400 net tons, as compared with 84,700 tons the previous week. The cumulative shipments this season to June 12, inclusive, were 715,620 tons. In the corresponding period of 1922 only 19,500 tons had been moved, but in 1921 the total to corresponding date was 1,023,000 tons. Dumping at Hampton Roads for all accounts during the week ended June 14 was 282,706 net tons, as compared with 356,349 net tons the previous week.

There is a growing demand for anthracite, especially in the larger sizes. Egg and stove continue to grow scarcer in some sections, with chestnut size becoming stronger in demand. Buckwheat is the easiest of the steam coals.

Chicago Market at Low Ebb

Trade in all coals was at the bottom of the Chicago market during the past week. Domestic—even the best southern Illinois lump—was in no demand whatever and naturally every other Western domestic also was at a standstill. Prices were not shaken, however. Association operators stuck to $4.35 for Franklin County prepared sizes and independents continued to get varying amounts down to $3.25. Since there is no domestic stocking of anything but anthracite and a little coke and smokeless, about all the lump made in Illinois and Indiana went into railroad stockpiles. The only steam movement to speak of through this market was coal for immediate consumption.

The market generally is so low that shutdowns have reduced the Illinois and Indiana output to a point where several producers have been buying coal to fulfill their own contracts. Much sales activity is centered in the Northwest. The flow of Pocahontas and hard coal into the Chicago territory continues steadily with a reasonably brisk trade in the latter. As for the former, some operators were glad to see the Sandusky embargo slapped on a few days ago to restrict

Current Quotations - Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

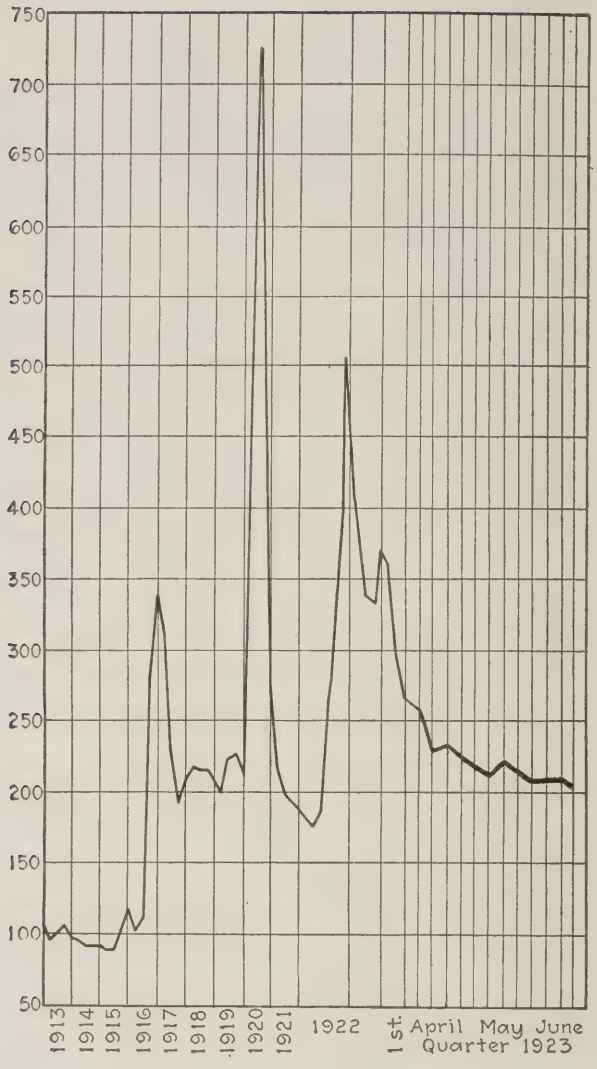
	Market Quoted	June 19 1922	June 4 1923	June 11 1923	June 18 1923†
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.50	$6.25	$6.25	$6.00@$6.50
Smokeless mine run	Columbus	3.30	4.25	4.25	*3.75@ 4.10*
Smokeless screenings	Columbus	3.15	3.60	3.60	3.50@ 3.75
Smokeless lump	Chicago	3.25	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	3.10	4.10	4.10	*3.75@ 4.00*
Smokeless lump	Cincinnati	3.55	6.25	6.25	**6.25@ 6.50**
Smokeless mine run	Cincinnati	3.40	4.10	4.10	**4.00@ 4.50**
Smokeless screenings	Cincinnati	3.15	4.00	4.00	**4.00@ 4.25**
*Smokeless mine run	Boston	6.10	6.35	6.10	*5.75@ 6.00*
Clearfield mine run	Boston	3.05	2.35	2.60	*2.00@ 2.75*
Cambria mine run	Boston	3.50	3.10	3.10	*2.75@ 3.25*
Somerset mine run	Boston	3.20	2.85	2.85	*2.50@ 3.00*
Pool 1 (Navy Standard)	New York	4.40	3.75	3.75	3.50@ 4.00
Pool 1 (Navy Standard)	Philadelphia		3.75	3.70	3.35@ 4.00
Pool 1 (Navy Standard)	Baltimore	4.00			
Pool 9 (Super. Low Vol.)	New York	4.05	2.85	2.80	*2.50@ 3.00*
Pool 9 (Super. Low Vol.)	Philadelphia	4.30	2.85	2.80	*2.45@ 3.05*
Pool 9 (Super. Low Vol.)	Baltimore	3.85	2.55	2.75	**2.80**
Pool 10 (H.Gr.Low Vol.)	New York	3.80	2.35	2.50	*2.25@ 2.50*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	4.00	2.30	2.25	*2.00@ 2.40*
Pool 10 (H.Gr.Low Vol.)	Baltimore	4.00	2.15	2.25	**2.45**
Pool 11 (Low Vol.)	New York	3.50	2.00	2.00	1.75@ 2.25
Pool 11 (Low Vol.)	Philadelphia	3.75	1.95	1.90	*1.70@ 2.10*
Pool 11 (Low Vol.)	Baltimore	3.50	1.95	2.00	**2.25**
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.65	1.85	1.85	*1.65@ 2.00*
Pool 54-64 (Gas and St.)	Philadelphia		2.05	2.10	*1.65@ 2.00*
Pool 54-64 (Gas and St.)	Baltimore	3.50	1.75	1.90	*1.75*
Pittsburgh sc'd gas	Pittsburgh		2.85	2.85	*2.75@ 2.90*
Pittsburgh mine run (St.)	Pittsburgh		2.20	2.20	*2.00@ 2.10*
Pittsburgh slack (Gas)	Pittsburgh		1.55	1.55	*1.50*
Kanawha lump	Columbus	3.35	2.75	2.80	2.50@ 3.10
Kanawha mine run	Columbus	3.25	2.05	2.05	1.90@ 2.20
Kanawha screenings	Columbus	3.25	1.60	1.65	*1.25@ 1.65*
W. Va. lump	Cincinnati	3.35	3.10	3.25	**3.25@ 4.00**
W. Va. Gas mine run	Cincinnati	3.35	1.70	1.80	*1.25@ 2.25*
W. Va. Steam mine run	Cincinnati	3.00	1.70	1.80	*1.25@ 2.25*
W. Va. screenings	Cincinnati	2.90	1.40	1.35	*1.00@ 1.50*
Hocking lump	Columbus	3.35	2.60	2.60	**2.50@ 3.00**
Hocking mine run	Columbus	3.10	1.85	1.85	**1.75@ 2.10**
Hocking screenings	Columbus	3.15	1.35	1.35	*1.15@ 1.30*
Pitts. No. 8 lump	Cleveland	4.00	2.85	2.80	*2.25@ 3.25*
Pitts. No. 8 mine run	Cleveland	3.70	2.05	2.05	*$1.85@$2.00*
Pitts. No. 8 screenings	Cleveland	3.70	1.45	1.40	*1.15@ 1.30*
Midwest					
Franklin, Ill lump	Chicago		4.05	4.05	3.75@ 4.35
Franklin, Ill. mine run	Chicago		3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago		1.80	1.80	1.75@ 1.85
Central, Ill. lump	Chicago		2.60	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago		2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago		1.85	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago		3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago		2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago		1.80	1.80	1.75@ 1.85
Ind. 5th Vein lump	Chicago		2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago		2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago		1.55	1.55	1.50@ 1.65
Standard lump	St. Louis		2.35	2.35	2.25@ 2.50
Standard mine run	St. Louis		1.80	1.80	1.75@ 1.90
Standard screenings	St. Louis		1.50	1.50	1.50
West Ky. lump	Louisville	3.85	2.30	2.30	*2.15@ 2.35*
West Ky. mine run	Louisville	3.80	1.80	1.75	1.65@ 1.85
West Ky. screenings	Louisville	3.80	1.35	1.35	1.25@ 1.50
West Ky. lump	Chicago	3.75	2.35	2.35	2.25@ 2.50
West Ky. mine run	Chicago	3.75	1.45	1.45	1.40@ 1.50
South and Southwest					
Big Seam lump	Birmingham	2.20	3.05	3.05	2.90@ 3.20
Big Seam mine run	Birmingham	1.85	2.05	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	3.50	3.25	3.25	3.00@ 3.50
S. E. Ky. mine run	Chicago	3.25	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Louisville	3.75	3.50	3.50	3.25@ 3.75
S. E. Ky. mine run	Louisville	3.25	2.25	2.25	*2.00@ 2.25*
S. E. Ky. screenings	Louisville	3.10	1.65	1.65	*1.25@ 1.50*
S. E. Ky. lump	Cincinnati	3.50	3.05	3.10	**3.25@ 4.00**
S. E. Ky. mine run	Cincinnati	3.05	1.60	1.65	**1.25@ 2.25**
S. E. Ky. screenings	Cincinnati	2.85	1.55	1.50	*1.00@ 1.75*
Kansas lump	Kansas City	5.00	3.85	4.00	3.50@ 4.50
Kansas mine run	Kansas City	4.25	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	2.95	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads
† Advances over previous week shown in **heavy type** declines in *italics*

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Latest Pre-Strike Company	June 11, 1923 Independent	June 11, 1923 Company	June 18, 1923† Independent	June 18, 1923† Company
Broken	New York	$2.34		$7.60@$7.75		$7.75@$8.35		$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85		7.00@ 8.10		7.00@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.50	8.00@ 8.35	$8.50@11.50	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@10.00	8.10@ 8.35	9.25@10.00	8.10@ 8.35
Egg	Chicago*	5.06	7.50	8.25	8.50@11.50	8.00@ 8.50	*7.60@10.25*	*7.25@ 7.45*
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.50	8.00@ 8.35	8.50@11.50	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@10.00	8.15@ 8.35	9.25@10.00	8.15@ 8.35
Stove	Chicago*	5.06	7.75	8.25	8.50@11.50	8.00@ 8.50	*7.60@10.25*	*7.25@ 7.45*
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@10.00	8.15@ 8.35	9.25@10.00	8.15@ 8.35
Chestnut	Chicago*	5.06	7.75	8.25	8.50@11.50	8.00@ 8.50	*7.60@10.25*	*7.25@ 7.45*
Ranges	New York	2.34				8.30		8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.00@ 8.00	6.00@ 6.30	**7.25@ 8.00**	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	6.00@ 6.50	*6.25@ 7.25*	*5.50@ 5.65*
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	1.75@ 2.50	2.50	**2.00@ 2.50**	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22		2.00@ 2.50		1.60		1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 210, Week of June 18, 1923. Average spot price for same period, $2.54. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

the recent easy flow of smokeless to this territory. It was becoming difficult to maintain a price of $4 on mine-run and $6@$6.25 on lump.

Illinois Fields Inactive

The situation in southern Illinois during the week shows a further slowing up on all sizes. The easing up on domestic sizes, however, has caused a better movement of the steam sizes that had been available, but this is nothing like what it should be under present conditions. All mines have unbilled coal on track. No 1 nut and egg seem to be the hardest to move.

A little railroad coal is moving out of the Mt. Olive district, but practically nothing in the way of steam or domestic. In the Standard district working time seems to be getting uniformly less. Railroad tonnage dropped off the past week and every mine seems to have "no bills." Some mines have not worked for five weeks and still have unbilled coal on track.

There is practically no domestic moving in St. Louis and the little that is coming in seems to be anthracite or coke, but even the coke tonnage has dropped off. Local wagon-load steam has practically stopped but a little movement of cheap coal is coming in for apartment-house storage. Local carload steam is easy, with no steam demand from the country at all. Domestic business in the country has dropped off the same as in the city and the dealer trade generally has a pretty fair supply on hand.

Louisville Is Not Downhearted

While there is a good deal of complaint heard among Louisville coal offices over the difficulty of selling coal the general movement from the mines continues quite fair. Competition for business is very keen. Movement to the Lakes is showing a little improvement, it is said, and there is a slightly better inquiry from utilities, municipal plants, etc.

Western Kentucky mines have been having a little more distress coal on the market than usual, and this is causing complaint among some of the operators as well as jobbers, as the weak prices quoted on distress fuel makes it a hard market in which to sell coal at the mine.

Minneapolis Hard After Anthracite

The hard-coal demand at Minneapolis has been materially better this spring. Receipts at the docks have been encouraging and people appear to be remembering last year's shortage. Soft-coal buyers are more inclined to hold back. They did not have any serious experience during last winter. They propose to get lower prices and are stimulated in their efforts by the volume of demurrage stuff they have been picking up lately.

A sudden demand for screenings at Duluth has featured a market which is otherwise dead. Several industrial concerns are in the market and it looks as if large lots of screenings will move soon. One concern using more than 300,000 tons of screenings yearly has signified its intention of placing its orders for dock coal. This concern has always used Illinois coal till now. Shipments are duller than at this time last month, which is causing some anxiety among the dock men. Buyers want lower prices.

Absolute quiet prevails in the Milwaukee coal market in spite of hard work by jobbers and retailers. Nine out of ten consumers consider coal too high. Coke is in the same category and byproduct companies are finding a slow sale for their outputs. Car ferries brought 30,636 tons of anthracite, and 48,242 tons of soft coal during May. The May rail movement was confined to 50,428 tons of soft coal.

Nothing has happened in the last week to lift the gloom which settled down on the Kansas district last winter and which has been growing heavier ever since.

Utah Trade Is More Active

Utah production is now estimated to be 60 per cent of full-time capacity, a big jump in the past 10 days. Industrials such as smelters, copper companies, sugar companies and others are buying now. The contract price averages $1.50@$1.25. Railroads are not buying much. They have plenty of coal on hand. Domestic business is improving, but so far consumers have shown no disposition to rush the dealers. General Sales Manager Calvin of the United States Fuel Co. said he expected August to be the biggest month of the year because the car supply will be excellent. The beet crop will not have started to move. September, October and November, he thought, would see less activity in the coal industry.

There is a big shortage in Colorado lignite slack on account of the limited domestic business. This fuel is selling at $1.80, an advance from $1.25 two weeks ago. First-grade lump is $3.50, second grade, $2.75, mine-run, $2.25@$2.75.

Demand Quiet in Ohio Markets

Columbus, Ohio, reports no trouble from car shortage, but there is a lack of demand for coal reported from practically every section in which Ohio-mined coal sells. Domestic demand has fallen off and the steam trade is easier. Buying on the part of nearly all consumers in the Columbus territory is for immediate needs. Steam users are buying in the open market rather than entering into contracts. Demand in the Cleveland market is quiet and some mines in adjacent mining districts have closed down because of the situation. Mines in No. 8 district have been kept busy up to this time producing railroad fuel and coal for lake shipment.

There has been a return of confidence in the smokeless coal situation at Cincinnati following reports of much distress coal in the Chicago market. The market for block and 4-in. lump is listless. Standard coals held up pretty well. Quotations for West Virginia 2-in. lump at Cincinnati on June 18 were $2.75@$3 as compared with $2.50@$3 the previous week, and for southeastern Kentucky 2-in. lump $2.50@$3 as compared with $2.50@$2.75.

With ample car and labor supplies, production of coal in the Pittsburgh district moved up so easily and smoothly that the increase in demand is not fully realized.

Buying Negligible in New England

Cotton manufacturers in New England to a considerable number have curtailed production from a third to a half and there are enough other industries so nearly in the same position that except for scattering small lots buying is almost negligible. Reduced prices on the Southern coal have removed the inducement for buying high grades all-rail from central Pennsylvania in a widening area.

Sales of Pocahontas and New River are very light. Operators have been obliged to slow down production to avoid carrying large tonnages on cars at the piers, and prices have shown a further decline as compared with a week ago. No. 1 Navy standard coal sold down to $5.75 per gross ton, f.o.b. vessel, with shippers of No. 2 coals and the high volatiles actively soliciting offers. At Boston for inland delivery also the price level has dropped and where a month ago quotations were firmer at $8.25 per gross ton on cars they have now receded to $7.50 and less.

All-rail prices remain practically unchanged. The hardening tendency noticed a few weeks ago, especially on the choice coals, is now eliminated, and the agencies that did not then improve the opportunity to tie up business are beginning to feel the effects of the dull market. No. 1 coals have sold down to $3.25 and $3 per ton at the mines, and new consignments are not readily obtained.

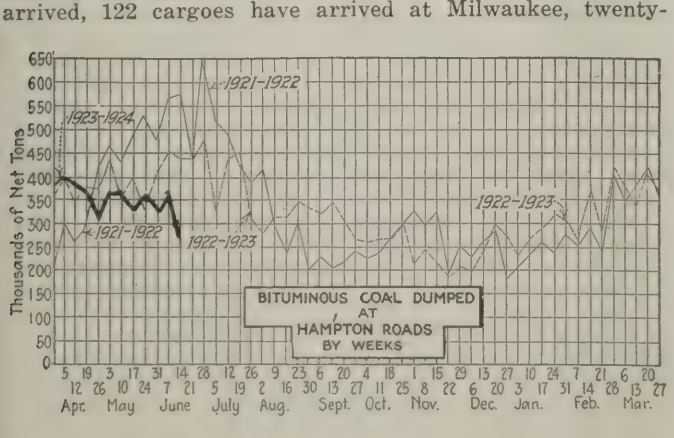
Spotty Tendency in New York Market

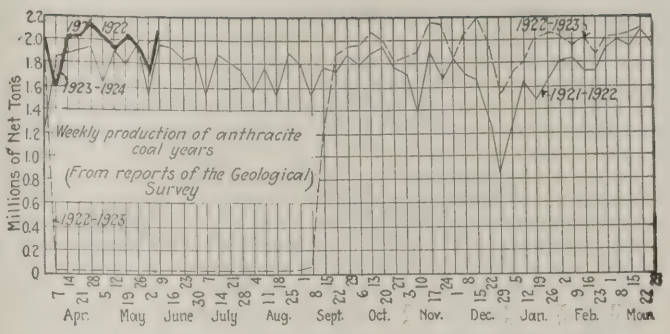
The New York market is spotty, sales depending principally on the prices quoted and the buyer's needs. Some shippers believe the bottom in prices has been reached but they do not look for any substantial increase in either prices or demand until the latter part of August or early in September. In the meantime the situation may be affected by the anthracite wage negotiations.

Consumers in the Philadelphia market appear to be taking slightly more interest in the situation and it is believed that some quiet contracting has been going on, principally on the initiative of the consumer.

Inquiries for commercial coal in the Birmingham (Ala.) market is practically at a standstill. Inquiries, which are few, are for small tonnages. The feature of last week's market was the closing of contracts for supplying the Southern Railway system for the next twelve months, 1,250,000 tons being involved, which is about the same as was required last year.

Of the sixty-two cargoes of coal arriving at Duluth last week, five of them were anthracite. It is reported that twenty-five more, of which four are anthracite, are on their way. It was estimated that on June 1 stocks on the docks amounted to 1,750,000 tons of bituminous coal and 150,000 tons of anthracite. Since May 3, when the first cargo arrived, 122 cargoes have arrived at Milwaukee, twenty-





seven carrying 216,119 tons of anthracite and ninety-five carrying 780,889 tons of soft coal. Dumpings at Lake ports during the week ended June 18 were 1,020,176 net tons of cargo coal and 54,667 net tons of fuel coal, making dumpings for the season 7,391,956 tons of cargo coal and 342,765 tons of fuel coal.

Domestic Users Watch Anthracite Situation

Consumers of the domestic sizes of anthracite are closely watching the situation in the coal fields. They are becoming more insistent concerning deliveries and some are already putting substitutes, principally coke, into their bins. In the New York market there has been a slightly increased demand for broken coal to take the place of either egg or stove, both of which are short. Chestnut coal is stronger. The upper region steam coals are in better demand than those from the Southern fields.

Stove coal is short in the Philadelphia market and some retail dealers have advanced their prices for this size in an effort to relieve the situation. Retail dealers are urging shippers for more coal. Slow shipments to Baltimore make it difficult for retail dealers there to fill orders.

"During the week ended June 9 the rate of production of anthracite recovered from the holiday slump," says the Geological Survey. "The total output is estimated at 2,046,000 net tons, including mine fuel, local sales, and product of washeries and dredges."

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to June 2, 1923 Inclusive	Week Ended June 2, 1923
U. S. Total	55.7	....	....	....
Somerset County	74.9	36.3	39.7	77.9
Panhandle, W. Va.	51.3	57.3	57.9	69.2
Westmoreland	58.8	65.8	58.6	67.1
Virginia	59.9	55.7	57.9	64.4
Harlan	54.8	22.1	21.7	27.5
Hazard	58.4	16.4	26.9	43.6
Pocahontas	60.0	36.6	35.4	45.7
Tug River	63.7	28.8	38.3	49.4
Logan	61.1	26.2	32.4	41.3
Cumberland-Piedmont	50.6	31.7	50.9	73.6
Winding Gulf	64.3	30.4	36.8	42.9
Kenova-Thacker	54.3	42.4	37.8	(a)
N. E. Kentucky	47.7	28.4	30.5	36.5
New River	37.9	31.6	37.2	43.2
Oklahoma	59.6	59.1	44.2	44.9
Iowa	78.4	75.9	70.2	58.8
Ohio, Eastern	46.6	40.8	41.0	78.3
Missouri	66.8	76.3	69.5	66.1
Illinois	54.5	49.9	42.7	37.0
Kansas	54.9	55.9	47.3	68.7
Indiana	53.8	37.7	46.9	47.2
Pittsburgh†	39.8	41.2	41.5	63.8
Central Pennsylvania	50.2	53.4	50.9	69.2
Fairmont	44.0	35.5	44.4	69.4
Western Kentucky	37.7	32.4	31.8	27.5
Pittsburgh*	31.9	56.1	65.7	88.4
Kanawha	13.0	15.6	24.7	28.8
Ohio, Southern	24.3	38.1	30.7	31.9

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended June 2, 1923	932,041	171,248
Previous week	1,014,029	192,092
Same week in 1922	739,559	86,289

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
June 7, 1923	.....	.....	.....	.....
Same date in 1922	284,189	180,831	.....	.....
May 31, 1923	32,443	3,953	16,277	11,392

Foreign Market And Export News

British Coal Output Rebounds Sharply; Quotations Show Decline

Output of coal in Great Britain's mines during the week ended June 2 totaled 5,727,000 tons, says a cable to *Coal Age*, an increase of 1,990,000 tons over the production of the previous week. Prices continue on the downward grade, with demand for immediate shipments easier.

Buyers in the Welsh markets are holding off in the hope of lower prices, but, owing to heavy orders waiting fulfillment the strength of the market is well sustained. The decline in output over the holidays is reflected in a scarcity of superior grade coals for prompt shipment.

Beyond this month the outlook is less satisfactory, and middlemen holding contracts made when prices were very much lower are inclined to undersell the mines.

The market in the north of England is quieter and also somewhat weaker. The German demand is not so insistent, and labor troubles have obstructed dealings with Belgium, Holland and Dunkirk. The result is an accumulation of coal-laden steamers and an interruption of the steady flow of business. France is buying very cautiously. The mines are sold heavily over this month.

French Coal Situation

Coal supplies in Paris are somewhat depleted because of the strike of Belgian railway employees, but with the men back at work it is expected there will be no further trouble. However, some additional trouble is expected in the Sarre coal fields where the mine officials have put forward the following "revendications": Increase of wages, speedier promotion, extension of annual leave, and constitution of a committee to represent the officials' interests with the management.

Coke is being received by the Société des Cokes de Hauts-Fourneaux from the Ruhr at a daily average of about 5,000 tons. American coke continues to arrive, but it is very different from the coke usually used in French blast furnaces. Because of this French metallurgical concerns are making special investigations as to the best means of utilizing it. Some concerns are using it to the extent of 40 per cent as a component part of special coke mixtures, while others use about 15 per cent of it in their furnaces.

Production of French collieries during March and April, in metric tons, follows:

	COAL		
March.....	3,012,116	April.....	2,999,617
	COKE		
March.....	149,285	April.....	156,035
	BRIQUETS		
March.....	262,316	April.....	214,342

One reason given for heavier production of coal and briquets in March is that there were 27 working days in that month as compared with 24 in April.

Dullness Affects Hampton Roads Market

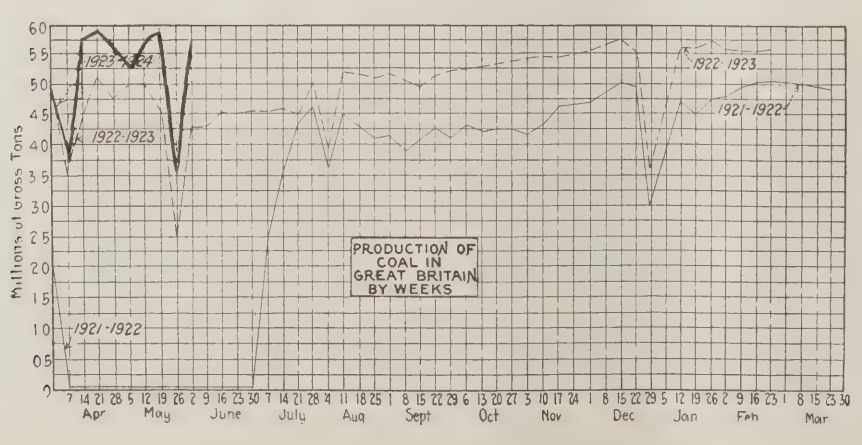
Business slackened at Hampton Roads last week with the customary summer dullness settling over the market. Embargoes on coal to the Great Lakes slowed up coastwise shipments, while all branches of the trade were light.

Decline in prices continued, and buyers were not eager to come into the market under the circumstances. Few contracts were being made, and shippers reported inquiries very rare.

Domestic dealers, in some instances, were making contracts on the most favorable basis in the last twelve months. Export business held fairly firm, but no new contracts in this trade were evident.

German Coal Prices Advance

An increase of 53 per cent was made in the price of coal throughout Germany to take effect June 1, according to an announcement made at Berlin. The advance was made in consequence of the further depreciation of the mark and an increase in wages granted the miners. The increase will make Ruhr coal cost 221,000 marks a ton, as compared with about 437,000 marks a ton for English coal delivered at Hamburg.



Export Clearances, Week Ended June 16, 1923

FROM BALTIMORE

	Net Tons
For Belgium:	
Du SS. Amersfoort	11,212
For Brazil:	
Nor. SS. Bjornstierne Bjornson	7,458
For France:	
Belg. SS. Carlier	11,733
Jap. SS. Biyo Maru	7,483
Fr. SS. Vendorne	6,615
Ital. SS. Persco	8,071
For Germany:	
Br. SS. Glentworth	9,250
For Italy:	
Nor. SS. Atlantis	8,175
For Porto Rico:	
Am. SS. Major Wheeler	503
For Spain:	
Span. SS. Astoi Mendi	7,783
For Sweden:	
Swed. SS. Orangesberg	7,019
For West Indies:	
Am. Schr. Purnell T. White	1,046

FROM HAMPTON ROADS

For Brazil:	
Swed. SS. Atland, for Rio de Janeiro	6,821
For Canada:	
Nor. SS. Almora, for St. Thomas	3,463
For Chile:	
Nor. SS. Vendeggen, for Valparaiso	2,014
For Cuba:	
Nor. SS. Ravnanger, for Havana	5,127
Br. SS. Macabi, for Banes	1,022
For Italy:	
Ital. SS. Nicolo II, for Porto Ferrajo	6,745
For Porto Rico:	
Amer. SS. Mariana, for San Juan	3,994
For West Indies:	
Br. SS. Matura, for Port au Spain	2,331

United States April Coal and Coke Imports

(In Gross Tons)

	1922	1923
Anthracite	1,391	14,516
Bituminous { free	68,695	67,006
Bituminous { dutiable	.....	92,247
Imported from:		
United Kingdom	16,095	62,783
Canada	43,597	92,247
Japan	100	13
Australia	8,146	4,210
Other countries	757	.....
Coke	432	5,439

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	June 7	June 14
Cars on hand	980	998
Tons on hand	59,228	60,102
Tons dumped for week	111,884	88,685
Tonnage waiting	10,400	5,300
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,578	1,764
Tons on hand	92,080	100,020
Tons dumped for week	134,235	95,698
Tonnage waiting	20,221	14,888
C. & O. piers, Newport News:		
Cars on hand	1,034	1,357
Tons on hand	57,920	71,935
Tons dumped for week	72,050	68,033
Tonnage waiting	2,550	12,880

Pier and Bunker Prices, Gross Tons

PIERS

	June 9	June 16
Pool 9, New York	$5.65@$6.00	*$5.50@$6.00*
Pool 10, New York	4.95@ 5.50	*4.75@ 5.00*
Pool 11, New York	4.00@ 4.75	4.00@ 4.75
Pool 9, Philadelphia	5.50@ 5.90	*5.45@ 5.85*
Pool 10, Philadelphia	4.60@ 5.30	*4.55@ 5.25*
Pool 11, Philadelphia	3.80@ 4.45	*3.75@ 4.40*
Pool 1, Hamp. Roads	6.35@ 6.50	*5.75*
Pools 5-6-7, Hamp. Rds.	4.85	4.85
Pool 2, Hamp. Roads	6.10	*5.65*

BUNKERS

Pool 9, New York	5.95@ 6.30	*5.80@ 6.30*
Pool 10, New York	5.25@ 5.80	*5.05@ 5.30*
Pool 11, New York	4.30@ 5.05	4.30@ 5.05
Pool 9, Philadelphia	5.90@ 6.10	*5.85@ 6.05*
Pool 10, Philadelphia	4.90@ 5.60	*4.85@ 5.55*
Pool 11, Philadelphia	4.05@ 4.75	*4.00@ 4.75*
Pool 1, Hamp. Roads	6.35@ 6.50	*5.85*
Pool 2, Hamp. Roads	6.10	*5.65*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	June 9	June 16†
Admiralty, large	40s.@41s.6d.	*32s.6d.*
Steam smalls	31s.6d.	*26s.3d.*
Newcastle:		
Best steams	27s.6d.@28s.6d.	*27s.@28s.*
Best gas	32s.6d.	*30s.@32s.6d.*
Best bunkers	30s.@32s.	30s.@32s.

† Advances over previous week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade

ALABAMA

Announcement is made that the **Pratt Fuel Co. has purchased the properties of the Dora Fuel Co. and Kershaw Mining Co.**, at Dora, Walker County. Frank Marquis, president of the Dora Fuel Co. and John Stone, of the Kershaw Mining Co., will be officials of the consolidated companies, of which Waler Moore will be president.

COLORADO

Work on the Moffatt tunnel in Colorado is to be started within a month. The ruling of the U. S. Supreme Court during the past week that the Colorado law is constitutional providing for the construction of the Moffat tunnel, clears the way, the tunnel commission has announced. In Moffat and Routt countries, it is estimated by state engineers, there are 79,349 acres of coal lands which have an estimated future production of coal from workable beds of 2,014,740,253 tons. In addition, there are 99,488 acres in the two counties which should, at the lowest estimate, yield 99,488,000 tons. The project also will open up valuable oil and oil shale lands. Friends of the tunnel project assert that it means to Denver and Colorado what the immense harbors at San Francisco and New York city mean to those cities. Opponents declare the others are too optimistic, that the coal market will not absorb the Routt County output and that the southern Colorado coal fields will suffer keenly.

ILLINOIS

Thirty thousand dollars of the Herrin defence fund has been returned to the donors. Originally $60,000 was collected from business men of Illinois through the State Chamber of Commerce to support the prosecution of the case by the state Attorney General's office afte it became known that state funds were insufficient.

Bids for furnishing and delivering bituminous coal to Illinois charitable, penal and reformatory institutions and the state normal schools **have been requested** by the State Department of Public Works, Division of Purchases and Supplies, for the period from July 1, 1923, up to and including June 30, 1924. Bids will be received up to 10 P. M., June 25.

Two hundred miners or more are expected to compete in the state mine rescue contest to be held at Collinsville, June 23. Medals will be given all contestants and loving cups will be presented to the winning teams. Over thirty teams have already been entered in the event and three or more winning teams will be sent to the international first-aid contest at Salt Lake City.

Tests are being made and plans formed for the opening of **a new mine between St. Johns and Du Quoin** in the future. In all probability the mine will be a stripping operation. Work is being carried on by men connected in a way with the Majestic Coal & Coke Co., of Du Quoin, and it is thought that that company is back of the present plans, although no official announcement has been given by that company.

The Reynolds Coal & Fuel Mining Co., Loami, has been incorporated with a capital of $14,000, to mine and deal in coal; incorporators, C. M Reynolds, L. D. Reynolds, John R. Reynolds; correspondent, Ed. D. Henry, 508 Myers Building, Springfield.

M. M. Leighton has been appointed chief of the Illinois Geological Survey at Urbana, succeeding F. W. DeWolfe, who resigned last spring. During the interim Harold E. Culver was acting chief.

The Dering Coal Co. is building the two-and-a-half-mile railroad now being constructed from a Dering mine near Eldorado to a connection with the Big Four near Wasson. It was erroneously reported that the Illinois Central R.R. was building it. Illinois Central engineers laid it out but the line belongs to the Dering company. It is not yet determined whether the short road will be operated by the Big Four or by the Dering company.

A new coal mine with anticipated production of 300 tons will be opened on the Toledo, Peoria & Western R.R. west of Civer, a village near Canton. The firm of McGlaughlin Bros. has leased about 400 acres of coal lands. They have been engaged for fifteen years in the coal business in Canton.

A bill for accounting, for receivership and for an injunction has been filed in the St. Clair County Circuit Court by Elmer H., Michael H., and Robert C. Wright, of Belleville, Ill., against the Red River Coal Co., J. A. Knebel and A. W. Sieglaff. The corporation was formed in 1922, the capital stock being $150,000, of which $100,000 was common and $50,000 preferred. Elmer H. Wright, J. A. Knebel and A. W. Seiglaff were named directors.

No. 2 mine at Du Quoin, formerly operated by the Old Abe Mining Co., of that city, and the output of which was sold through the Kanawha Fuel Co., Milwaukee, **has been taken over by J. M. Mitchell,** coal operator of Royalton. The new owner of the shaft has sent an engineer to the mine and a force of men have been put to work cleaning up ready for operation. This mine was closed down over a year ago, and while much of the machinery and equipment was left in the plant, quite an amount of new installation will be made.

INDIANA

The Bloomington Block Coal Co., Bloomington, has been chartered with a capital of $20,000; directors, John S. Risher, Helen T. Risher and Ina R. Irvine.

A cave-in of the seventh southwest entry of **Francisco No. 1 mine,** involving an area of about 200 sq.ft. underground, caused the sinking of earth under the main line tracks of the Southern Ry. near Princeton, Ind., recently. The sunken area at the surface was 100 ft. square. No further spread of the cave is expected.

The Board of Trustees of Indiana University, at Bloomington, Ind., is receiving bids for the installation of coal- and ash-handling equipment to be used in connection with the new power house there. The board also is seeking bids on a large traveling crane. Bids will close June 22. Charles R. Ammerman, 520 Occidental building, Indianapolis, is the engineer in charge of the work.

IOWA

The Northwestern Coal Co., of Albia, has five prospect drills at work in the Coal Glen neighborhood near Columbia. This is the second visit of the drillers to that locality. They drilled each 40-acre tract upon which they had prospect rights. The present intention is thoroughly to prospect every ten-acre tract.

KANSAS

The Capital Coal & Mining Co., of Topeka, with an authorized capitalization of $200,000, has been incorporated by the following, all of Topeka: O. M. Lyons, F. L. Loveless, Fred D. Coffman, Florence G. Coffman and John E. Barrett. Mr. Barrett is Governor Davis' choice for state oil inspector and now has a suit pending in the State Supreme Court to try to oust Hugh Duff, Republican, appointed to the position by Governor Allen.

KENTUCKY

The Kentucky Block Coal Co., of Lexington, is reported to have purchased hard wood timber lands near Whitesburg.

The St. Mihiel Coal Co., McCreary, has increased its capital stock from $25,000 to $40,000.

Numerous improvements are being made by the Chesapeake & Ohio Ry. in the Big Sandy District of Kentucky. When such improvements to trackage and yard increases are completed it will be possible for the road to handle approximately 1,200 cars per day instead of about 300 per day, as under present facilities.

LOUISIANA

The District Engineer, 140 Decatur St., New Orleans, will soon let contract for 5,000 tons bituminous coal for shipment to Natchez, Miss., and 1,500 tons for shipment to New Orleans, for flood control works.

NEW YORK

Burns Brothers stockholders at their annual meeting June 14 in Jersey City **voted in favor of the recapitalization plan** submitted by a special committee of directors. The plan as approved calls for the retirement of both issues of preferred stock, the conversion of the Class A common stock into preferred stock of the recapitalized company and conversion of the Class B stock into common stock of the recapitalized company. One share of common stock of the new company will be given with each share of Class A common, also the right to subscribe to one additional share. The right to subscribe to one additional share of common stock also will be given to present Class B common stockholders.

For probably the first time **the Board of Purchase of the City of New York received proposals** on June 12 for furnishing and delivering to various points in the five Boroughs 29,121 tons of briquets as a substitute for egg, stove and chestnut coals "in so far as the department's requirements permit." The specifications provide that the briquets shall show on analysis maximum moisture 3 per cent as delivered; maximum ash, 16.5 per cent dry coal; minimum B.t.u., 12,400; maximum volatile combustible matter, 9 per cent. The proposals called for 245,076 net tons of anthracite; 73,621 tons bituminous run of mine coal; 65,800 tons mixed coal; and 103 tons George's Creek. Deliveries are to be for the period July 1, 1923, to March 31, 1924. Bids for furnishing and delivering 12,165 tons of briquets in Manhattan ranged from $11.03 to $13.20 per ton; for 9,239 tons in Brooklyn, and 2,682 tons in Queens, $11.03 to $11.95; for 4,266 tons in the Bronx, $11.03 to $11.65 and for 779 tons in Richmond, $11.12 to $13.03. Bids received for furnishing and delivering domestic sizes of athracite in the various boroughs ranged as follows: Manhattan—Egg, stove and chestnut, $13.75 to $16, pea coal $9.94 to $12. Brooklyn—Egg, $13.61 to $15.50, stove and chestnut sizes $13.50 to $15.50 and pea, $9.94 to $10.38. Queens—Egg stove and chestnut, $14.55 to $15.50. The Bronx—Egg, stove and chestnut sizes, $14.50 to $16. Other bids received for Manhattan deliveries included the following: 9,000 tons mixed coal, 75 per cent No. 3 buckwheat and 25 per cent soft coal, $5.34 to $5.79; 6,280 tons No. 2 buckwheat, $5.69 to $6.03, and 2,056 tons soft coal, run of mine, $6.64 to $8.28.

For Brooklyn deliveries the proposals received included the following: 7,400 tons No. 1 buckwheat, $5.19 to $6.07; and 14,600 tons mixed coal (12,950 tons No. 2 buckwheat and 3,650 tons soft coal), $5.60 to $6.39. For furnishing and delivering 12,065 tons No. 1 buckwheat in Queens borough the bids ranged from $5.51 to $7.42. For furnishing 9,225 tons of run of mine to boats of the various city departments the bids ranged from $6.96 to $7.20.

Proposals calling for barge deliveries to various points included the following: 113,520 tons No. 1 buckwheat, $5.08 to $6.41; 8,000 tons No. 2 buckwheat, $4.78 to $5.79; 40,000 tons No. 3 buckwheat, $3.60 to $4.29; 32,066 tons run of mine, $5.44 to $6.48; 19,200 tons mixed (6,900 tons soft coal, 4,200 tons No. 3 buckwheat and 8,100 tons No 2 buckwheat) $4.71 to $6.03; 400 tons egg coal, $11.42 to $13.75; 748 tons stove coal, $15, and 350 tons coke, $10.59 to $13.20.

For furnishing and delivering to various institutions in Orange County New York, to watersheds the following bids were among those received: stove and chestnut coal, $13.50 to $16; No. 3 buckwheat, $3.60 to $3.62; and run of mine, $5.61 to $5.78. Bids received for furnishing in car load deliveries 8,550 tons soft coal, run of mine, for Brooklyn watersheds outside the city limits on Long Island ranged from $5.76 to $6.60, and for furnishing and delivering in carload lots to the Ridgewood Brooklyn, pumping station, 15,650 tons soft coal, run of mine, $5.65 to $6.33.

OHIO

The following coal companies were incorporated in this state recently: **The Long Hill Coal Co.**, Nelsonville; capital, $25,000; L. J. Eberle, R. S. Oxley, A. H. Schory, O. P. Amann and M. E. Voll. **The Zanesville Coal Co.**, Zanesville; capital, $200,000; S.

H. Carrick, C. W. Howell, E. F. O'Neal, C. L. Truesdell and H. C. Pugh. **The Terminal Fuel Co.**, Cleveland; capital, $25,000; Arthur B. Ragon, L. A. Ragon, C. E. Cline, Fay S. Zimmerman and H. L. Smith. **The Blue Flame Coal Co.**, New Lexington; $25,000; Sheldon Kinsel, R. W. Murray, Raymond Diller, T. M. Potter and Thomas Ward.

The Ernst Coal Co. and the Sandford Coal Co. have merged, with offices at 1201 Public Square, Marion; capital, $1,500,000; incorporators, H. J. Meehan, John C. Cosgrove, R. B. Mitchell.

The Kensington Coal Co., Youngstown, has increased its capital from $40,000 to $75,000, and the **Battle Axe Coal Co.**, Massilon, from $10,000 to $100,000.

The U. S. Court of Appeals at Cincinnati **denied the petition of Sherman Everett, trading as the Western Coal Co., for a rehearing** of the case in which the Emmons Coal Mining Co. of Philadelphia and Charleston, W. Va., obtained a verdict for about $16,000 because of the violation of a contract for the delivery of coal some three or four years ago.

OKLAHOMA

Local Union No. 719, United Mine Workers, at Henryetta, has filed suit in the Superior Court of Logan County **seeking receivership for the Monarch Coal Co.**, which has been operating mines at Kuss. Plaintiffs allege in their petition that the defendant company is in debt to various coal miners, members of the local, in sums ranging from $10 to $80, such indebtedness aggregating a total of $470, and ask that a receiver be appointed to conduct the affairs of the company until these claims are paid.

The Mammoth Vein Colliery Co. has been incorporated in Muskogee, with a capital of $10,000, by T. H. Niles, Muskogee, and J. G. Puterbaugh and E. P. Joyner, of McAlester.

PENNSYLVANIA

Net income of the Pennsylvania Coal & Coke Corporation for the first four months of 1923 totaled $469,612, before federal tax deductions, which was equal to $2.71 a share on 172,606 shares of $50 par. This is equivalent to slightly more than 16 per cent income annually.

Mrs. Charles F. Huber, wife of the president and general manager of the Lehigh & Wilkes-Barre Coal Co., and her chauffeur, Oliver Gibbons, were so **badly burned by an explosion of gasoline** at her home in Wilkes-Barre, June 12, that **both died** a few hours later. She was prominent socially and a leader in civic affairs.

The House Mines and Mining Committee at Harrisburg took **favorable action** June 6 **on the Clarke Senate bill exempting mine inspectors from furnishing surety bonds** and permitting the chief of the Bureau of Mines to designate the number of days the members of the miners' inspectors examining boards shall be paid for their services.

After passing the Senate by a vote of 35 to 11, **the Joyce Compensation Bill**, which provides increases in workmen's compensation rates from $12 to $15 per week, **was defeated in the House** by 94 to 85. It required 105 votes to send it to the Governor. An effort may be made to get the House to reconsider its action.

Three mine workers were burned June 13 in an explosion of gas in the Henry Colliery of the Lehigh Valley Coal Co. at Plains. The explosion occurred shortly before noon in the Red Ash vein. It knocked over some timber and ventilation equipment but no other damage was caused to the mine property.

Mine Inspector W. T. Williams at Scranton says that **over 100 mine workers in the territory between Peckville and Avoca have qualified for the positions of foreman and assistant foreman.** The examination was held in the Board of Trade building May 1. The names of those who passed have been forwarded to Harrisburg for approval of Joseph J. Walsh, chief of the mine bureau. It was one of the largest single classes to qualify since the certificate law was enacted.

Mining operations were resumed June 12 in No. 28 slope of the Dorrance colliery, where a fire raged for two weeks. John M. Humphrey, president of the Lehigh & Wilkes-Barre, announced that all trace of fire had disappeared. He said reopening of the slope would give employment to approximately 100 men. Mr. Humphrey also said that a fire which started from an explosion June 11, resulting in burns to two men, was extinguished within a short time. When the flames were first discovered thousands of feet of hose were immediately rushed into the mine.

The House at Harrisburg on Monday evening, June 11, passed finally the Davis-Fowler mine-cave bills, which provide that 12½ per cent. of the anthracite tax collected by the state be returned to the anthracite counties. One-half of this sum is to go to the Anthracite Mine-Cave Fund for protection against mine caves and the other half to the Anthracite Municipalities Fund for municipal improvements. Each of the bills creates one of the commissions. Representative Fowler explained the bills and there was no debate. Governor Pinchot has gone on record as saying that unless the Legislature provided other revenues the state could not afford to divide the anthracite tax among the counties. Both Senate and House having passed the bills, the question of their signature is now up to him.

To compel the employment of a man for eight hours to do half an hour's work, **employees at New Castle colliery of the Replier Coal Co., Minersville, are on strike** and the colliery is idle. Men working in the separator at the colliery demanded that the company employ a man for a full day to oil the machinery. The oiling requires fifteen minutes of a man's time twice a day and had been done by one of the regular employees. This man objected to doing two jobs and the matter was taken up with the mine grievance committee, which agreed that the demand of the separator men was absurd. The matter apparently was settled, but the employees, after working ten minutes, decided to strike until the company complied with their demand.

Shipments of anthracite during the month of May, 1923, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 6,564,285 gross tons, as compared with 6,173,774 gross tons during the preceding month of April, an increase of 390,511 tons, or 6.3 per cent. Comparing the shipments of May this year with the same month in 1921, an increase of 770,390 tons is recorded, or 13.3 per cent. The shipment of prepared sizes last month established a record for May, and was only approached during the month of May in the years 1917 and 1918, when the maximum production was reached. Shipments by originating carriers were as follows:

	May 1923	April 1923
Phila. & Reading	1,152,026	1,170,925
Lehigh Valley	1,150,037	1,088,782
Central R.R. of N. J.	538,386	508,683
Del., Lack. & Western	985,035	906,203
Delaware & Hudson	892,471	851,960
Pennsylvania	618,096	527,139
Erie	721,756	647,707
N. Y., Ont., & Western	159,043	146,985
Lehigh & New England	347,435	325,389
Totals	6,564,285	6,173,774

SOUTH DAKOTA

A. O. Ringsrud, president of the **South Dakota Board of Charities and Corrections has been authorized to canvass for bids on coal for various state institutions.** The state penal and charitable institutions used about 18,000 tons of lignite last year and expect to use about the same amount this year and a supplementary amount will be needed. The report of State Heating Engineer Radcliff recommended the use of lignite from the state mine at $2.50 a ton at the mine for the majority of the institutions, supplemented by screenings. Iowa coal is found cheaper for the state hospital and Wyoming coal for the Custer sanitarium. The Redfield school uses lignite.

TENNESSEE

The Putnam Mining Co., of Cookeville, has been incorporated with a capital of $50,000 and will develop a coal mine near Monterey. O. K. Holladay is president and H. S. Hargis is secretary and treasurer.

Nine barges of coal being towed on the Mississippi River by the steamer Charles F. Richardson, of the West Kentucky Coal Co. and destined to Vicksburg, Miss., are reported as having sunk when the cargo encountered a rain and wind storm a short distance north of Memphis, June 7. The estimated value of the barges and coal was given at $60,000.

TEXAS

H. L. Mills, business manager of public schools, Houston, is in the market for 1,200 tons of lump coal to be distributed to various school houses.

A bill levying a 2 per cent tax on production of coal and lignite in Texas has been reported favorably by a Senate committee of the third called session of the Thirty-eighth Legislature now in session at Austin. The tax on lignite and coal mined in this state was added to the bill as it passed the House, a committee substitute levying the production tax of 2 per cent on eleven other articles. The House bill proposed only to levy the tax on sulphur and turpentine. It is declared that the proposed tax on coal and lignite will result in the death of the bill in the Senate.

UTAH

The Utah Railway is spending $100,000 in Spring Canyon **cementing two of its tunnels between Hiawatha and Martin.** These tunnels have been giving considerable trouble.

The State Industrial Commission is investigating allegations made by two men that they were sent here by an Illinois employment agency and assured work in Utah coal mines only to find men were being turned away.

The Utah Central Coal Co. has been incorporated at Ogden with a capital of $500,000 in shares of par value of $100 each. M. S. Browning is president; E. S. Rolapp, vice-president; John Browning, secretary and treasurer. The company's property is in Carbon County.

A story comes from southern Utah about an Easterner named Buckner, who 40 years ago invested some of his small savings in a Utah coal mine, later coming West himself. The coal mine in a short time was regarded as a gold brick and forgotten. Last winter Buckner's feet were badly frozen and a few weks ago his legs became infected and he died. Just before he died relatives announced that his coal stock had taken a jump and was worth $50,000.

WEST VIRGINIA

The Searles Coal Co. has been organized by Charleston capitalists for the purpose of engaging in the coal business in the Kanawha field, with a capital stock of $50,000. Principally interested in the new company are: S. W. Searles, E. E. Searles, F. W. Field, E. A. Field and R. W. Burton, all of Charleston.

The West Virginia-Great Lakes Coal Corporation has been organized with a capital stock of $500,000 by some of those prominent in coal circles in northern West Virginia and with a view to producing and marketing northern West Virginia coal on a large scale, principally at piers on the Great Lakes. Fairmont is to be the general office of the company. Among those largely interested in this company are: James Edwin Gaskill, C. E. Gaskill, M. L. Gaskill, E. M. Hill and E. M. Watkins, all of Fairmont.

The Sterling Black Mining Co. has been incorporated with 1,000 shares of no-par value, the seat of operation to be at or near Altman, in Boone County. Among those interested in the new enterprise are G. W. Coyle, of Columbus, Ohio; Sam Brown, of Pittsburgh, Pa.; T. L. Johnson, Frank Kerns and I. F. Somerville, of Charleston.

The Morrison Coal Co. is engaged in opening a large mine for the purpose of operating on a large scale in Wyoming County, where this company has a large acreage under lease. At the present rate of construction progress, the company will be able to operate late in the year. The Morrison company is headed by John Laing, of Charleston.

The New River Co., the largest concern operating in the New River field, produced a total of 600,000 tons during the months of January, February, March and April, production for April amounting to 154,000 tons or about 20,000 tons less than for March. During the first four months of the year the New River company had declared $4.50 a share in dividends, or $330,546 in all on its 73,477 shares of preferred stock.

Extensive improvements are under way at the plants of the **Brady Warner Coal Corporation** at Brady, in Monongalia County, and at its Abrams Creek mine at Oakmont, in Mineral County. At Brady the company has built a wooden tipple with loading booms, has installed two rotary dumps, and has laid 65-lb. rail along the haulageway. The company has also purchased 100 new 4½-ton steel mine cars. When improvements are completed, the two

mines at Brady will have a capacity of 4,000 tons a day. At the Oakmont mine 65-lb. steel rails are being laid and a substation is being constructed. It is planned to equip the plant with a 24-ft. picking table, rotary dump and button conveyor, the latter being installed by the Fairmont Mining Machinery Co. At this plant also 100 new 3½-ton steel mine cars have been added.

Construction work is under way on **a tipple for the Brown No. 1 mine of the Fairmont-West Virginia Gas Coal Co.** on the Wyatt branch of the Western Maryland Ry. in the Marion County field. Robert L. Brown and associates are largely interested in the company. The tipple will have a loading capacity of from 1,000 to 1,250 tons of coal a day. Construction work is progressing also on an adequate siding.

A fall of slate which loosened a trolley wire in the Jamison No. 7 mine of the Bethlehem Mines Corporation near Barrackville, in Marion County, on June 11 is thought to have been the indirect cause of a mine fire which baffled the efforts of fire fighters for the better part of a day and a half, though it did little damage. The mines resumed operations after the loss of only two or three days.

Under a decision of the West Virginia Supreme Court of Appeals handed down June 12 was held that miners at an operation where the "Washington agreement" of 1917, providing for increased wages and an increase in the fixed price of coal, was not in effect had no ground for claiming a share in any increased price of coal received by the operator after that agreement. The decision was in connection with a decree affirming the decision of the Circuit Court of McDowell County in the case of N. M. Brown and others against the Bottom Creek Coal & Coke Co. Brown and thirty-three other employees of the company sued that concern, alleging that after the Washington agreement in October, 1917, the company received an increase of 45c. a ton over the price fixed by the Coal Administrator in August, 1917, but that the miners received no increase in wages. The miners asked for an accounting of the tons of coal they had mined, the price received for it and distribution of what they claimed was a trust fund automatically created by reason of the increased price.

WASHINGTON

A miner was killed early in May by a fall of loose coal in the Hiawatha Coal Co.'s mine near Durham. The mine had been reopened after a shut-down of three years.

WISCONSIN

The Berwind Fuel Co. is completing a concrete floor on its Dock No. 1 at Superior. Screenings will be stored on the dock.

The B. F. Sturtevant Co., of Hyde Park, Mass., **has purchased the plant of the Wisconsin Engine Co.**, at Corliss. The new acquisition covers nearly ten acres and the buildings have approximately 150,000 sq.ft. of floor space.

J. W. Gorby, of the Cyclone Fence Co., Waukegan, Ill., told the members of the Junior Association of Commerce at Milwaukee recently that **Milwaukee and the entire lower basin of Lake Michigan is the center of the greatest deposits of coal and iron of the country.**

William Wilshire, president; **W. H. Goodwin**, vice-president, and **J. T. Stoneroad, of the Carnegie Dock & Coal Co.**, have made a tour of inspection of the company's properties at the Head-of-the-Lakes. They expressed themselves as well pleased with the outlook, and said that the prospective adjustment would settle the rate dispute now going on.

WASHINGTON, D. C.

Robert E. Quirk, who recently resigned as chief examiner of the Interstate Commerce Commission, has formed a partnership with J. VanDyke Norman and George F. Graham for the general practice of law. The firm name will be Norman, Quirk & Graham and will have offices in the Woodward Building, Washington, D. C., and the Inter-Southern Building, Louisville, Ky.

Two cases involving questions of evaluation of a public utility for rate-making purposes were decided by the U. S. Supreme Court June 11. In the case of the Bluefield Water Works & Improvement Co. against the Public Service Commission of West Virginia, the Court, in an opinion by Associate Justice Butler, held that **the rates fixed for water service at Bluefield were too low**, and that under the facts presented **the company was entitled to a return of more than 6 per cent.** Associate Justice Brandeis agreed with the other members of the Court in reversing the state court, but noted the same position regarding replacement values that he took in the case of the Southwestern Telephone Co. against the Missouri Commission, decided the week previous. In the case of the Georgia Railway & Power Co. and the Atlanta Gas Light Co., its lessor, the Supreme Court, in an opinion read by Associate Justice Brandeis, affirmed the decree of the lower courts **dismissing a suit against the Railroad Commission of Georgia to restrain reduced rates for Atlanta's gas supply.** Associate Justice McKenna dissented from the majority opinion, holding that replacement value, as fixed in principle by the Court in the cases of the Southwestern Telephone Co. and the Bluefield Water Works & Improvement Co., had not been applied in this Georgia case. The majority opinion pointed out that in the Atlanta gas case, the Railroad Commission had carefully considered replacement value and increased costs, although it did not allow all the claims of the company in this regard; hence the case differed from the others cited as precedents.

The U. S. Civil Service Commission announces open **competitive examinations for valuation engineer** ($3,600 to $4,800 a year) and **associate valuation engineer** ($3,000 to $3,600 a year), oil and gas, coal mining and timber. Applications will be rated as received until Aug. 31. The examination is to fill vacancies in the technical staff of the income tax unit of the Bureau of Internal Revenue, Treasury Department, and in positions requiring similar qualifications. Full information and application blanks may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil service examiners at the post office or custom house in any city.

CANADA

During the last two months there has been a heavy slump in the coal mining industry in British Columbia, particularly at the Vancouver Island collieries, the majority of which are working only half time. Coke production at the Crow's Nest mines has fallen off to a corresponding degree.

The floods in southern Alberta and southeastern British Columbia have done some damage to the coal mines and have completely disorganized the railways that serve them. The airshaft at the Galt mine has been caved in by floods and much water has entered the mine, and the tipple and screen at the Federal Coal Co.'s plant have been carried away. Traffic on the Canadian Pacific Crow's Nest Pass branch has been completely disorganized by washouts at Cowley and Michel, and for the time being is routed via the main line and the Kootenay central branch. Towns on the Crow's Nest Pass are being served by local trains that run between the washouts.

Canadian mines produced during February 1,611,800 net tons of coal, a decrease of 8 per cent from the output of January, which amounted to 1,745,700 tons. The February output was, however, 27 per cent greater than the previous three-year average for the month. The combined outputs from the mines of Nova Scotia, Saskatchewan, Alberta and British Columbia were 132,000 tons less than in January. The cumulative output from all mines for January and February amounted to 3,357,500 tons. This figure, against the three-year average for the period, showed a gain of 26 per cent. Importations of all coal during the month of February amounted to 1,326,200 tons, a decrease of 19 per cent from the January imports but 29 per cent above the three-year average for the month. Included in the February imports figure was 64,200 tons from Great Britain. Total importations of all coal for January and February was 2,967,900 tons, an increase of 37 per cent above the three-year average. The imports of anthracite during February were approximately 1,000 tons greater than in January and amounted to 422,550 tons, including 42,200 tons from Great Britain. These imports were 49 per cent greater than the three-year average for the month.

Decision to tie up every colliery in the Sydney Mines district and to halt all shipping of coal from the piers at North Sydney was reported at a meeting of miners June 14. The decision followed the dismissal of certain employees in the Florence Colliery. The strike was to begin June 15.

Coal production in British Columbia during April shows a marked falling off as compared to March figures, the decline amounting to 65,246 tons. The weakness of the market is reflected in the output of each of the three chief coal fields of the province. At present there are no signs of improvement. All the Vancouver Island mines are working half time and the crews of most are being reduced. The only exception to this is the East Wellington Coal Co., operated by J. Grant, which is included among the producers for the first time and which mined 1,044 tons. The Canadian Collieries (D), Ltd., and the Western Fuel Corporation of Canada are the most affected in this field. The Crow's Nest of the Eastern Interior seems to be facing the necessity of slowing down also, as production there has dropped from 79,509 to 56,651 tons. The British Columbia April, 1923, output is shown in this report.

	Tons
VANCOUVER ISLAND DISTRICT	
Granby C. M. S. & P. Co.	19,908
Nanoose-Wellington Collieries	5,489
East Wellington Coal Co.	1,044
King & Foster	572
Canadian Collieries	
Comox	24,017
Extension	14,162
S. Wellington	5,880
Western Fuel Co.	
No. 5 Mine	25,023
Reserve	11,111
Wakesiah	8,422
Total	115,628
NICOLA-PRINCETON DISTRICT	
Middlesboro Collieries	7,664
Coalmont Collieries	9,401
Princeton Land & Coal Co.	1,210
Total	18,275
CROW'S NEST PASS DISTRICT	
Crow's Nest Pass Coal Co. Ltd.	52,371
Corbin Coal & Coke Co.	4,280
Total	56,651
Total for province	190,554

Association Activities

Coal Operators' Association of Fifth and Ninth Districts of Illinois

The annual meeting and election of officers of the Coal Operators' Association of the Fifth and Ninth Districts of Illinois was held June 12 at the Missouri Athletic Association, St. Louis. After a light lunch the happenings of the past year effecting the coal industry were reviewed and discussed by the president, Dr. C. H. Krause, and the vice president, H. C. Perry. Both speakers cited the tendency in Illinois as well as some other districts to handicap the coal industry with legislation which would not only be a detriment to the coal industry itself but to other industries as well. Hope was expressed that the report of the U. S. Coal Commission soon to be made would prove to be a foundation around which constructive work in making of wage agreements might be carried on with resulting greater stability in the future than has been experienced in the past few years. The necessity of service as the foundation of true prosperity was emphasized. Officers re-elected for the ensuing year are: Dr. C. H. Krause, president; H. C. Perry, vice president; O. L. Lumaghi, secretary-treasurer.

Mine Inspectors' Institute of America

The Mine Inspectors' Institute of America will hold its annual meeting in Pittsburg, Kan., July 10, 11 and 12, 1923. Headquarters will be the Stilwell Hotel. The following are subjects to be discussed: (1) Electric machinery in gaseous mines, and its limitations for safety. (2) How to recognize a dusty mine, from the standpoint of danger. (3) Should the use of black blasting powder be prohibited in all bituminous mines? (4) What can be done to reduce accidents from falls of roof: (a) by additional legislation; (b) by the operator; (c) by the miner; (d) by the state inspector? (5) Is compensation and aid in reducing mine accidents? (6) What reduction in accidents has resulted from safety organizations conducted by the operator, and what are the main features of any that have proved a benefit? (7) Is it practicable to frame a basic mine law suitable for all bituminous mine conditions as a model for promotion of uniformity in state laws, as they relate to accident prevention and general safety? (8) In what manner can the Federal Bureau of Mines be of greatest assistance to the state mine inspectors? Discussion opened by Dr. J. J. Rutledge, Chief of the Bureau of Mines, Maryland.

Trade Literature

Steam Turbines for Power Distribution in a By-Product Coking Plant. De Laval Steam Turbine Co., Trenton, N. J. Four-page folder describing and illustrating installation of steam turbines in the by-products coke oven plant of the New England Fuel & Transportation Co. at Everett, Mass.

Centrifugal Pumps and Centrifugal Pumping Units. Allis-Chalmers Mfg. Co., Milwaukee, Wis., Bulletin No. 1632-F., Pp. 58; 8 x 10 in., illustrated; tables. On pages 28 and 34 are described pumps for the power plant and for unwatering and drainage purposes at the mines. Instructions for installation and operation of horizontal centrifugal pumps cover pages 50 to 55.

Combusco Ash Conveyor. Combustion Engineering Corporation, New York City. Pp. 11, 8 x 11 in., illustrated. Among the advantages claimed for this new apparatus are that it dispenses with manual labor, quenches the ashes as they fall from the furnace, prevents all dust, fumes and heat in the ash tunnel, maintains a perfect air seal in the combustion chamber, improves the efficiency of the boilers by preventing air leakage, removes the ashes and clinker from the furnace automatically and continuously and does not necessitate that the boilers be built above the ground level as the conveyor can be built in the setting.

Shuveloder. Lake Superior Loader Co., Duluth, Minn. Pp. 23; 8 x 11 in., illustrated. The shuveloder is shown at work excavating fire clay without blasting, loading rock brushed from the roof, etc. The savings from the use of this machine is given in a report from the superintendent of a coal company.

American Power Pumps. American Steam Pump Co., Battle Creek, Mich., Bulletin No. 18. Pp. 15, 6 x 9 in., illustrated. Describing the following power pumps: Duplex, geared, belted, gathering or dip pump and motor-driven pump.

A Handbook of Rock Drill Steel. Sullivan Machinery Co., Chicago, Ill. Circular No. 72-G. Pp. 79, 5 x 7 in., illustrated. This useful little book describes the selection, heating, forging and tempering of rock drill steel. Included also are instructions for the care and use of Sullivan drill sharpeners and drill steel furnaces.

Traffic News

The United Collieries, Inc., of St. Charles, Va., has filed a complaint against the Southern Ry. in the matter of car supply.

Complaints have been filed by numerous consumers in Atlanta against existing rates on coal from points in Kentucky and Tennessee.

The Chesapeake & Ohio Ry. has appointed A. M. Dudley general coal freight agent in charge of all coal and coke traffic, vice H. S. Smith, coal freight agent, who is appointed assistant general freight agent with offices at Richmond, Va. The change became effective June 1.

The Interstate Commerce Commission hearing set for June 18 to consider matters in connection with the case of Winding Gulf Colliery Co. versus the Chesapeake & Ohio Ry. has been postponed until July 9. Examiner W. H. Wagner will conduct the hearing in Washington on that date.

In the case of the Detroit Coal Exchange attacking rates applied on anthracite during a portion of 1918, the Interstate Commerce Commission has ruled that the **rate applied by the carriers was unreasonable to the extent that it exceeded $3.70 per gross ton.** The commission has **upheld the contention of the Utah Fuel Co. in regard to unreasonable rates** on intra-plant switching service. **Reparation has been awarded the Terre Haute Paper Co.** because of unreasonable intrastate rates charged during federal control.

Thirty-five million dollars is the total expended in 1922 and authorized for 1923 **for improvements by the Norfolk & Western Ry.** Orders were given for 7,500 coal and freight cars, nearly all of which have been received and are in service. Forty-two heavy-type steam locomotives also were ordered and most of these have been delivered. Four of the big electric locomotives are due to be delivered this autumn. Large expenditures are under way for additional main-line track at a number of points where a third track is being installed, the object being to make the line a three-track line, at least, through the coal field and most of the way to Roanoke. To facilitate the western movement, the Auville yard is being considerably expanded. Double-track extension, involving considerable excavation, is being pushed rapidly from Bluestone to Ruth. This extension is leading up to one of the biggest improvements about to be started, a duplicate of the Coaldale tunnel over a mile in length to be driven as soon as the preparatory work is finished on the approaches to the Coaldale tunnel. Another big improvement under consideration is the probable double-tracking of a portion of the Big Sandy line of the Norfolk and Western. Although a great amount of construction work is observed from Bluestone east, including the third-track extension work at Shawsville, the greater portion of improvements have been contracted for west of Bluefield and west to Cincinnati and Columbus, where the volume of traffic of the road is growing rapidly.

The Coal and Coke Committee, Trunk Line Territory, announces hearings at 143 Liberty Street New York, commencing June 28, relative to adjustment of rates on coke from regions on Pennsylvania System and lateral connections to points on the New York, Ontario & Western Ry. and to New Berlin, N. Y., Unadilla Valley Ry.; from ovens on the Buffalo, Rochester & Pittsburgh Ry. to points on the New York Ontario Western Ry; on bitmuminous coal from mines on the Norfolk & Western Ry. to points on the Washington division of the Southern Ry. and from mines on originating lines to the Erie R.R., Barton to Owego, N. Y., inclusive; D. L. & W. R.R., Litchfield to Owego, N. Y., inclusive, and L. V. R.R., Hanna to Owego, N. Y., inclusive. The reasons for these proposals are to remove fourth section departures and to establish the same rates to the same rates the same or contiguous points on the Erie R.R. and the D. L. & W. R.R.

The New York, New Haven & Hartford R.R. had a deficit after all charges of $4,865,767.92, says the annual report for 1922 of E. J. Pearson, president. This is attributed to the cut in freight rates, increase in the cost of fuel owing to the coal strike, increase in operating expenses owing to the shop-crafts strike, and congestion of traffic following the settlement of the coal strike, aggravated by unusual winter adversity. This company owns 291,622 shares, or 50.2 per cent, of the capital stock of the New York, Ontario & Western R.R., having a total value of $13,108,397.62. Operating revenues for the year were $123,246,640.64, an increase of $6,841,407.77 over 1921. The revenue from freight increased $6,337,747.34, or 11.83 per cent, while the freight carried showed an increase of 2,224,301 tons over 1921. The report shows that there was spent for fuel for yard locomotives $2,006,344.60, an increase of $186,590.37 over 1921, and for train locomotives $9,224,123.80, a decrease of $140,664.55 over 1921.

Rates on coal from the mines of the Commercial Coal Co., in the McRoberts group on the eastern Kentucky division of the Louisville & Nashville R.R. to Louisville, Cincinnati and other points west of the Illinois-Indiana line are not unreasonable, but are unduly prejudicial to the extent that they exceed the contemporaneous rates from the Hazard group, in the opinion of John McChord, an attorney examiner for the Interstate Commerce Commission. In his tentative opinion in this case he points out that the rate groups of this division are not of long standing and that the extensions of the Hazard group in recent years is convincing that they are in a state of evolution.

On June 1, according to the Car Service Division of the American Railway Association, **railroads of the United States had 51,281 serviceable locomotives**, which is the largest number on record for any time during the same period. This was an increase of 694 over the number of such locomotives on May 15 which had previously marked the peak. Locomotives in need of repair June 1 totaled 12,683, 19.9 per cent of the total number on line, which is the smallest number in need of repair for any time since the Car Service Division began the compilation of its locomotive records. The railroads repaired and turned out of their shops from May 15 to June 1 21,406 locomotives, the largest number for any semi-monthly period on record. The total number of locomotives in need of repair on June 1 was a decrease of 812 since May 15, at which time there were 13,495 or 21 per cent.

Three members of the Interstate Commerce Commission dissented from the majority opinion in the case of John Hawkins and Co., coal dealers of Nutley N. J., against the Erie Railroad Co., involving a demurrage question. The shipments involved in the case originated at Pennsylvania mines during October and November, 1919. They were stopped in transit, by orders from the U. S. Fuel Administraiton. The Hawkins track had a capacity of two cars. The cars, through no fault of the consignee, were bunched in transit and when delivered the coal was frozen. Immediately on their arrival, however, the consignee set about vigorously to thaw the coal and unload it. While all of the demurrage regulations were not compiled with, the majority holds that the commission's powers "should not be construed so narrowly as to defeat justice." On that basis, the Hawkins Co. was awarded reparation in the full amount of the demurrage charges paid. Commissioner Hall, in a dissenting opinion, declares that "we have no jurisdiction to mitigate the seeming harshness of the law."

Coming Meetings

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the **International Safety and First-Aid Meet.** Secretary, Benedict Shubart, Denver, Colo.

Iron and Steel Exposition at Buffalo, N. Y., Sept. 24-28. Association of Iron and Steel Electrical Engineers, Empire Building, Pittsburgh, Pa.

National Retail Coal Merchants' Association will hold its sixth annual convention June 25, 26 and 27 at Scranton, Pa., with headquarters at the Hotel Casey.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

American Institute of Electrical Engineers will hold its annual convention June 25-29, at Swampscott, Mass. Secretary F. L. Hutchinson, 29 West 39th St., New York City.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

National Coal Association will hold its sixth annual convention June 19-22, at Atlantic City, N. J. Assistant secretary, C. C. Crowe, Washington, D. C.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting lill start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**. Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Ninth National Exposition of Chemical Industries at the Grand Central Palace, New York City, week of Sept. 17. Manager, Charles F. Roth, Grand Central Palace, New York City.

West Virginia Coal Association will hold its annual meeting Tuesday afternoon, June 19, at Atlantic City, N. J. Secretary W. H. Cunningham, Huntington W. Va.

Mine Inspectors' Institute of America will hold its 13th annual meeting July 10-12 at Pittsburgh, Kan. Secretary, J. W. Paul, 4800 Forbes St., Pittsburgh, Pa.

Ontario Mining Association will hold its annual meeting July 5 at Kirkland Lake, Ont., Can. Secretary, B. Neilly, Toronto, Ont., Can.

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Lewis Fights the Reds

BORING from within, the radicals are attacking the United Mine Workers. Led by the well-known William Z. Foster and the indefatigable Alex. Howat a movement styling itself the Progressive International Committee of the miners' union has sprung up in the Pittsburgh district. As pointed out in a statement given out by the International Executive Board of the United Mine Workers at Indianapolis last week, this movement is part and parcel of a kind that has infested the Southwest and several parts of Canada. The union authorities "view with great concern" the spread of radicalism in the ranks of the mine workers. The executive committee gave a week or more to a study of how to check it. They are setting out to discard from their organization those who participate in such "dual" associations.

The American labor movement is sincere in its condemnation of radicalism and consistently repulses its spread, even if at times making much ado of the process. It is not a straw man that is being knocked down. The menace to the United Mine Workers has become so real that John L. Lewis can no longer temporize. The outlawry within his organization has assumed such proportions in the last few years as to threaten conservative leadership. So sinister has the cloud become that, it is reported, Farrington has joined hands with Lewis, abandoning his support of the reds, assumed in the past for political purposes, in the effort to save the union from the assault of communism.

It is going to be a stiff job to mop up the scuff, especially after playing with it for so long, but it is giving the Lewis régime a valuable lesson. Perhaps, and we so hope, a chastened United Mine Workers will result—one less inclined to take the country by the throat, one more inclined to reason than war.

Can Bituminous Coal Use an Overlord?

JOHN C. BRYDON, last week elected president of the National Coal Association, set both feet in a forward direction in his characteristic aggressive way. He told the soft-coal operators that their industry needs a leader and executive who is influenced neither by his own business interests nor sectional considerations, and that on top of the individual operator's interest in mining and distributing coal efficiently there is a responsibility resting on the industry as a whole to look after the fuel requirements of the country.

He advocates a full-time executive as the head of the National, one to whom the public may look with respect as well as one who can command the producer, large or small. The idea is not new, for, encouraged by the success of Judge Landis, Will Hays and Franklin Roosevelt with baseball, moving pictures and construction respectively, these coal men have been considering its possibilities in the coal industry. To Mr. Brydon has been given the task of putting the idea to work. As a means of consolidating a wide variety of interests and harmonizing a medley of opinion no happier solution has been voiced.

But it is because Mr. Brydon coupled with his recommendation for the new kind of leadership the suggestion for the organization within the soft-coal industry of the kind of machinery for public service that the anthracite operators have developed so well and time and again demonstrated its effectiveness that he may be credited with being in the way of removing the operators' "blind spot." Experience has demonstrated that the public is less inclined to be suspicious, is in fact, more tolerant and less exacting of any group of business men who give evidence of taking the people into their confidence. The way to the heart of the public lies in telling your good points rather than stressing the bad points of your associates.

The idea, for instance, has been fostered and allowed to grow that the soft-coal industry is inefficient and wasteful. In certain respects this is true, but not more so than of other industries. As between apologizing for its shortcomings and expounding the simple facts with respect to the big things the coal industry does accomplish, there is no argument as to which is better publicity. Restriction of output by the unions is an example of internal maladjustment the recital of which serves but to cast doubt on the ability of its management, whereas a widespread understanding of the development of mining machines, fast underground transportation, safety practices and equipment for cleaning and preparing coal for market will give the public a new confidence in the industry.

There is nothing novel in Mr. Brydon's suggestion of machinery for emergency distribution of soft coal. As regards the needs of the government in war time, the plan was successfully worked out in 1917 prior to the Fuel Administration. Considerably more than half the machinery and expense of the distribution machinery of the Fuel Administration was supplied voluntarily by the coal operators. In 1920 arbitrary distribution was urged by the operators' organization and made effective through the power of government. The operators went even further then and set up "fair-price" committees the effectiveness of which none may doubt.

Nor is it pertinent at this time to inquire as to how far anyone may commit the soft-coal industry to any particular line of performance. It is quite certain that it has no such large element as the feudalistically controlled Hudson Coal Co. in the anthracite industry to confound its combined effort in the public interest, or in its own interest, for that matter.

The program on which Mr. Brydon starts off is not a spontaneous extemporaneous outburst. It follows logically the thinking, planning and desires of the retiring president of the National Coal Association, Alfred Ogle, who surrenders the reins after the most turbulent year in the history of that organization.

Does It Pay to Restrict Expenditure?

NO ONE can deny that Frank Haas, in his paper before the West Virginia Mining Institute, printed this week, has chosen an admirable subject for consideration, nor can it be gainsaid that he has applied most valuable principles in reaching his conclusions on the value of economy in laying out a mine. Subtle methods of reasoning, however, need careful investigation or errors will creep in, not only mathematical errors but those having to do with assumptions. Consequently we are justified in questioning whether all Mr. Haas' premises are correct.

Is he, for instance, justified in assuming that the gross earnings per ton of expensively and inexpensively equipped mines are equal? We are not by any means convinced that this is true. Men do not spend $2 instead of 50c. per ton of annual production for building their plant, much less $8 and even more, as some are doing, without the hope that the gross earning per ton of coal mined will be increased and that the net earnings will be greater in consequence, though it is recognized that they will be reduced somewhat by the higher fixed charges.

Mr. Haas is right in holding that if the gross earnings per ton are not increased by greater expenditures they will justify the conclusions he has reached, but granted that better equipment and outlay does more than raise tonnage, then his results must be accepted with appropriate reserve.

Here it should be stated that large tonnages themselves have a way of reducing labor bills and so with any given price for coal they increase gross earnings. Expenditures on certain classes of machinery improve quality and raise the selling price, thus also increasing gross earnings. These facts cannot be waived aside as matters of no commercial importance. In fact we are afraid that in making his calculations Mr. Haas has quietly and unintentionally assumed that which he wishes to prove, and that done, all that follows is quite to be expected.

Nor are we clear that obsolescence is to be satisfactorily disposed of as Mr. Haas has indicated. There is obsolescence of two kinds in a mine—one due to machinery becoming antiquated and another due to inherent mine obsolescence. The mine in time becomes difficult to ventilate; airways that are adequate in a young mine are less equal or even unequal to the work of ventilating an old one. The fan becomes inefficient from the same cause, the equivalent orifice of the mine changing. Larger locomotives become necessary. New airshafts must be sunk or new openings made. These are progressive changes, growing with the progress of the mine.

We may not perhaps scrap or sell the machinery, but if we do not, we face a steady and far heavier loss. The burden of using obsolete machinery or running with obsolete conditions is even heavier than that borne by the man who brings his mine up to date. If we scrap the equipment and buy new, if we make further development to supplement that which is inadequate, we add to the fixed charges. Consequently we decrease the net earnings. This obsolescence is likely to be less if the first equipment is fully abreast of the times when installed and its purchase not too closely based on the principle of keeping down equipment costs. It will be distinctly less if the early development is conceived on a sufficiently liberal basis.

If we assume that the mine is allowed to remain obsolete the fixed charges will remain the same but the cost of labor will increase. If the excess of selling price over payroll and material costs is 50c. when the mine is opened, can we assume that it will still be 50c. when the mine has been working 20 or even 40 years? The operating cost may be so high by that time that there may be no net earnings. Of course, other competitive mines are being subjected to a similar increase in operating costs, and in consequence the price of coal may be kept at a level giving the same excess over payroll and material costs, but that is an assumption not very safe in the United States with new mines always opening, some of which are in new territory.

Mr. Haas has led the way to a new kind of thinking. His mistakes are not easily corrected but we are convinced that some of them will make a revision necessary, and we prophesy that the author of the paper will be one of the first to venture on their correction, as his logical precision and long experience will fit him to do.

Eliot's Eight Points

CHARLES W. ELIOT, president emeritus of Harvard University, set forth for the coal operators assembled at Atlantic City last week the eight points which he considers represent what the public has a right to expect the United States Coal Commission to cover in its recommendations.

Those points dealing with the necessity of provision for keeping order in the coal fields and for protection of the public against monopoly either among employers or employees will be readily accepted, as should the proposal for incorporation of the union. Two of Dr. Eliot's points deal with development of a partnership relation between management and labor, one aspect of which, of course, would be the elimination of restriction of output. Partnership involves the idea of participation in profits. Just how much further Dr. Eliot would have the industry go than at present in this regard is not stated but the fact remains that through the exercise of its "economic strength" the miners' union has exacted its share of the profits from an industry that until the war had no profits. The union has gone further and assumed a large share of management. In the union fields the mine workers are partners just so far as they are willing to take on that relationship.

The remaining three of the eight points have to do with arbitration of industrial disputes. Here most assuredly lies the greatest public interest, for the public suffers most from lack of coal when the mines stop. Dr. Eliot points out the "high value toward prevention and settlement of industrial disputes of face-to-face discussion between parties before an impartial tribunal whose decision is effectively published." This is a fair statement of the problem that has been facing the coal industry, but who is to induce the United Mine Workers to accept any form of arbitration?

EVEN WHEN DEBTS ARE CANCELLED, somebody has to pay them.—*Philadelphia Evening Public Ledger.*

SMOOTH WORK. We won't have a new coal strike until after the old one has stopped hurting.—*Financial America.*

THE FRENCH PLAN in the Ruhr would work if the Germans would.—*Tacoma Ledger.*



Biggest of Our National Government's Coal Mines—Its History, Coal Seams and Operation

Mine Opened by Gold-Mine Owner—Coal First Shipped by Sled—Faults Drove Out Private Capital—Coal Good but Thin—Labor $4.50 per Day and Up—Mine Cost $6.50 per Ton—Operation Profitable

By Sumner S. Smith
Eska, Alaska

SO MUCH has been written in a general way regarding Alaskan coal fields that a description of the Eska mine, though it be small as compared to Eastern standards, may be warranted at this time because to date, it is the largest producer of coal in Alaska and is characteristic of this field.

The mine is approximately 60 miles from Anchorage, at the terminus of a three-mile standard-gage spur from the Chickaloon branch of the government railroad. The mine openings are on Eska Creek, a rather short, turbulent stream which rises in the Talkeetna Mountains to the north, follows the valley on the eastern flank of Wishbone Hill and flows into the Matanuska River near Mile A-18 on the railroad branch.

The natives who lived in the Matanuska Valley for many years knew of the existence of coal and mention is made of these beds in 1898 by W. C. Mendenhall, who accompanied Captain Edwin F. Glenn as geologist on the military expedition from Prince William Sound toward the Tanana by way of the Matanuska River. The earliest recorded locations were made about 1903 and much prospecting was undertaken on Moose, Eska, Coal and O'Brien creeks, Chickaloon River and Kings River. Reconnaissance parties from the U. S. Geological Survey made investigations in 1905, 1906 and 1909, and in 1910 a detailed study of the valley was made by Dr. G. C. Martin.

In 1906 all the coal lands in Alaska were withdrawn from entry by an executive order of the President and were not restored until 1916, following a subdivisional survey by the U. S. Land Office in 1915, when the areas believed to contain coal of commercial importance were laid out in leasing units.

In 1912 President Taft sent a commission to Alaska to report on the feasibility of constructing a railroad from the coast to the interior of the territory and in 1914 Congress passed an act authorizing this project. In the spring of 1915 the President selected what is commonly known as the Broad Pass route, which has its ocean terminus at Seward, follows round the head of Turnagain and Knik arms, crosses the Matanuska to the Susitna drainage, goes through Broad Pass, down the Nenana and up the Tanana drainage to Fairbanks.

It was stipulated that a branch should be constructed up the Matanuska Valley to open the coal fields. The route selected for the main line was approximately 470 miles long and the branch route 40 miles. The town of

Note—Headpiece shows the Eska coal mines. The building with the dog is the mess house, that on the near side of it is the store; the house next to it toward the foreground with the projecting roof is the office; the long building still further in the foreground is a bunk house and the small building with white roof is the hospital. The power house is seen over the dump on the left and the two trestles to the right are for Martin East, Shaw East and Eska East Mines and for the Maitland Mine, respectively. The small stream in the foreground is the turbulent Eska, kept in place by sundry cribbings. (Cut captions added by editorial department.)

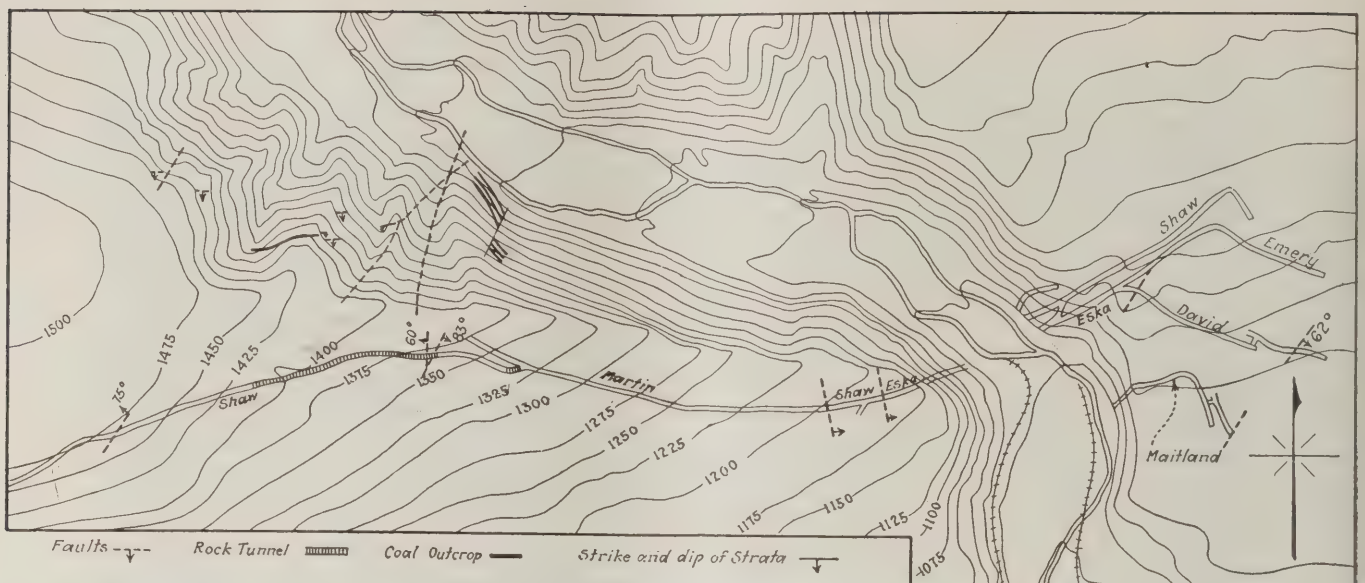


FIG. 1—MAP OF ESKA MINES

The Eska, Shaw and Martin are within a short distance of one another, and the faulting makes it possible to go from the Eska to the Shaw and from the Shaw to the Martin on easy grades, the Eska being the higher bed and the low beds being lifted by faults to the level of the Eska and then raised again so that the road in the Martin is on a level with the road in the Shaw.

Anchorage was established as a base in 1915 and construction of the road started in May of that year. The Matanuska branch was started in 1916 and completed in 1917.

The Alaskan Engineering Commission commenced contracting for its fuel locally in 1916, when a number of small contracts were let to local operators to supply coal for railroad work. In the autumn of 1916 William Martin, an attorney of Seattle, who was interested in lode gold mining in the Willow Creek district, applied for and was granted a lease on Unit No. 7, the greater portion of which lay on the western side of Eska Creek on the eastern flank of Wishbone Hill. This lease was later assigned to the Eska Creek Coal Co., which corporation commenced work in January, 1917, erecting log buildings for use as dining room and bunkhouse with several tents for living quarters and warehouses.

Five entries were started, three on the west and two on the east side of the creek, and open cuts were made which exposed several other beds, although all of these seams were thin, the biggest being less than 5 ft. thick. The company obtained a contract to supply a portion of the fuel used by the Alaskan Engineering Commission and hauled the coal in sleds from the mine to the railroad, a distance of approximately three miles. With the advent of spring the coal could not be hauled with any satisfaction in sleds or wagons, so a standard-gage spur was constructed on the property and another contract let based on the delivery of coal in railroad cars at the mine.

Soon after the completion of the spur the coal in the entries driven by the lessees was cut off by a somewhat complicated series of faults, and as the company did not care to assume the expense of opening other beds,

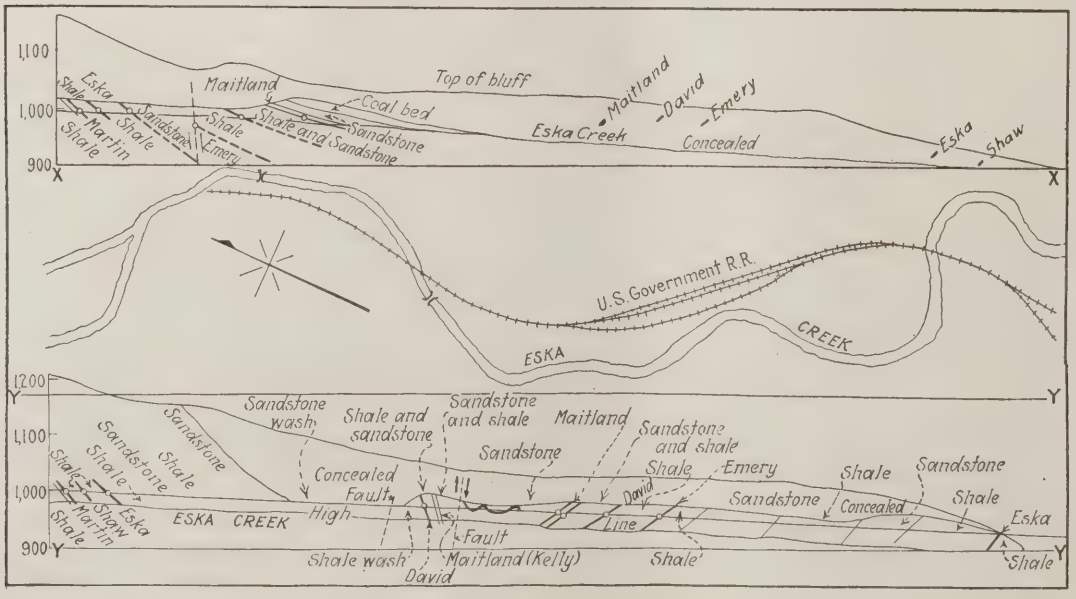


FIG. 2

Geological Map, Eska Field

Plan and two cross-sectional elevations taken at XX and YY. A steep-sided syncline runs across the Eska River. The measures also are faulted and in eastern section are cut by igneous dykes.

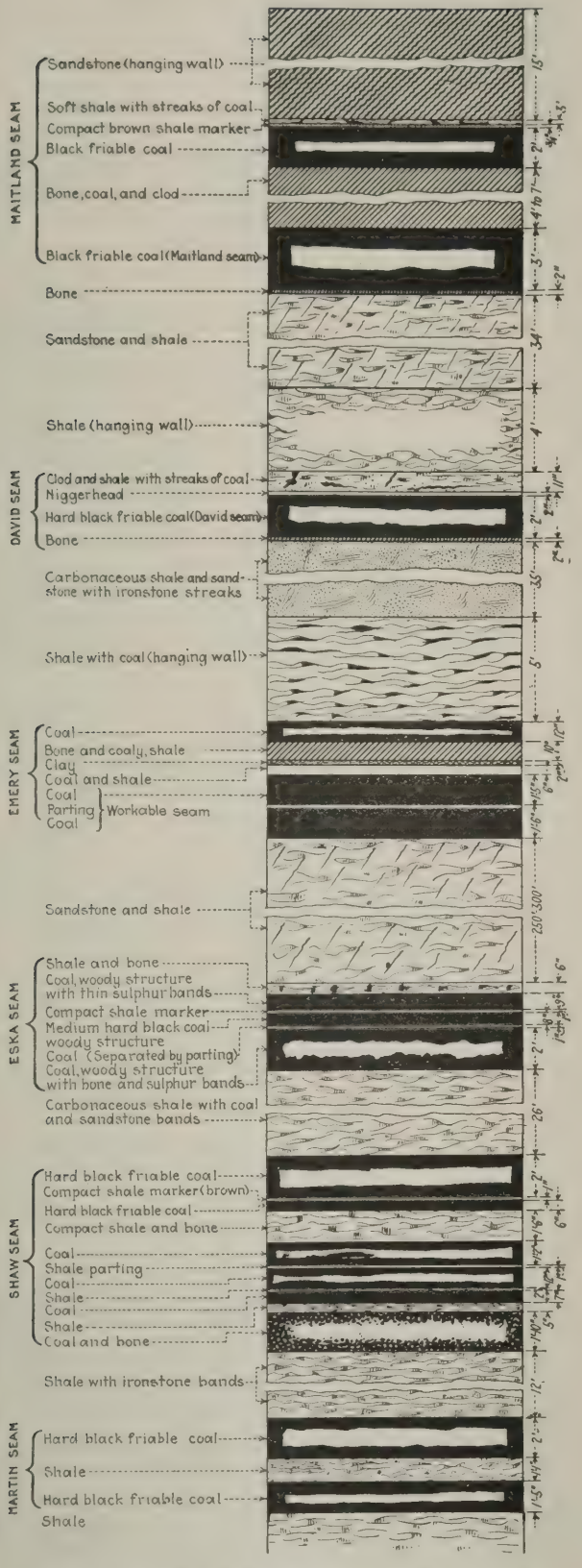


FIG. 3—CROSS-SECTION OF COAL MEASURES

The Eska measures are in two divisions, the upper and the lower. The upper consist of the Maitland, David and Emery, and the lower of Eska, Shaw and Martin. The sandstones and shales between the two groups are 250 to 300 ft. thick. Breaks have been made in the section where the bigger intervals occur.

though their outcrops indicated an abundant supply of fuel, the property was sold to the Alaskan Engineering Commission in June, 1917.

Upon taking over the property, the commission enlarged the dining room, constructed an additional bunkhouse, a washhouse and change room, an office, store, power house, first-aid hospital and six cottages for married employees. Water, sewer, light and telephone systems were installed and work started on a hand sorting plant where the coarser refuse was picked from the screened coal. This and a railroad yard were completed in 1918, since which time three cottages, a staff house and a 48-room dormitory which is modern in every respect have been added to the living quarters. In October of 1921 the mine was closed and all fuel for the railroad purchased from local operators, but in November, 1922, a fire in the adjoining property closed that mine and cut off the commission's chief supply of bituminous coal, which is used for all engine service, and the Eska property was immediately reopened.

The Matanuska Valley is a sunken fault block between two rugged mountain ranges, the Talkeetnas on the north and the Chugach on the south. Here the coal-bearing measures of the valley have been folded and bent and, in the eastern end of the district, invaded by igneous dikes. The coals are of the same geologic age as the Cook Inlet lignites, but, due to the processes mentioned, have advanced in grade till all types, ranging from lignite on the west to anthracite on the east, may be found throughout the valley. The medium-rank bituminous coals are excellent steam or domestic fuels and the higher-rank coals of this grade are first class for blacksmith use or the manufacture of metallurgical coke. On the recent tests made by the navy these coals were demonstrated the equal of the coals of navy standard of the Atlantic coast. The two analyses in Table I are typical of bituminous coals of different rank from different portions of the field:

TABLE I—TWO ANALYSES OF MATANUSKA COALS

	Coal, Air Dried	Coal, As Received	Coal, Moisture-Free	Coal, Moisture-and-Ash-Free
Maitland Bed, Eska Mine				
Moisture	3.23	5.06	.....	.....
Volatile Matter	42.82	42.01	44.25	47.90
Fixed carbon	46.58	45.70	48.13	52.10
Ash	7.37	7.23	7.62	.....
	100.00	100.00	100.00	100.00
No. 3 Bed, Chickaloon Mine				
Moisture	0.5	1.4	.....	.....
Volatile	18.5	18.4	18.6	20.3
Fixed carbon	73.0	72.2	73.3	79.7
Ash	8.0	8.0	8.1	.....
	100.00	100.00	100.00	100.00

The above samples are selected because of the similarity of their ash content. It is probable that the average samples cut at Eska would run higher in ash and those at Chickaloon somewhat lower than the above.

The stratigraphic cross-section shown in Fig. 2 was worked out by Dr. George C. Martin and Theodore Chapin, of the U. S. Geological Survey, and the following quotation is taken from Bulletin 712-E of the Survey by Chapin: "The coal-bearing rocks at the Eska Mine occur in an open syncline whose axis strikes across Eska Creek near the center of the mine camp. The coal beds have been identified on both limbs of the syncline and on both sides of the creek, which crosses the coal tract and divides it into two parts. Stratigraphically the coal beds occur in two groups of three each, separated by a thick integral of sandstone and shale. Although the coal and the enclosing sediments vary in character and thickness from place to place, the coal beds have prominent markers which are persistent enough to identify the beds with little doubt wherever they have been opened."

In mapping the structural geology of the mine a crushed or faulted zone was noted about 1,500 or

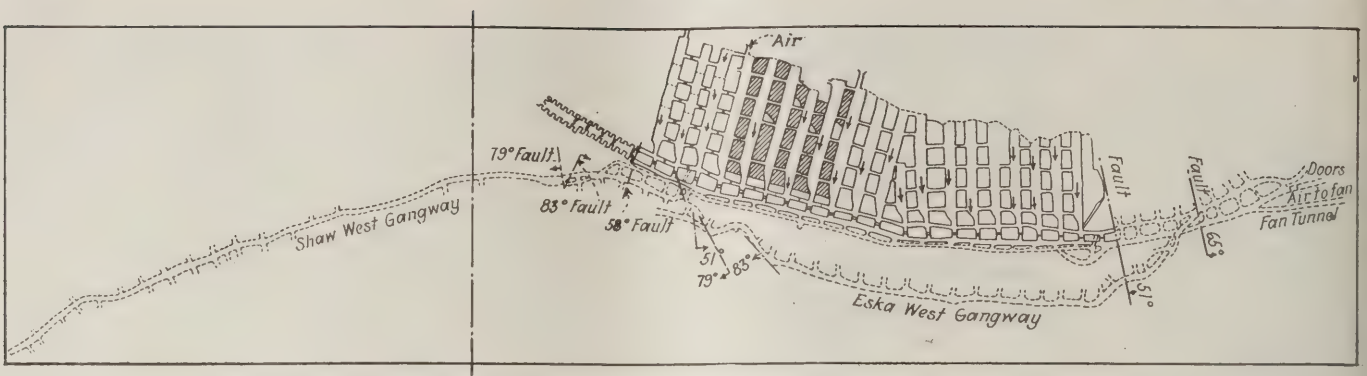


FIG. 4—PROGRESS PLAT OF MARTIN WEST MINE IN LOWEST SEAM OF SERIES
This also shows in broken lines the roadways driven in other beds of coal, the Shaw and the Eska, some of these roadways in other seams being part of the ventilation and transportation system of the Martin West workings though not in that bed.

1,600 ft. west of the portal of the Eska West gangway. This zone was several hundred feet in width and its position indicated that the coal on the northern limb of the syncline would be off when the gangway reached a point along the strike of this fault. Fragments of the known coal beds were uncovered on the surface in this area, and the seams traced to points where the structure appeared fairly regular (Fig. 2). From a series of observations on the dip and strike of the strata along the outcrops of the coal beds the probable position of the beds on the same level as the Shaw gangway was plotted on the map and this entry driven nearly 700 ft. through the rock to pick up these seams.

All haulageways, or gangways, are driven on the coal, the standard timber set being 6 ft. wide at the top, 9 ft. at the bottom and the collar 6½ ft. above the rail. Forty-pound steel is used on the mine tracks, which have a gage of 36 in. and a grade of 0.6 per cent in favor of the loads. The airways, which are from 5 to 6 ft. wide and approximately 4 ft. high, are driven so as to leave a 30-ft. pillar between them and the haulageways. Chutes are 8 ft. wide, giving 4 ft. for the manway and 4 ft. for the coal chutes, which are lined with sheet iron. The coal is mined by the room-and-pillar system, the rooms being driven 20 ft. wide and on 50-ft. centers. Crosscuts are driven between rooms every 50 ft. On the west side the pitch varies from 25 to 45 deg. In consequence, the coal runs readily in the chutes, but on the east side the Maitland and David seams dip approximately 10 or 12 deg. on the northern limb of the syncline where they have been opened. On the Maitland bed the practice has been to use a McGinty with two small cars running in balance to convey the coal from the face of the rooms to the gangway, but on the David roof conditions were such that a large quantity of material had to be gobbed and but little room left for tracks. Here a chute and manway were carried close to one rib, the chute being well lined with sheet iron. A water main from tanks just above the David workings was laid along the gangway with branches to each room. With water thus supplied the coal was flushed to the cars below. The volume of water per ton of coal moved was fairly constant regardless of the distance from the face of the room to the gangway. About 218 gallons of flushing water was used for each ton of coal thus conveyed.

The coal is sheared on one side of the room and shot with permissible powder, Monobel No. 5 or Miners' Friend No. 5, both proving satisfactory for this work.



FIG. 5—MINERS' DORMITORY, ESKA MINES, JULY 23, 1921
Alaska blooms in her short summer. This does not look like a land of snows. The Alaska Engineering Commission's operation is marked by all due frugality. Neither the nation nor the nation's people can afford to venture too far from economical business principles, and Eska shows no prodigal expenditure of the taxpayers' money.

When the rooms are driven rapidly and the pillars removed promptly no trouble is experienced with squeezing along the entries or caving in the rooms, but if the rooms are driven and the pillars allowed to stand a long time the recovery of the pillar coal becomes a difficult matter.

Fig. 3 gives stratigraphic cross sections which indicate the thickness of the beds and the mining conditions better than any description.

The coal is hauled about 2,500 ft. from the mine to the cleaning plant, where it passes over a ¾-in. shaking screen, the lower end of which acts as a picking table where the coarser of the refuse is removed. As practically all the coal is used by the railroad the fine and the picked oversize is allowed to run into the same car and is shipped as run-of-mine, although it can be loaded separately as lump and steam coal. The coal as thus shipped will average about 20 per cent ash. With proper washing this probably could be reduced to 14 per cent. There are, however, several other properties in the Eska district the run-of-mine coal from which has an ash content which is only a trifle in excess of 10 per cent.

The mine is ventilated by two Jeffrey double-inlet stepped multi-bladed reversible fans belted to steam engines. As there is practically no gas in the mine, the main haulageways are made the returns, thus preventing the water in the ditch from freezing and overflowing the track in winter time. The details are shown on the mine maps.

Because of the physical condition of the seams and the lack (in the past) of proper washing equipment it was considered better to pay day wages rather than contract the mining of the coal. Skilled underground laborers such as miners or timbermen are paid $8.60 per 8-hour shift, unskilled underground labor $7.80, skilled surface labor $6.60, semi-skilled surface labor $5.20 and unskilled surface labor $4.50. Board costs $1.50 per day and rooms 25c. per day.

Over a period of six years, one of which the mine was idle, the production of coal has amounted to some 200,000 net tons, the average cost of which has been $6.50 per ton divided as follows: Investment, $1.20; maintenance and operation, $5.30. As compared with the coal imported from the States the Eska mine has saved the commission approximately a million and a half dollars and had the mine been operated continuously the total investment could be written off when the cost is compared with the price paid to private operators in the field.

Removing Coal from Under the Susquehanna River Where Cover Is Shallow

By Dever C. Ashmead*
Kingston, Pa.

IN MANY PARTS of the anthracite region and particularly in the Northern or Wyoming Field, much of the mining is under the Susquehanna River and what is known as the "Buried Valley." This latter is a prehistoric river valley that was filled with drift during the glacial period. As there is no drainage from the valley and as the Susquehanna River flows over the surface the glacial material is saturated with water and contains large areas of quicksand.

In consequence when any of the mine workings approach this valley or the river itself, great care has to be taken so that neither the sand nor gravel from the valley flows into the mines and that water from the river shall not come down through cracks that may extend from the mine to the surface. When the beds being mined are not near the surface the operations known as first mining are conducted in practically the same manner as usual and the percentage of coal extracted in that part of the work is as large as it would be if the river and the Buried Valley did not exist. Even second mining is now being undertaken in parts of the region where the beds are well covered by preglacial strata.

At one colliery the Red Ash bed, which is about 15 ft. thick, is being completely extracted directly under the Susquehanna River. The depth below the surface, however, is about 1,200 ft. Although this coal is being com-

*Now of U. S. Coal Commission.

FIG. 1

Mining Under Susquehanna

At the Cortright Slope of No. 14 Colliery of the Pennsylvania Coal Co., between Wilkes-Barre and Scranton, coal is extracted by pairs of headings 135 ft. apart. This is the first mining. After the coal is extracted the headings are rock-filled. Then the pillar is split by another pair of headings, which also are piled full of rock for fear that they might collapse after having been worked and might let in such a quantity of surface water as would close the mine. No pillars are drawn.

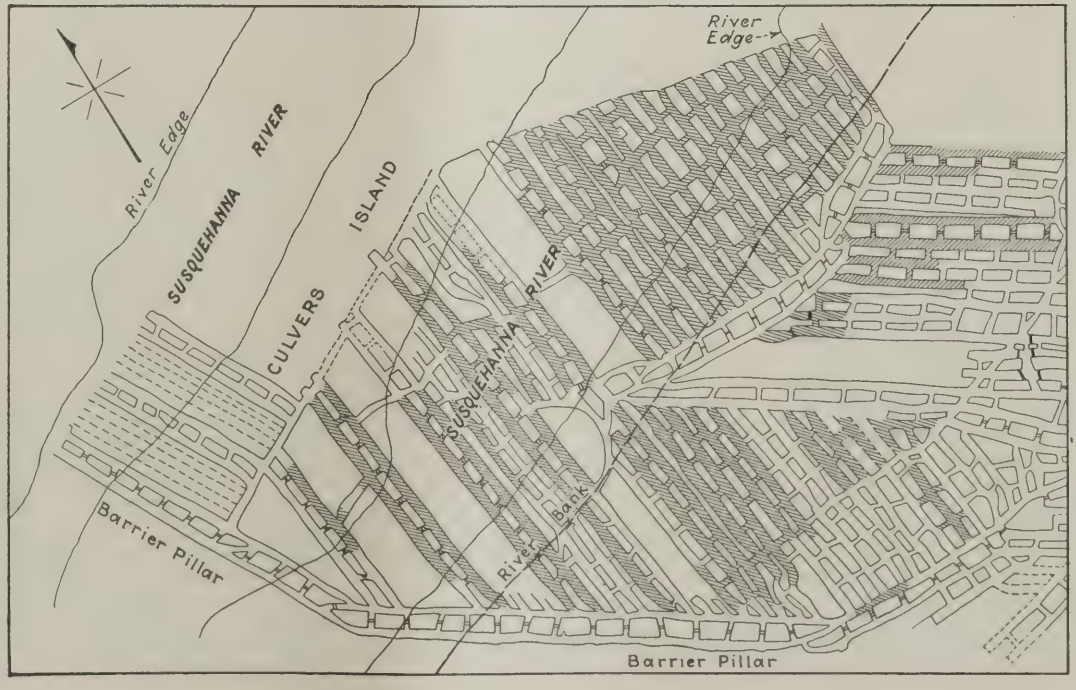




FIG. 2—FILLING HEADINGS WITH ROCK

Rock is brought in mine cars from the breaker, two miles away. Frequently rock barriers are built one by one across the heading, and loose rock is piled in behind them. The coal is over 7 ft. thick, so that in unloading the rock the unloader can get into the car as the man in the illustration has done. The coal rib shown on the left is lost, as is also that on the right also, which cannot be seen.

pletely taken out it is not thought that it will so seriously break the overlying rock that water will flow in from the river.

The greatest difficulty in mining in this vicinity is in the upper beds, where the cover rock is light, the coal of good quality, of reasonable thickness and too valuable to leave. Here great care has to be exercised in the mining so that the roof will not settle and cause cracks that will extend to the surface and permit the inflow of water or quicksand. If this were to happen the operation would have to be abandoned.

At the Cortright slope of No. 14 Colliery of the Pennsylvania Coal Co., between Wilkes-Barre and Pittston, the Hillman bed, which at this place is about 88 in. thick, is being mined. This seam extends under the Susquehanna River and it has only a comparatively light cover. The elevation of the surface of the river is approximately 517 ft. above tide and the elevation of the bottom of the coal is about 420 ft. at this particular point.

The bottom of the coal, however, shows elevations varying between 374 and 432 ft. At the borehole where the elevation first given was taken the wash and river constituted 62 ft. of the cover and the rock is only 25 ft. thick. This thickness of rock is inadequate so no mining can be done at this point. It is not considered safe to mine in places of this character if the rock is less than 50 ft. thick. One company, however, is working coal under a rock cover as light as 30 ft.

With as thin a cover as 50 ft. it is, of course, impossible to remove all the coal, for this would cause surface breaks and water would be admitted to the mine. But though complete extraction is scarcely possible, it is feasible to plan a method of mining that will permit a large proportion of the coal to be removed without danger to the men or the mine.

The method used by the Pennsylvania Coal Co. is distinctly different from that used by other companies in the anthracite region. The usual gangways are driven to develop the area. From these gangways parallel headings, or narrow rooms, as they would be termed in many mines, are driven in pairs and on 30-ft. centers. These headings are about 15 ft. wide, and the pillars are of the same width. They are driven to a maximum length of about 500 ft. When they have reached their limit they are filled with rock.

This rock is brought from the breaker of the mine, which is located about two miles away. It is transported in the mine cars which take coal to the breaker. The rock is unloaded from these cars and is packed by hand in the rooms. Walls are built at short intervals across the heading and then the rock is thrown back of these walls until it is filled to the roof.

These parallel room pairs are driven so as to leave between adjacent pairs a pillar of 75 ft. and when any two pairs have been driven to their limit and have been rock-filled, another pair of rooms is driven up between them, and when these are finished then these likewise are filled with rock. By this means it is possible to recover about 57 per cent of the coal from the bed, which is an unusually high percentage of recovery from beds of this character. Other companies which do not use rock-filling methods recover only a small percentage of the coal.

It readily can be seen from the illustration that in the first work of this character the recovery was not as great as it has been of late, for when the work was first commenced it was considered necessary to leave larger pillars, and it is probable that the recovery was only about 50 per cent.

Urge Fixing of Standards and Adoption of Net Ton in Coal Industry

Legislation which would fix certain coal standards is favored in a resolution adopted by weights and measures officials from the various states who met in Washington recently at their annual conference at the Bureau of Standards. The resolution pointed out that there are no definite specifications as to coal quality; that the heat values of the various varieties are unknown and that there is no general knowledge as to the effect upon coal when sheltered or exposed. It was the sense of the meeting that suitable action should be taken by Congress "to the end that an adequate legislative remedy be afforded the people of this nation by fixing the proper standards." The conference also recommended that the several states adopt as their standards those fixed by Congress or by its authorized agencies.

Another resolution adopted at the conference provides for the use of the net ton as the universal standard in the sale of coal. The fact that Pennsylvania uses the net ton for bituminous coal and the gross ton for anthracite was cited as indicative of the lack of system in handling the principal unit used in the coal trade.

The third resolution calls upon Congress and upon the legislatures of the several states to enact laws establishing the hundredweight as the unit rather than the bushel for the trade in vegetables, grain and similar commodities. The use of the bushel, it was declared, leads to confusion and presents constant opportunity for fraud. The entire abolition of dry measures was advocated. The conference elected the following officers to serve during the ensuing year: Dr. George K. Burgess, Director, Bureau of Standards, president; Wm. B. McGrady, chief, Pennsylvania Bureau of Standards, first vice-president; I. L. Miller, Commissioner of Weights and Measures for Indiana, second vice-president; F. S. Holbrook, Bureau of Standards, secretary; J. H. Foley, superintendent of Weights and Measures for New Jersey, treasurer. It was decided at this meeting to take up for discussion at next year's conference the whole subject of taximeters.

The tolerances for heavy duty scales recommended last year were adopted.

COAL PRODUCTION OF HUNGARY during 1922 was 7,117,910 metric tons or an average of 593,159 tons per month, as compared with 6,419,861 tons in 1921.

Determining What Is Most Economical Life for a Mine*

Too Much Spent on Some Mines for Maximum of Profit—Must Consider Not Only Net Earnings but What Sums of Money Would Earn Annuities Equal to the Several Net Earnings

By Frank Haas
Consulting Engineer, Consolidation Coal Co., Fairmont, W. Va.

CHOICE of this subject was prompted by observing that certain coal mines in Fairmont and other regions had been developed and equipped in a manner that suggested errors in judgment. These errors have not, except in a few instances, made themselves apparent by actual financial failures and some may never be so detected, but the losses of money are inevitable even if not readily perceived.

In the opening of a coal mine the question presents itself—although it is not always seriously considered—as to the amount that should be spent to obtain from the investments the best returns. During the war small economies were overlooked in frantic efforts to get coal and more coal, and some of the things that were done during that desperate period were both warranted and excusable, but in the times that are before us with the prospects that the margin of profit will be cut to a small figure, not only must strict economies be practiced in the operation of coal mines but the executive management in planning what shall be expended on them must likewise take advantage of all the economies that will lower the cost per ton.

We all know in a general way that if a coal property is worked out too rapidly certain losses occur, and the same is true if the process of extraction is extended over too long a period. It is the purpose of this paper to discuss some of the fundamental features which govern such economies and to explain the method of determining what are and what are not economies and to end by drawing some practical conclusions.

The problems involve many factors most of which are beyond control and cannot be anticipated; among these might be mentioned car supply, labor shortage and fluctuations in operating costs and in the selling price of coal. The effects of such variations are not, however, of a fundamental nature and may be disregarded in considering the subject from a theoretical standpoint. The fundamental features are the size of and price paid for the coal lands, the cost of the plant and equipment, together with the value of money as expressed in percentage rate of interest. In other words it involves only what are ordinarily termed the fixed charges.

An individual or a group of persons, having decided to enter into the industry of producing coal, usually has, or should have, a fairly clear and matured idea as to the magnitude of the project as well as a close approximation of what profit is anticipated. Without such preconceived ideas and anticipations one more hazard is being added to a business which by its nature already has many. The selection of the coal lands is the first consideration. In a region so intensively operated as the Fairmont field it is rather a case of what is available, hence the size of the coal field and the price paid is the controlling, if not the most important factor.

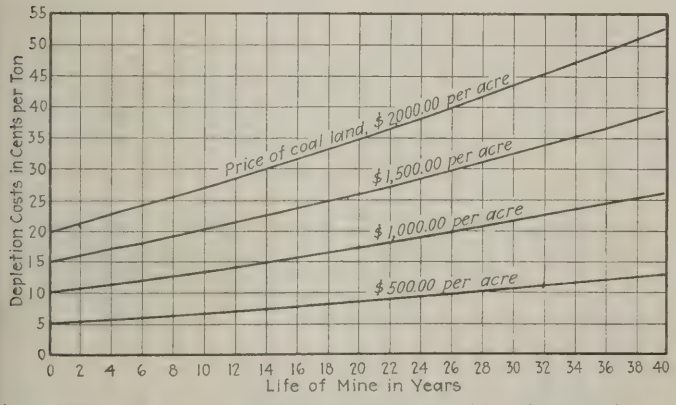


FIG. 1—COST PER TON FOR COAL ON LAND SELLING AT VARIOUS PRICES, ALLOWING FOR INTEREST CHARGES AND RETIREMENT OF CAPITAL

As the coal which is mined in the course of many years is subject to a heavy interest charge the cost of coal per ton increases with the life of a mine in years. If all of it could be taken out on the day of purchase the cost per ton would be the price of the coal land divided by the tons in it. Gradually mined out in forty years it will cost 165 per cent more. In making this diagram the product per acre was assumed to equal 10,000 tons, which is about what may be expected from the Pittsburgh seam in West Virginia.

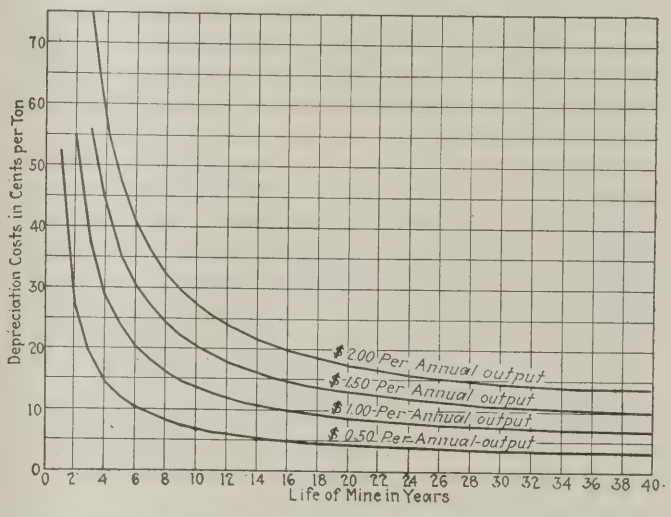


FIG. 2—COST PER TON FOR DEPRECIATION WITH VARYING CONSTRUCTION COSTS

Curves of depreciation run precipitately and then slowly but steadily downward with increased length of mine life, whereas the graphs of depletion as shown in Fig. 1 steadily rise.

We are now ready to discuss what effect the life of a coal field has on the cost of coal and ultimately its value. In Fig. 1 are shown some curves with the life of the mine varying from one to forty years and the cost per ton for different prices per acre of coal. The life of the mine is determined by dividing the recoverable coal by the average output of the mine. The costs per ton represent the charge that must be made to each ton of coal when mined to cover the original cost of the coal and to pay the interest charges at 6 per cent until such capital has been wiped out; these will be referred to as the depletion cost.

It will be seen at a glance that the longer the life the

*Article entitled "The Economic Life of a Mine," read at the West Virginia Coal Mining Institute, Clarksburg, W. Va.

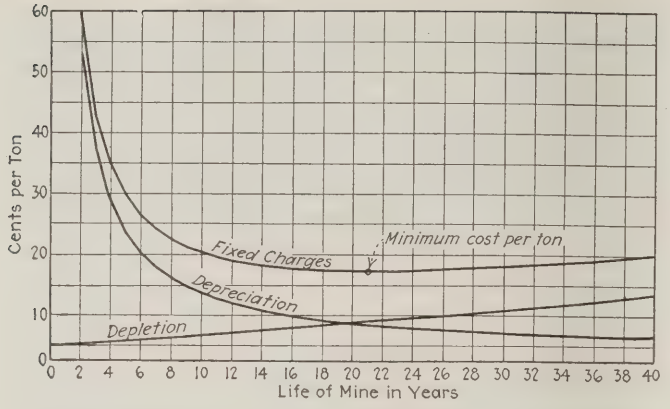


FIG. 3—DEPLETION AND DEPRECIATION GRAPHS TOTALLED FOR ANY ONE YEAR GIVE A CURVE OF FIXED CHARGES

The graphs shown here are those based on a value of coal land costing $500 per acre and a plant expenditure of $1 per annual ton. This is about one-eighth of the expenditure customary in anthracite mines. The minimum cost per ton is obtained with a life of twenty-one years but this is not the period that would give the greatest earning as further inquiry develops.

higher the cost per ton of coal, and if this was the only factor to consider there would be no problem. Before leaving these curves it might be well to point out some features which they illustrate, which while of no connection with the subject at hand, yet may be of interest. Each one of these curves represents an equivalent basis for royalty.

As the value of a lease depends on three factors, (1) the present value of the coal; (2) the term of years the lease will run and (3) the value of money, it is evident that by changing one of these factors either or both of the other factors must be changed. A person or corporation having decided to lease a coal property to an operating company would logically determine first what the present value of the property is, then would determine how long the lease is to run.

For instance, if they value their land at $500 per acre it would be immaterial to them whether they leased the coal for a term of forty years at a minimum that would exhaust the area within that time at a royalty of $0.1329 per ton or leased it for twenty years at double the minimum at $0.0872 per ton, or finally, sold it for cash at $0.05 per ton, assuming that it has a merchantable yield of 10,000 tons to the acre, as has the Pittsburgh bed.

Coming back to our original subject we find in depreciation, the second factor, more complications than in depletion. Considering but one object, improvement or machine depreciation is easily and fairly accurately determined, but in the total of plant and equipment of a coal mine we have a large variety of improvements and machines each of which has a specific life and therefore a different rate of depreciation.

To attempt to work out each item separately would be an endless task and while of value for other purposes is not necessary in these calculations. The subject of depreciation has been much discussed and greatly mystified by such terms as "replacements," "betterments" and "obsolesence" which have not been uniformly interpreted and have thereby caused confusion. Depreciation as we expect to use it in this discussion will be simply that the loss of the capital which has been expended on plant and equipment for the purpose of making them produce a certain output.

Taking "one ton per year" as our unit we find that we can determine with fair accuracy how much money must be expended to produce this tonnage. In the Fairmont region this sum varies from 50c. to $2. In other words if we attempt to build a mine to produce, say, 100,000 tons per year it will require $50,000 to $200,000 to accomplish this, depending on the natural facilities or obstacles encountered. Such things as betterments, replacements and obsolescence exist and care must be taken of them, so I suggest that they be considered as operating cost under repairs and supplies, and we have found that all these questionable features can be grouped and estimated as an annual charge of approximately 5 per cent of the original investment. It will cover all these items.

If this is a constant quantity it is immaterial whether it is included as depreciation or operating cost, and in order to simplify a problem which may to some seem complicated enough we leave it as the second. I am aware that with a small mine the purchase of a haulage motor, for example, would have a considerable effect on the cost sheet of a single month, but this could be handled in a suspense account over a period of a year instead of capitalizing it.

In Fig. 2 is plotted a curve which shows how the average cost of depreciation varies in mines of varying life. It will be noticed that on a short life this cost is prohibitive, but the curves drop off rapidly. The various points on the graph are determined by considering the depreciation charges as an annuity which, divided by the output corresponding to a particular life, gives the cost per ton. The tendency is directly opposite to that of depletion and the diagram plainly indicates that the longer the life the less the depreciation, or its cost per ton.

In Fig. 3 we take a particular case. With the value of coal at $500 per acre and the cost of the plant and equipment at $1 per ton of annual production I show both the depletion and the depreciation curve, and as the sum of these two is the total fixed charges I have added a third curve which represents this total. This curve shows a downward tendency at first but reverses the direction to an upward movement. Under the conditions assumed the minimum fixed charge is at a life of twenty-one years. The first impression is that as the cost is at its lowest with a life of twenty-one years this would be the period of greatest earnings, but this is not so, as will presently be shown.

With the selling price and all operating costs per ton known it is possible to determine the gross profits, and if we were to assume an arbitrary figure as representing the gross earnings (by gross earnings I mean the differ-

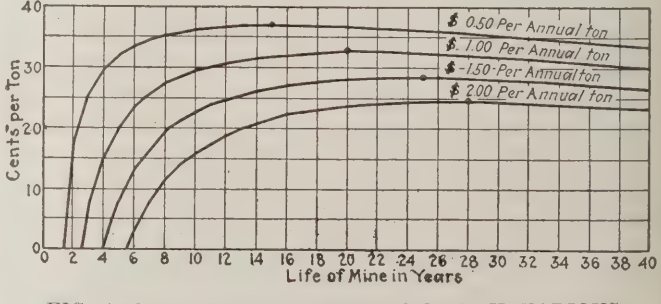


FIG. 4—NET EARNINGS PER TON WITH VARIOUS CONSTRUCTION COSTS AND MINE DURATIONS

This is based on a coal cost of $500 per acre and gross earnings of 50c. per ton with the fixed charges deducted. In a mine of short life on which much money has been expended, nothing remains of gross earnings after such deductions because they are so large. This is shown by the fact that all the curves rise from the base or zero line of the figure. In a mine of longer life the net earnings are larger.

ence between the selling price and all costs except the fixed charges) we can determine the net earnings and their relative value.

In Fig. 4 I have assumed a constant figure of 50c. per ton as representing the gross earnings and by subtracting from this sum the variable fixed charges I get a curve showing the net earnings per ton. On this diagram I am still holding to the assumption that the original cost of the coal is $500 per acre and have introduced four different costs of plant and equipment, 50c., $1, $1.50 and $2 per ton of annual production in order to show the effect of cost of plant and equipment on the economic life of the mine.

This series of curves shows conclusively, so far as annual earnings are concerned, that the economic life of a mine increases with the increased cost of plant and equipment. With an original cost of 50c. per annual ton for plant and equipment the largest average annual net earnings are attained with a 15-year life irrrespective of the size of the coal area and irrespective of cost of the coal per acre. For $1 equipment the life is twenty years; for $1.50 equipment it is twenty-five years and for $2 equipment it is 28 years.

We have previously intimated that the highest average earnings do not realize the highest value nor do they indicate the most economic life. The reason for this is that it is not only necessary to know how much money is to be earned but also just when it will be earned. In order to introduce this factor it will be

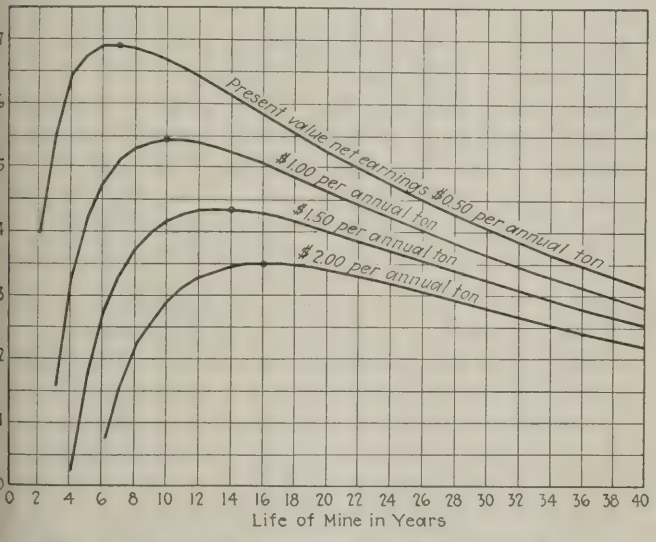


FIG. 5—PRESENT VALUE OF NET EARNINGS
This is based on four different rates of expenditure per ton of annual production with various lengths of mine life.

necessary to establish a fixed time and determine the value of each series of earning. The present time is the most convenient and we have constructed in Fig. 5 four curves which represent the present value of the net earnings.

It is seen in these curves that the most economic life is considerably shortened as compared to and indicated by the highest average earnings per ton. These curves, or rather the maximum points in these curves, give us the answer to our problem. For a mine costing 50c. per ton of annual output the most economic life is seven years. For $1 equipment it is ten years; for $1.50 equipment it is thirteen years and for $2 equipment it is sixteen years, all irrespective of size or cost of the coal field.

Having demonstrated the most economic life of a

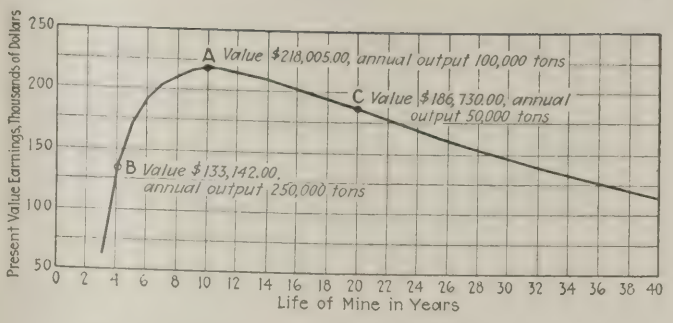


FIG. 6—PRESENT VALUE OF PRODUCT FROM THREE MINES
Here the total production over the life of the mine is 1,000,000 tons in each case. One is exhausted in four years, one in ten years and one in twenty years. According to the author's calculations the mine which is exhausted in ten years brings the greatest profits.

mine we will now attempt to show the practical effect and for this purpose we will assume that three men, indicated by *A*, *B* and *C*, each owning a tract of 100 acres of coal, for which they paid $500 per acre, with uniform conditions and operating cost and the selling price giving each the same gross earnings, and see what happens to them. *A* builds a plant and supplies equipment to produce 100,000 tons per year, which would give his mine a life of ten years. *B* puts in a plant to produce 250,000 tons per year with a life of four years and *C* puts in a plant for 50,000 tons per year, or a 20-year life. We find as indicated by the curve in Fig. 6:

A realizes a profit the present value of which is $218,005,

B a profit the present value of which is $133,142 and

C one the present value value of which is $186,730.

Therefore *A* makes practically 64 per cent more out of his property than *B* and 17 per cent more than *C*.

The above comparisons are no exaggeration; in fact greater variations can be found in the Fairmont field. What may to some appear merely a tendency really assumes large proportions and in extreme cases results in disaster from this cause alone.

ALL MEMBERS OF THE STAFF of the U. S. Geological Survey who are available for field work are now thus engaged. R. K. Lyn's party reached Kanatak, southwestern Alaska, June 7. A. I. Jonas is engaged in field work near Westminster, Md. Joseph L. Gillson, who is associated with Edward Sampson in the preparation of a report on the Pend Oreille district, Idaho, is in Washington to complete his part of the report. He will complete this work late in June, when he will join Prof. L. G. Westgate in the examination of the Pioche district of Nevada. Professor Westgate left Delaware, Ohio, for Pioche June 15. A. F. Melcher is continuing work connected with core drilling in the Burbank district, Osage County, Oklahoma. W. W. Rubey is at Moorecroft, Wyo., continuing work on the Black Hills rim. He is being assisted by Alexander Stepanoff. The headquarters of the Spieker party have been changed from Price to Huntington, Utah. Prof. C. R. Longwell, of Yale University, is at Las Vegas for summer field work. Dr. R. C. Moore has been assigned to work as geologist to the Grand Canyon surveying party in charge of C. H. Birdseye. J. B. Mertie, Jr., reached Alaska June 7. G. C. Martin left June 11 to visit some of the oil fields of California. On July 5 he will sail from Seattle to study the geology of the oil deposits of Alaska Peninsula.

THE CONFERENCE ON WASTE IN FREIGHT TRANSPORTATION which was to have been held this month in Washington under Commerce Department auspices has been postponed until such time that it will be possible to have a more representative attendance than could have been obtained on such short notice at this time when traffic men and others interested in transportation are particularly occupied.

Will Find What Makes Steel Castings Fail

THE Electric Steel Founders' Research Group held a regular meeting of executives of the five electric steel foundries conducting co-operative research work, at Wernersville, Pa., on May 14 to May 17. Those in attendance were W. J. Nugent, vice-president, Electric Steel Co., Chicago, Ill.; C. S. Koch, president and H. J. Koch, secretary, of Fort Pitt Steel Casting Co., McKeesport, Pa.; W. H. Worrilow, president, T. S. Quinn, treasurer, and K. V. Wheeler, general manager, of Lebanon Steel Foundry, Lebanon, Pa.; R. F. Flinterman, president and H. A. Neel, manager, of Michigan Steel Casting Co., Detroit, Mich.; C. R. Messinger, vice-president, E. J. Doty, vice-president, and B. Fleeger, treasurer, Sivyer Steel Casting Co., Milwaukee, Wis., and R. A. Bull, research director of the group.

The various phases of the research work being done by the members of the group to improve the quality of steel castings and increase efficiency in methods were discussed in detail. Formal reports giving the status of the present research investigations were read on such subjects as facing sand mixtures, core-sand mixtures, electric-furnace practice, heat treatment of steel castings, production control, porosity in castings, etc.

At this meeting plans were made for conducting research investigations into other problems of steel founders. The results obtained from the work done so far have been so beneficial as to make it highly desirable to study intensively some of the other complex problems involved in making electric steel castings of thin section and intricate design.

Small Cartridges Inefficient and Unsafe

EXHAUSTIVE tests on the action of explosives in use, when made into cartridges of small diameter, have just been completed by the U. S. Bureau of Mines. They prove that in the interest of safety, economy and efficiency in mining and other work small cartridges should not be used.

"One of the most serious and dangerous features in the use of explosives," says Dr. Charles E. Munroe, "is the frequency with which cartridges 'misfire' or fail to fire. Such cartridges must be eliminated."

The growing use of high explosives by the general public, in addition to their use by the mining, road-building, and agricultural industries, brought about by the constant distribution of surplus war explosives, makes it necessary, Dr. Munroe believes, that the public become better acquainted with explosives and their use. Hundreds of thousands of pounds of dynamite, trinitrotoluol, picric acid, smokeless powder, and other similar high explosives have been and are being distributed throughout the country by the federal government, in order to use up the surplus materials left over from the war. Dr. Munroe has been one of the government's chief expert advisers concerning this distribution. He said:

"The bureau has found that the size of the cartridge used is vital if further economies, additional efficiency and increased safety are to be effected. The tests recently completed prove that we cannot get efficient work from an explosive when it is confined in a cartridge of small diameter. Heretofore, explosive users have believed that they could save money by making small holes and using cartridges of a size suited thereto. That has now been proved to be false economy.

"The bureau's tests prove that we can excavate more ground, blow up and take out more rock and stumps by making larger holes and using larger cartridges. They prove also that the customary and practically standardized cartridge, measuring in diameter 1¼ in. and in length 8 in., is small enough in the interest of safety. If it is made smaller, misfires may occur and 'duds' will be left around to be exploded at unexpected moments. For these reasons users of explosives must employ that size in the future."

Pennsylvania Mines Department Co-operates In Plan for Education of Coal Miners

By Frank Hall
Deputy Chief, Pennsylvania State Department of Mines

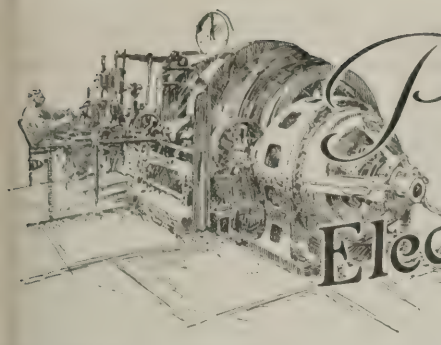
THE advantage of education in all lines of activity is daily becoming more apparent as the demands of modern business grow more exacting and more critical. But the scope of an education should not be limited to the specific things that pertain to a particular occupation; it should include also as much general knowledge as possible, for it is a truism that the better the education, other things being equal, the better will be the service performed.

The Department of Mines of Pennsylvania has found by experience that, even with the most stringent enforcement of the mining laws enacted by the state and the mining rules and regulations formulated by the operators, a large number of casualties occur in and about the mines that should be prevented.

The question naturally arises, What can be done to remedy this condition? One thing to do is to educate the mine workers. The mining department has always recognized this great need, realizing that an occupation so beset with dangers as coal mining is made more perilous by lack of knowledge and inefficiency. The agencies, such as the vocational schools, mining institutes, the Y. M. C. A. and the Scranton schools, have, therefore, all met with encouragement from the department, as they are practical in their methods of instruction and have proved to be a power in increasing the efficiency and carefulness of the mine workers.

The Department of Mines is at present co-operating with the Vocational Bureau of the Department of Public Instruction and the Mining Department of State College in the preparation of courses of study to be used throughout the state in the vocational schools, where miners receive instructions during the evening hours in all branches of the mining industry. The courses are being made comprehensive and include the most modern thought upon all subjects connected with coal mining; but they have been wisely kept in the simplest form possible so that they may afford thorough instruction without demanding too much effort on the part of the student.

The mining industry of Pennsylvania is so great that there always are thousands of men who are seeking, by educational means, to improve their condition, and it is expected that the courses now being prepared will bring to these ambitious workers an opportunity to acquire a fund of valuable knowledge that will enable them to seek with confidence higher and more responsible positions in and about the mines of the commonwealth. These men will be a potent factor in adding to the intelligent operation of the mines and in bringing about safer conditions for the mine workers.



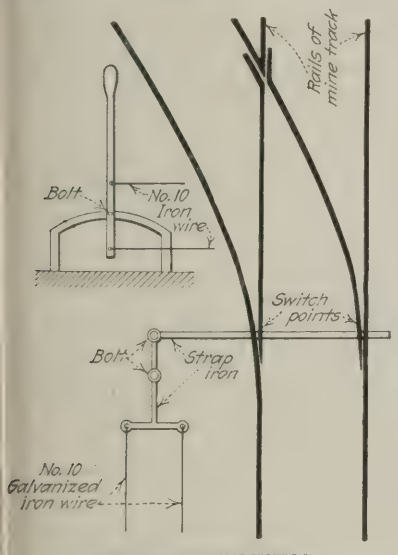
Practical Pointers for Electrical and Mechanical Men



Simple Mine-Track Switch Thrower

WHERE it is desired to throw a switch when handling several cars, as is frequently the case in mine haulage, I have found the following arrangement very satisfactory and efficient.

A layout such as is shown in the figure herewith is used, which consists of merely lengthening the regular crossbar between the switch points and fastening a T-shaped piece of iron to the extended end by means of bolts. The T-shaped piece of iron must be pivoted so as to move freely from side to side. This may be accomplished by using a loosely fitting bolt. To the ends of the T-shaped piece of iron are fastened two iron wires. No. 10 iron wire usually is strong enough for the purpose. These wires are actuated by means of a hand lever arrangement as shown in the figure. This consists simply of a vertical piece of iron bolted to a frame. The wires from the T-shaped piece of iron are fastened as shown in the sketch. The upper part of this vertical iron is shaped to make the operation of the lever as easy as possible.



SWITCH-THROWING ARRANGEMENT

Considerable time may be saved by throwing the switch from the locomotive. Such an arrangement is safer than the usual method of kicking the latch over with the foot.

Considerable time may be saved by using this arrangement, as the switch may be thrown from the cars or locomotive without running to the switch points and kicking the switch over with the foot.

Tokay, N. M. CECIL ROWE,
Assistant Manager, Kinney Coal Mine.

To Overcome Smoke with Low-Volatile Coal

(1) The heat from low-volatile coal comes mainly from the red-hot incandescent coke and not from gas.

(2) To obtain constant heat keep about 75 per cent of the fuel bed in the rear red hot and generally from 8 to 12 in. thick.

(3) Throw green coal in the front part of the fire box, usually 8 to 20 in. high, for the purpose of coking it.

(4) While green coal is in the early stages of coking, smoke will be created, but in flowing over the very hot fuel bed in the rear it will be consumed and its valuable gases saved.

(5) When the green coal has given off practically all smoke, push it back and level off the fire bed.

(6) In a few moments repeat the process of coking green coal in the front as before.

(7) Do not permit black spots and holes to occur in the fire bed.

—*Courtesy W. A. Marshall & Co., New York.*

How to Get Best Results from a Battery

IN ORDER to assure best results the following condensed instructions have been issued for the use of Exide Ironclad batteries:

Care.—Solution in cells (the electrolyte) should always cover the plates. To replace evaporation, add pure water only, bringing level to bottom of filling tube.

Add water before a charge or immediately after starting charge. It should not be necessary to add water oftener than once a week. Otherwise the battery is being given too much charge or is too hot.

Never add acid to a cell, except in case solution has been spilled, then replace with new solution of same specific gravity as that of surrounding cells.

Filling plugs should be properly locked in place at all times, except when adding water or taking hydrometer readings.

Cleanliness of the exposed battery parts is very necessary.

If electrolyte is spilled or wood trays or compartment is damp with acid, apply a solution of cooking soda and water, then rinse with water and dry; do not allow soda solution to get into cells.

If this soda treatment is given two or three times a year and the battery kept clean between times by means of weekly washings with water or blowing off with a steam or air jet, the life and service of the battery in general and the trays in particular will be increased considerably.

Discharge.—In ordinary service do not use more than the rated capacity of the battery. In an emergency, take out all that it will give.

Charging.—A charge must always be completed at a rate not higher than about 1 amp. for each plate in a cell; for example, 15 amp. for a 15-plate cell.

A charge may be started at a high rate, provided the current is lowered and never exceeds the reading of the ampere-hour meter, until rate falls to about one ampere per plate.

The temperature of the cells must not exceed 110 deg. F. Open up battery compartment while charging.

An equalizing charge must be given once a week. (See instruction book.)

Once a month, after an equalizing charge, take and

record the specific gravity of every cell. If the specific gravity is not between 1.250 and 1.285 notify the company.

Caution.—To avoid a possible explosion never bring a lighted cigar, match, open miner's lamp or other flame near a battery.

Never lay tools on top of a battery.

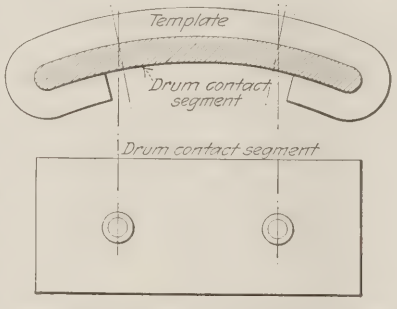
Always remove the covers from the battery box when charging.

Keep all parts of the battery clean.

For Detailed Instructions.—The instruction book gives complete information. Read it and obtain best results from the battery. For this book or other battery information, write to the company, specifying in what service the battery is used—whether in mine locomotive, industrial truck, street truck, etc.

Mine-Made Controller Segments

DRUM segments can easily be made in the mine shops. The diameter of the controller drum with the drum segments removed should be taken. This will be the inside diameter of a copper tube of suitable thickness, which, when cut up, will provide drum segments with the same curvature as those already in use. The copper tube may be purchased in lengths of a few feet, being placed in a lathe and cut into rings of the required width. These are then cut up as required. The drum segments should have their holes accurately drilled, and they should be interchangeable. Therefore it is best to make them in a template as shown in the figure. This can be made out of $\frac{1}{4}$-in. or $\frac{3}{8}$-in. iron. It should be shaped and drilled to a new drum segment supplied by the makers, the same one being kept as a standard. The template and drum segment should be the same width so that when the latter is inserted and entirely covered by the template the holes will be drilled in the proper location.



TEMPLATE FOR LOCATING THE HOLES IN CONTROLLER DRUM SEGMENTS

Accuracy in the location of the segments of the drum cylinder is important if arcing is to be kept at a minimum.

Drum segments of course burn on only one end, and therefore they should always be reversed in order to get out of them the maximum service. A spare set of these should be kept so that no filing is done in the controller.

When filing a drum segment the end should be properly rounded as shown in the figure. This insures a quick connection where the moving drum segment encounters the fingers. If they are filed at an angle as shown dotted, then contact is established and broken much more slowly, and burning is more severe.

R. F.—E.

H. F. YANCEY, assistant chemist, and Thomas Fraser, assistant mining engineer at Urbana (Ill.) experiment station of the Bureau of Mines, have completed a preliminary study taken to determine the amenability of coal to improvement by the dry-cleaning process. The distribution of the impurities in all of the coals was found to be such as to make them amenable to treatment by either the wet or dry process.

Determining Boiler Capacity and Requirements

DUE to the fact that the electric load at one of our mines has high peaks but of short duration, I am inclined to the belief that a very large boiler installation is hardly necessary. In proportion to the load I believe we are operating too many of our boilers. Much of the time we are working under the boiler horsepower rating. Will you kindly give me some information as to evaporating capacity of the average boiler per square foot of heating surface, the heating surface required per boiler horsepower and the possibilities of working boilers above their normal rating for short periods.

MINE PLANT OPERATOR.

The best efficiency under ordinary working conditions with most boilers, is obtained when evaporating about 3 lb. of water per square foot of heating surface per hour, from a feed temperature of 212 deg. F. into steam at atmospheric pressure. This is equivalent to allowing nearly 12 sq.ft. of heating surface per boiler horsepower.

However, at the present time 10 sq.ft. of heating surface ordinarily is considered the equivalent of one boiler horsepower.

In electric generating plants where the heat load is of short duration it is not particularly necessary to have the capacity of the boilers too liberal because most boilers may be pushed to 200 per cent load without seriously affecting their efficiency.

By dividing the total number of pounds of steam that are to be evaporated from and at 212 deg. F. per hour by 3 for fire-tube boilers and 3.4 for water-tube boilers, the amount of heating surface for plants with a constant load may be obtained with reasonable accuracy.

Plow Steel Rope for Mine Uses

FOR mine haulage, including endless-tail rope systems, gravity hoists, as well as coal-dock haulage and roads operating small grip cars a plow-steel transmission rope may be used to great advantage. When replacing a softer crucible steel rope where it is necessary to obtain increased strength and the physical requirements render it impossible to alter the working conditions a plow-steel rope may be used to distinct advantage. Under these conditions it is rarely necessary to increase the diameter of the rope.

A plow-steel transmission or haulage rope made up of six strands of seven wires per strand and having a hemp center has the following qualities when properly made:

Diameter in Inches	Circumference in Inches	Approximate Weight per Foot in Pounds	Approximate Strength in Net Tons	Proper Working Load in Net Tons	Diameter of Drum or Sheave in Feet Advised
1 1/4	4 3/8	3.55	82	16.4	11
1 3/16	4 1/8	3	72	14.4	10
1 1/8	4	2.45	60	12	9
1 1/16	3 1/2	2	47	9.4	8
1	3	1.58	38	7.6	7
15/16	2 7/8	1.20	31	6.2	6
7/8	2 1/4	0.89	23	4.6	5
13/16	2 1/8	0.75	18	3.6	4 3/4
3/4	2	0.62	16	3.2	4 1/2
11/16	1 3/4	0.50	12	2.4	4
5/8	1 5/8	0.39	10	2	3 1/2
9/16	1 1/2	.30	7	1.4	3
1/2	1/8	0.22	5.9	1.2	2 3/4
7/16	1	0.15	4.4	0.88	2 1/4
3/8	1 7/8	0.12 1/2	3.4	0.68	1 3/4

PARTY LINES MAY BE DISAPPEARING in this country, but coal lines are forming.—*Brooklyn Eagle.*



How Many More Years Can Southwestern Coal Fields Keep Up Heartbreaking Fight Against Oil?

Lower Costs Are Vital Yet Unions Even Refuse 11c. Machine Differential—Coal Loses More Than 12,000,000 Tons of Market Among Railroads, Industries and Homes

By C. F. Butcher
Kansas City, Mo.

A MAN familiar with coal conditions in the southwestern district, one who has diagnosed afflictions of the industry with considerable accuracy in times past, has given the mines of Kansas, Oklahoma, Arkansas and Missouri "ten years more to live." In his opinion the industry is gradually succumbing to the high cost of production, and oil and electric competition. A cut in costs is a vital necessity.

It is a district capable of normal production of more than a million tons of coal a month with present equipment. At such a rate of production, in acreage now being developed, it should have a natural expectation of at least fifty years more of activity. It has undeveloped acreage estimated potentially to be good for from 300,000,000 to 600,000,000 tons additional. This is the Southwest's armor against exorbitant oil prices. It will always be ready to yield coal for every purpose. Yet there is no doubt of the sincerity of coal men who say the sun is setting on Kansas, Arkansas, Oklahoma and Missouri coal.

The "ten years" statement was repeated to many operators recently. Although not all are as pessimistic as that, they agreed that Old King Coal is a sick man at least as affects that part of his anatomy distributed over these four states. But, as one views the situation, it is well to bear in mind the admonition with which the general commissioner of the Southwestern Interstate Coal Operators' Association concluded a survey of conditions in the district for members of the association. "The coal industry," he wrote, "has in the past survived many adversities, and will no doubt be equal to the task of readjusting itself under these circumstances."

Note—Headpiece shows typical Oklahoma oil field, spiked with derricks, laced with pipe lines and spotted with field storage tanks from which main pipe lines carry oil to refineries any distance from 15 to 200 miles.

The high wage scale of last year remains effective for another year. Concerning the possible trend of wages or the stability of labor after the expiration of the existing contracts, no one will risk a guess. Operators attribute to present high operating costs much of the success of competitive fuels. And so far there is no sign of operators and miners coming closer together.

The other day a conference of representatives of operators and miners adjourned in Kansas City after arguing intermittently more than six weeks over a difference of 5c. in a machine scale differential for Kansas mines, where it is proposed to install machines. Operators offered an 11c. differential—the miners demanded 6c. About the time the conference adjourned, miners of Jackson-Walker mine No. 16, in the southeastern Kansas field, were petitioning Governor Jonathan Davis to force the company to resume work in the mine, which had been shut down because of lack of business. This indicates the attitude of union miners toward the obliteration of their jobs.

The competition of electricity is steadily increasing. In 1922 public-utility power plants produced and distributed an average of approximately 85,000,000 kw.-hr. of electric energy a month, while new projects are under way for centralizing the electrification of almost every town of 5,000 or more people in eastern Oklahoma, eastern Kansas and western Missouri into a dozen or so large power plants. In addition to making it possible to substitute electrical energy for steam in many plants now using boilers, engineers for the interested power companies estimate that centralization will effect a reduction of 20 to 25 per cent in the amount of fuel required for their plants.

And finally, there is the constant encroachment of fuel oil upon the coal market. Immediately before,



"TANK FARM" IN THE CENTER OF A GREAT SOUTHWEST PRODUCING FIELD

Here oil is collected by millions of gallons for general field storage on its way out of the region via one of the several main pipe lines. The bulk of the oil shipped out of the Southwest field never uses a tank car nor does it clutter up a railroad en route.

during and since the war, oil production in the mid-continent field has grown by leaps and bounds. Great new fields have been opened in Oklahoma, Texas, Arkansas and Kansas. A network of pipe lines has been laid over the states, affording economical transportation to refineries and loading points. No strikes have occurred in the oil fields to tie up production, and selling agencies have not overlooked the argument afforded by this fact in seeking replacement of grates by oil burners.

Before the war, oil competition was negligible. There was some experimentation, but for the most part such plants as installed oil burners vacillated from coal to oil and from oil back to coal with the fluctuations in price of the two fuels. During the war there was such a demand for all forms of fuel that no effort was made to tabulate the comparative popularity of the various types. It was not until the autumn of 1919 that any attempt was made to discover the relative positions of coal and oil in the Southwest. At that time, W. L. A. Johnson, general commissioner of the Southwestern Interstate Coal Operators' Association, requested from all coal-selling organizations of the Southwest the names of their customers who had replaced grates with oil burners and the amount of coal displaced in each plant. The replies to the query, as submitted to the Bituminous Coal Commission in Washington, D. C., early in 1920, revealed that in 385 establishments, including both industrial plants and railroads, 12,484,750 tons of coal a year was being displaced by fuel oil. Displacement in industrial plants was 5,881,900 tons and on railroads 6,602,850 tons. No survey has been made since, but there has been a steady increase in displacement in the last two years.

In considering these returns it must be borne in mind that they are for ten states, and embrace territory supplied only in part by mines of Kansas, Arkansas, Oklahoma and Missouri. Even so, the total is startling, exceeding as it does the total production of coal in the four states in either 1921 or 1922.

In Kansas City alone in 1922 oil displaced some 695,000 tons of coal. Of this displacement, approximately 542,000 tons was industrial, 153,000 tons domestic. On May 1, 1922, there were 9,220 oil burners in Kansas City domestic heating plants. Now there are in the neighborhood of 15,300. This increase in the summer of last year is attributed largely to the uncertainty of labor conditions. The public had no assurance that the strike would be settled before winter. It had had previous experience with "coal famines" produced by labor troubles and with prices prevailing at such times. The skyrocketing of prices on such coal as was obtainable in the summer augmented its fears.

So with industries. Rather than risk a shut-down for lack of fuel, many companies installed oil burners.

Railroads are converting virtually all their divisions south and southwest of Kansas City to oil. Almost every railroad of the Southwest and the middle South taps one or more of the scores of immense pools of Texas, Arkansas, Oklahoma and Kansas. Transportation costs are reduced by the proximity of the lines to the fields. Within a few months the southern divisions of the Frisco, Katy, Rock Island, Santa Fe., Missouri Pacific, Southern Pacific, Kansas City Southern and Cotton Belt all will be using oil exclusively. All roads in Texas already are using only oil.

It is considered probable that the Southern Pacific will install oil on its transcontinental lines. It has contracted for the erection of a steel storage tank at Lordsburg, N. M., that will have a capacity of 2,500,000 gallons. A recent contract made by the Missouri Pacific with the Great American Oil Co., to run three years, provides for oil to be used on all southern divisions of the system. The company will erect twenty-three 55,000-barrel steel storage tanks, and expects to equip 100 locomotives with oil burners, at a cost of $200,000.

The Cotton Belt recently contracted with the Houston Oil Co. for 4,000,000 barrels of fuel oil to be used at the rate of 10,000 barrels a day. It is equipping 119 locomotives with burners, and is building storage tanks with a capacity of 500,000 barrels. The Frisco has a three-year contract for fuel oil to be used on its Southwestern lines. The Rock Island recently announced its intention to convert all locomotives to oil, and to close its mines in Hartshorne and Haileyville, Okla., until the cost of producing coal is reduced. The Katy is burning oil in all engines running between Parsons, Kan., and Denison, Texas, and in its shop boilers at Parsons.

These changes entail a coal-market loss of approximately 30,000 tons a day.

As to comparative costs of the two fuels there is no agreement. Purchasing agents for companies using coal say coal costs less to use than oil. Those for plants burning oil swear oil is the cheaper—that the greater initial cost and the expense of substituting burners for grates is offset by a cheaper handling cost. Most home owners who have substituted oil for coal agree that, in addition to the cost of necessary changes in their heating plants, their oil bills run from 20 to 25 per cent greater than did their bills for Arkansas



IF COAL MINING SPOILS LANDSCAPES, WHAT DOES OIL MINING DO?

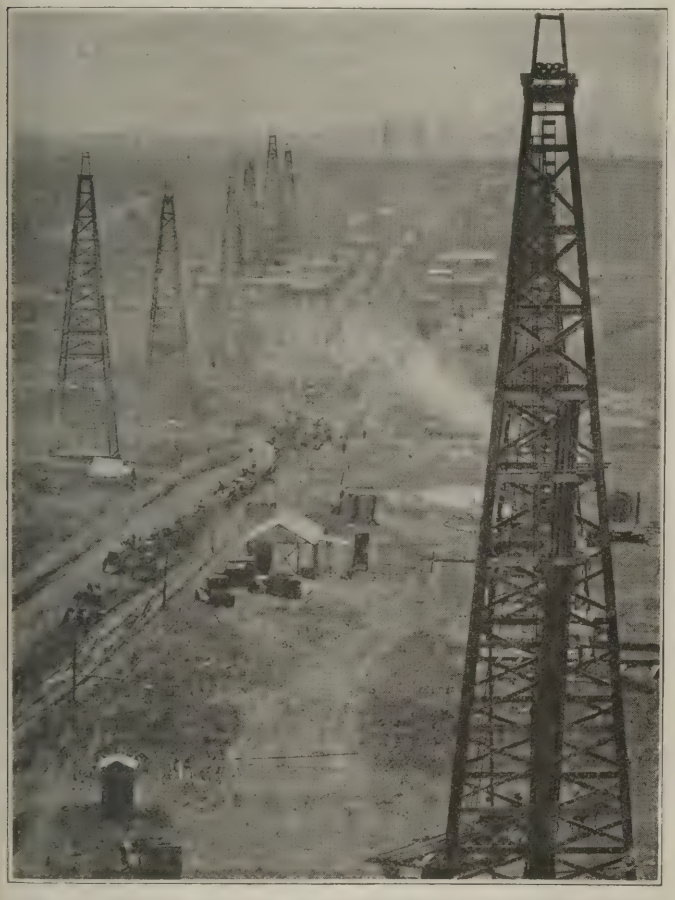
This countryside yielded its every claim to beauty and devoted itself to raising this crop of derricks and hulking odorous tanks which help to keep pipelines full and give the producer a chance to keep his wells pumping even though the demand may be slack.

TABLE I—INCREASE OF ELECTRIC POWER GENERATED IN THE SOUTHWEST WITH AMOUNTS OF FUEL CONSUMED *

Year	Kw.-Hr. Produced by Water	Kw.-Hr. Produced by Fuels	Fuels Consumed — Coal, (Net Tons)	Oil, (Barrels)	Gas, (M. Cu.Ft.)
ARKANSAS					
1920	1,373,000	117,337,000	123,019	83,816	2,698,740
1921	1,438,000	123,014,000	128,539	155,355	1,954,493
1922	1,649,000	139,074,000	94,310	224,654	2,015,185
KANSAS					
1920	20,508,000	417,144,000	472,771	821,383	1,481,295
1921	21,231,000	393,999,000	282,892	1,056,152	2,160,040
1922	17,040,000	477,893,000	242,168	1,359,265	3,216,445
MISSOURI					
1920	45,044,000	652,181,000	1,190,148	448,837	.....
1921	41,238,000	681,082,000	1,092,616	225,840	.....
1922	29,250,000	841,849,000	1,160,068	519,735	.....
OKLAHOMA					
1920	2,006,000	211,822,000	102,072	345,685	5,608,484
1921	2,343,000	212,275,000	70,029	552,308	4,503,294
1922	5,337,000	238,756,000	61,176	507,140	4,547,636

* Based on returns from plants producing 10,000 or more kw.-hr.

semi-anthracite, the domestic coal most generally used in Kansas City. "But," they explain, "there are no strikes in the oil fields. We know we can get fuel oil



THE KLONDIKE RUSH HAD NOTHING ON A RUSH FOR OIL

When a strike is made a new field sprouts up overnight. Roads begin to run oil, machinery, tanks and pipe. Shacks are thrown together, gangs throng in from everywhere and nowhere, drills bore day and night, everything is forgotten by oil men except that a pool of oil is right there under their feet and that the first man into it begins to cash in first. Reckless waste marks every move.

as long as the railroads run." This likewise is the reason most frequently heard among industrial buyers for converting to oil.

And yet last autumn, as soon as it became apparent that the labor situation in the coal fields was more or less stabilized, several plants which had been using oil during the months of uncertainty returned to their grates. Among them was the Armour packing plant, one of the largest industrial fuel buyers in Kansas City.

As this is written fuel oil is quoted by the tank car, f.o.b. Oklahoma shipping points, at $1.15 a barrel.



COAL MINE TOWNS SHINE BY COMPARISON

While of course there are oil companies which build comfortable houses for employees, the footloose oil man must hop around suddenly from place to place, and his home usually is a shack like one of these. The wooden box in the foreground has a "Rooms for Rent" sign on it.

Kansas coal, f.o.b. mines, is $4.50 for lump, $4 for nut, $3.50 for mine-run, and $2.50 for screenings. Taking 4½ barrels of fuel oil as the equivalent of one ton of Kansas bituminous in B.t.u. value, it is apparent that oil to do the work of one ton of coal would cost $5.175.

Electricity forms the third point of the competitive fuel triangle. But, whereas its participation in the competition is more or less simple, electric power itself provides a market for which its two competitors must struggle. And although each month the U. S. Geological Survey publishes statistics on the number of kilowatt-hours produced by water power, and by various fuels in each state, engineers refuse to attempt to estimate the amount of fuel displaced by a specified number of kilowatt-hours of electrical energy. Such a compilation, they say, would be affected by too many unstable factors to be made to apply generally through all industries. It would vary for each plant.

Table I, taken from the Geological Survey, does show, however, a steady increase in the production of electrical energy in the four states in the last three years accompanied by a steady increase in oil burned to generate electricity and a decrease in coal consumed for



THE "TIPPLE" OF THE OIL INDUSTRY

About 500 refineries of various sorts raise their distilling columns in air in various large communities near the oil fields. Here the gasoline and gas oils are removed, leaving approximately 20 per cent of the original volume, which is fuel oil.

the same purpose. It further illustrates the magnitude of the power-plant market for oil and coal, and the quantities of each used.

From the first two columns of Table I may be obtained an idea of the steady increase in production of electrical energy during the three years. From the third and fourth columns are obtained the figures on the increase or decrease of the use of coal and fuel oil in power plants shown in Table II. It will be noted that the minus signs are in the majority in the coal column, the plus signs in the oil column. This is especially significant in view of the fact that oil men say power-plant reports may be taken as a fairly accurate gage of the relative popularity of the two fuels in other industries of the district.

TABLE II—INCREASE OR DECREASE IN AMOUNT OF COAL AND FUEL OIL CONSUMED BY PUBLIC UTILITY-POWER PLANTS

Year	Coal (Tons)	Oil (Bbls.)
ARKANSAS		
1921	+5,520	+71,539
1922	-34,229	+69,299
KANSAS		
1921	-189,879	+234,769
1922	-40,724	+303,113
MISSOURI		
1921	-97,532	-222,997
1922	+67,452	+293,895
OKLAHOMA		
1921	-32,043	+206,623
1922	- 8,853	-45,168

Research Fellows Study Dust Explosions, Heat Conductivity and Stray Current

A STUDY of the factors causing mine explosions will be made at Carnegie Institute of Technology. The study of mine-explosion causes will be divided into investigations of (a) modification of Stokes law for settling of coal-dust particles; (b) time-pressure relations in dust explosions; (c) conductivity and specific heat of coal; (d) static charges in coal mines; and (e) effect of electric field in propagation of explosions.

Six college graduates will be appointed to research fellowships to conduct the investigations in co-operation with the U. S. Bureau of Mines and an advisory board of Pittsburgh coal operators and mining engineers. September, 1923, will mark the beginning of the third consecutive year that the Department of Co-operative Mining Courses at Carnegie Tech. will devote to mine research.

Other subjects for investigations during the coming year will be geology, acid mine waters, coal mining, coal washing, utilization of coal, safety and efficiency, and coal storage. The results of the work will be published at the end of the ten months devoted to it.

Magnitude in Anthracite Mining Operations

FROM President Loree's remarks at the banquet in celebration of the centennial of the Delaware & Hudson Co. it may be possible to get some idea as to the large quantities of material used and of the magnitude of the work performed at anthracite collieries. As he well says:

"Some of the mechanical measurements are startling. This company elevates to the surface 14 tons of water for each ton of coal that is prepared and sent to market from its mines. The mine tracks, underground, in its collieries, have a combined length of 650 miles, or more than two-thirds the length of the great railway system that has been developed incident to the marketing of the coal. Each miner is a shipper, who must have several mine cars delivered one at a time during the day, and 20,000 of these cars have been loaded and unloaded in one working day.

"Anthracite is recovered from ten to twelve superimposed beds at a single operation, each bed extending over an area of from 8 to 10 square miles, making a total of from 80 to 120 square miles for one colliery operation. Owing to the greater depth of anthracite mines and the complicated and costly apparatus required in the preparation of hard coal, the present cost of a new operation capable of an annual output of 1,000,000 tons is about $8,500,000 for the anthracite region, whereas in the bituminous fields the average cost of a plant capable of similar output would be approximately $2,500,000."

Bituminous Movement to Tidewater in May Exceeds That of March and April

Soft coal moved through North Atlantic ports in May, according to the U. S. Geological Survey, totaled 3,731,000 net tons, as compared with 3,366,000 tons in April and 3,315,000 tons in March. Each of the ports shared in the increase. The total shipments and the quantity of coal exported in May were larger than at any time since the summer of 1921. Coastwise shipments to New England decreased.

TIDEWATER BITUMINOUS COAL SHIPMENTS FOR MAY, 1923
(Net Tons)

Destination	New York	Philadelphia	Baltimore	Hampton Roads	Charleston	Total
Coastwise to New England	182,000	115,000	114,000	718,000	.....	1,129,000
Exports	1,000	74,000	329,000	405,000	38,000	847,000
Bunker	250,000	45,000	65,000	182,000	5,000	547,000
Inside capes	.....	198,000	180,000	32,000	.....	410,000
Other tonnage	565,000	.....	9,000	219,000	5,000	798,000
Total	998,000	432,000	697,000	1,556,000	48,000	3,731,000

Retail Anthracite Sales in Massachusetts Fell Off 20 Per Cent in 1922-3

Distribution of domestic anthracite by the retail dealers of Massachusetts fell off 1,100 000 tons, or about 20 per cent, in the coal year 1922-1923 as compared with the previous coal year. The detailed figures, in net tons, including the monthly receipts shown below were compiled by the Massachusetts Special Commission on the Necessaries of life:

Stocks on hand April 1, 1922	726,611
Receipts, April, 1922	226,312
May	98,801
June	97,668
July	70,847
August	46,871
September	95,059
October	449,681
November	449,853
December	472,777
January, 1923	476,169
February	472,210
March	609,627
Available for distribution	4,292,486
Stocks on hand April 1, 1923	181,887
Distributed in year	4,110,599

Stocks in the dealers' yards on April 1, 1923, were considerably less than in previous years, as shown below:

Stocks on hand in dealers' yards, in net tons:

April 1, 1920	342,925
April 1, 1921	803,029
April 1, 1922	726,611
April 1, 1923	181,887

Receipts of anthracite through the New England rail gateways show 458 cars per day during April to the 23rd. The daily average receipts of anthracite in the 1921-1922 coal year through these gateways was 417 cars per day.

ALMOST ANY SYSTEM of government will work if the people will.—*Springfield State Register.*

West Virginia Mining Institute Discusses Mine Development, Fires and Housing

Many interesting papers were read at the twenty-seventh semi-annual meeting of the West Virginia Mining Institute held in Clarksburg on June 12, 13 and 14, over which Professor A. C. Callen, of Morgantown, head of the department of mining engineering of the West Virginia University, presided. Hugh G. Scott of the Smith Bros. Coal Co., of Clarksburg, delivered the address of welcome, response to which was made by J. B. Hanford, of Morgantown, president of the institute when first organized in Clarksburg about 15 years ago.

J. W. Knowlton, chief of the testing department of the West Virginia Coal & Coke Co., of Elkins, read the first paper entitled: "What the Future Holds for Coal." Mr. Knowlton in his address said that the difference between prosperity and business depression is only 10 to 20 per cent instead of 100 per cent as many were inclined to believe.

He expressed the opinion that there was no need for the opening of additional mines, stating that there were sufficient plants to meet the needs of the present and the immediate future. He said that was especially true in this age of the utilization of coal when central power plants and byproduct plants are employed to utilize fuel to its greatest extent. Mr. Knowlton thought that the principal problem to be solved in the future was that of transportation and that the main difficulty in obtaining our fuel supplies would lie not so much in the mining as in the moving of coal.

An interesting paper on "The Economic Life of a Coal Mine" was read by Frank Haas, consulting engineer of the Consolidation Coal Co. of Fairmont. His paper was of a technical nature and appears on another page in this issue of *Coal Age*.

In reading a paper on "Informing the Consumer as to the Hazard and Expense of Coal Production," Captain W. J. German, technical representative of E. I. du Pont de Nemours & Co., of Huntington, contended that the coal industry should let the general public know more of the various hazards and expenses entering into the costs of producing coal. Captain German illustrated what he meant by saying that he had had occasion to ascertain in Chicago not long ago just what the public knew about coal mining. The answers he had received disclosed the fact that people in general were under the impression that coal lies in thick deposits and that all the work to be done was to dig it and roll it into railroad cars.

Dr. C. L. Jones, of the Mellon Institute of Pittsburgh, talked of entirely new methods in fighting mine fires in a paper on "Fighting Mine Fires with Carbon Dioxide." He mentioned the fact that the coal in the Bitner mine of the H. C. Frick Coke Co., near Connellsville, Pa., had been burning fully two months before the fire was checked by resorting to the use of carbon dioxide. He also stated that those connected with the company have expressed the belief that the fire could not have been extinguished if carbon dioxide had not been utilized.

Dr. Jones described how stoppings were built and the entire area sealed. Then carbon dioxide was injected through boreholes through which water was forced to extinguish the flames. It was stated by Dr. Jones that 230,000 lb. or the equivalent of 4,600 tanks which hold 450 cu.ft. of carbon dioxide were used in the successful drive to extinguish the mine fire. He said that the success of the treatment at the fire described has been due to sealing off the area of fire; cooling the temperature of the area by means of water; the smothering effect of carbon dioxide and the fact that the gas to a certain extent prevents the inflow of outside air to the fire area during the period of contraction.

Other papers read at the meeting were "Housing the Coal Industry," by L. Brandt, of Pittsburgh; "The Low Temperature Distillation of Coal," by R. D. Lamie of the Huntington Coal Distillation Co., of Huntington; and "Where to Build Our Mining Towns," by Thomas F. Downing, Jr., general manager of the Lundale Coal Corporation, of Lundale, W. Va.

Production of Byproduct and Beehive Coke Continued to Gain in May

Output of byproduct coke in May, according to the U. S. Geological Survey, was 3,328,000 net tons, an increase of 122,000 tons, or 3.8 per cent, over the April output. This gain was partly due to the greater number of working days and partly to an increase in the average daily rate of production. The quantity of coke produced was 89.2 per cent of the capacity of plants in existence. The total count of plants is now 69, two formerly reported separately having been consolidated. Of these, 63 were active and 6 idle.

The production of beehive coke also increased in May. The output was 1,829,000 net tons, as compared with 1,776,000 tons in April. Thus the total output of all coke was 5,157,000 tons, of which byproduct coke constituted 64.5 per cent and beehive coke 35.5 per cent.

MONTHLY OUTPUT OF BYPRODUCT AND BEEHIVE COKE IN THE UNITED STATES(a)
(In net tons)

	Byproduct Coke	Beehive Coke	Total
1917 Monthly average	1,870,000	2,764,000	4,634,000
1918 Monthly average	2,166,000	2,540,000	4,706,000
1919 Monthly average	2,095,000	1,638,000	3,733,000
1920 Monthly average	2,565,000	1,748,000	4,313,000
1921 Monthly average	1,646,000	462,000	2,108,000
1922 Monthly average	2,374,000	669,000	3,043,000
March, 1923	3,256,000	1,749,000	5,005,000
April, 1923	3,206,000	1,776,000	4,982,000
May, 1923	3,328,000	1,829,000	5,157,000

(a) Excludes screenings and breeze.

Coal consumed in the manufacture of coke in May is estimated at 7,667,000 net tons, of which 4,782 tons was used in byproduct ovens and 2,885,000 tons in beehive ovens. The following table presents for comparison the average monthly consumption of coal for coke-making during the past six years.

ESTIMATED MONTHLY CONSUMPTION OF COAL FOR MANUFACTURE OF COKE a
(In net tons)

	Consumed in Byproduct Ovens	Consumed in Beehive Ovens	Total Coal Consumed
1917 Monthly average	2,625,000	4,354,000	6,979,000
1918 Monthly average	3,072,000	4,014,000	7,086,000
1919 Monthly average	2,988,000	2,478,000	5,466,000
1920 Monthly average	3,684,000	2,665,000	6,349,000
1921 Monthly average	2,401,000	706,000	3,107,000
1922 Monthly average	3,411,000	1,056,000	4,467,000
March, 1923	4,679,000	2,759,000	7,438,000
April, 1923	4,607,000	2,801,000	7,408,000
May, 1923	4,782,000	2,885,000	7,667,000

(a) Assuming a yield in merchantable coke of 69.6 per cent of the coal charged in byproduct ovens and of 63.4 per cent in beehive ovens.

Railroad Reports Show Amount of Coal Carried by Roads Last Year

The following statistics from annual reports of railroads give the coal and coke freight tonnages moved by the carriers during the calendar years 1921 and 1922. Originating tonnage as well as that received from connections are included in these totals, which are all in gross tons.

	Anthracite		Bituminous		Coke	
	1922	1921	1922	1921	1922	1921
N. Y., N. H. & H.	2,026,680	3,433,352	3,926,888	3,475,663	210,337	126,393
Long Island R. R.	1,358,558	1,754,093	350,790	285,625	22,436	13,941
Norfolk & Western	5,582	12,216	28,120,614	21,766,196	377,185	320,514
Delaware & Hudson	6,875,436	13,007,505	2,298,734	2,933,504	51,543	83,787
D. L. & W.	6,321,512	10,713,233	1,969,610	1,646,569	216,276	172,067
Pennsylvania	7,463,731	.....	76,977,309	.....	5,849,090	.....
Lehigh Valley	7,931,540	13,028,065	1,848,877	1,793,941	170,392	43,184
Virginian	15,903	13,225	6,558,854	5,691,790	26	313



Problems of Operating Men

Edited by James T. Beard



Disposal of Slate Refuse When Working Twin Coal Seams

Complete Extraction of Coal a Controlling Factor —Method of Working Adopted an Important Consideration — Advantage in Longwall Plan

IN TWO recent articles that appeared as Inquiries in that department of *Coal Age*, attention has been drawn to the economic disposal of slate refuse. The first of these inquiries appeared in the issue of April 12, p. 608, under the title "Gobbing Slate in Rooms in Mines." The second is found in the issue of May 10, p. 762, under the title "Working Coal Seams With Heavy Slate Parting."

In treating this question, due regard must be had to the efficiency of the operation; but probably the controlling factor is the complete extraction of the coal made possible by the method of working adopted. Assuming that the gob is thrown back into the waste, as the rooms are driven up in the first working, unless particular care is taken in the stowing of this refuse, it will often hinder the extraction of the pillars. If it becomes necessary to move a portion of the refuse, the extraction of the pillars will be made more difficult and much coal will then be lost.

It is this consideration that makes me say that the complete extraction of the coal may often prove the controlling factor in the matter of the disposal of the waste, especially where there is much of that material to handle, which is no doubt the case in the mining of twin seams of coal separated by 30 in. of slate parting, as stated in the second inquiry mentioned.

New Methods Needed to Eliminate Waste

Looking to the future of coal mining and the limitation of our natural resources, in this particular instance, operators view with increasing uneasiness the question of waste in the mining of the coal. While many are loath to leave the old-established methods of mining and adopt another plan than that with which they are acquainted, the fact is becoming more generally realized that other methods of working will often give increased efficiency and eliminate much waste of the coal.

This remark applies particularly to the hesitancy in abandoning the common room-and-pillar method of working and adopting in its place the longwall method.

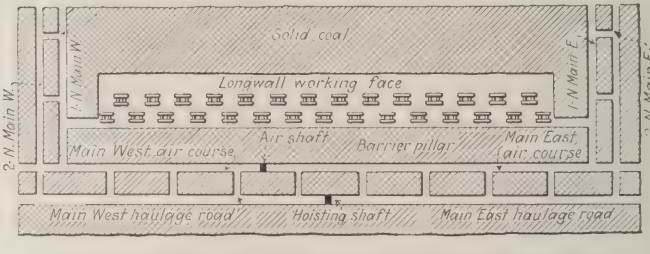
In that respect, let me suggest that the longwall method of working is far superior to the room-and-pillar method, in reference to securing the complete extraction of the coal where there is much refuse to handle, as appears to be the case in each of the inquiries here mentioned.

In regard to working the two seams of coal mentioned by the second inquirer, the seams having a thickness of 52 in. and 30 in., respectively, and being separated by 30 in. of slate parting, I have prepared and beg to submit a diagram giving an outline of the plan I would adopt.

The accompanying figure shows the main entries and air-course driven east and west from the hoisting shaft and the air shaft, respectively. On the right and left of these shafts, two pairs of cross-entries are driven, leaving a pillar of solid coal, 50 or 100 yd. in width, as may be desired or the conditions may permit.

Starting the Longwall Working Face

Both the main headings and the cross-entries are flanked with barrier pillars of sufficient thickness to protect them from squeeze or creep. The work of opening out a longwall face is now started by driving a cross-heading just behind the barrier pillar left for the protection of the main air-course. The inby rib of



PROPOSED PLAN OF LONGWALL PANEL WORKING

this cross-heading will then form the longwall face, the advancing method being employed in order to give earlier returns on the investment.

All entries should be driven just wide enough to hold up the slate or "middleman," as it is called, and prevent its falling on the roads. If possible, this width should be great enough to avoid the payment of yardage in driving these entries. My plan would be to use a 7-ft. machine for mining the coal, driving hardwood wedges under the coal, behind the cutting machine.

Supporting the Roof by "Chocks" or "Nogs"

For the protection of the men at the working face, I would build a line of "chocks" parallel to the face of the coal and at such a distance from it to permit the passing of the machine. As the work advanced, I would build a second row of chocks between the first row and the face of the coal. These chocks should be staggered in checkerboard form.

When the third cut has been made across the face, it would be time to withdraw the rear row of chocks; but this must not be done all at once. I would follow the plan of having enough material for building an extra chock at the face, before withdrawing the corresponding chock in the rear row. The chock then drawn should be used at the face and placed in position there, before withdrawing a second chock in the rear row. This plan should be followed the entire length of the longwall face.

These chocks or "nogs," as they are sometimes called, should be of hard wood, 8 in. square and 2 ft. 8 in. long, built up in log-cabin style. In order to make the task of withdrawing the chocks easier, the first course should be laid on from 3 to 6 in. of bug dust that can be easily picked out when removing the chock. The distance apart of setting the chocks, center to center, will depend on the conditions of roof and floor and will vary from 3 to 6 yd.

While this method may seem costly at first, it will generally prove a saving of time and money in the end. It also serves to make the men feel that they are safe, which is an important item in the successful operation of a mine, particularly when starting a new method of working unfamiliar to the men.

Longwall Affords Room for Stowing Waste

In closing, let me say that one of the chief advantages obtained in the adoption of the longwall method of mining is the opportunity afforded for the handling of the waste material, which is the chief concern of the inquirers to whom I have previously referred. All such waste material can be economically used in the building of good packwalls, which take the place of the timber required in the room-and-pillar system of working. With sufficient capital, it is a good plan to push the cross-headings to the boundary and open out the longwall face at that point and extract the coal on the retreating plan.

My experience has taught me that the longwall plan of mining coal, under conditions that favor the method, has the advantage of affording greater safety, efficiency and economy than the room-and-pillar method of working. If mine operators could only assume a perspective view, comparing these two methods of working, in mines that have been operated say ten years, under 500 ft. of cover and normal roof conditions, the result would convince them of the many advantages of the longwall method, which requires less timber, less deadwork, fewer mine fires and a lower cost of production, per ton of coal mined, than is possible by the other method.

Linton, Ind. W. H. Luxton.

Can Mine Explosions Be Prevented?

Why a mine becomes dangerous—Investigation of numerous explosions has always revealed some one's mistake—Need of closer supervision—Strict discipline insures safety in the mine.

THE records of the last few months have made the subject of coal-mine explosions one of deep interest. There is a reason for everything and explosions in mines are no exception to the general rule. A person loses his health because of continued disregard of the laws of hygiene. In the same way, a mine becomes dangerous because the management are disregardful of the laws of safety.

Indifference to the little bad practices of mine workers, or the known bad conditions of any portion of the workings in a mine, on the part of the management, breeds contempt for the finer points that make for safety in its operation. According to the laws of probability, disaster will take its toll sooner or later, depending on the extent to which the standards of safety are esteemed and supported by those who are in responsible charge of operations.

A little reflection impresses one that long time has been required to bring man to his present state of perfection and still the best of us are not exempt from mistakes. Experience proves that the man who has made no mistakes has never accomplished anything worth while.

The logical conclusion of these rambling thoughts is that the occurrence of mine explosions can only be hopefully prevented by more effectually striving for improvement in the management of our mines. Never was there greater need of the closer supervision of underground work than at present.

Reviewing the eleven mine disasters in which I have assisted in the work of rescue and recovery of the mines, I fail to find anything that is particularly mysterious regarding these calamities. In every instance, investigation has shown that some one, through ignorance or willful disregard of the requirements of safety, failed in the performance of his part in making the mine safe and the disaster followed as the result.

More than ever, I am impressed with the thought that our greatest need to prevent waste and destruction is supervision of the highest order. Let me say that an organization of this kind does not come about naturally; it is not self-creative, but must be developed gradually, by close and thoughtful study of all the conditions surrounding the work in and about the mine.

Little Regard for Possible Accident

There are many mines that are being operated with little thought of what tomorrow may bring forth. Any suggestion of disaster never enters the mind of the management. If approached on the subject, mine officials console themselves with the thought that they have been operating a long time, on the same scale as that which marks their present undertaking, and have been able to get by without serious accident. Such is their excuse for setting up no new standards, or putting in practice new rules and regulations in place of those at present in force.

Yes, they are aware that a neighboring mine blew up only a short time ago, but say, "We were not surprised for they were surely careless in their methods of operating." As a matter of fact, however, both operations are of the same class and reason suggests that it is only a matter of time when this self-satisfied operator will have a similar experience.

Allow me, here, to refer to another condition that prevails in many mines, but is seldom given much thought. Any one familiar with the inside workings and happenings, in coal mines today, knows that there are many near catastrophes, owing to a blownout shot here, a local explosion of gas there, or a runaway trip in another place. In all of these, it often so happens that conditions are not quite right to make a disaster. We all know, however, that it is good luck and not good management that is keeping many of us from entering the great beyond.

Again, many men working in the mines have a desire to gamble. They take chances and do things that may end in their destruction, simply because it is a little easier or will save a few moments of time. This statement does not apply alone to the ordinary workman, but includes mine officials responsible for the safety of the men in their charge. Nor is it hard to find an instance of this attitude on the part of mining men.

For example, it is well known that substantial concrete or masonry stoppings are absolutely necessary on main flats or entries, in order to insure a properly ventilated mine. In the end, the cost of such stoppings

is doubtless less than the usual makeshift, board stoppings that are so ineffectual in conducting the air forward to the working faces where it is needed. Notwithstanding, however, we find many poorly ventilated mines owing to such worthless stoppings.

Discipline Makes a Safe Mine

By way of illustration, allow me to cite an instance of an operation that was planned to make a safe mine from the first shovelful of dirt thrown out, and has been since and is now operated on the same safe practices. The management have always recognized that safe practices are profitable in every way. From the start, the planning of the mine was carefully executed and adhered to rigidly.

As so often happens, a change of foremen at that time did not mean a change in the plans. All stoppings were built of brick and when the last crosscut holed through, the one behind was closed at once. The foreman or assistant foreman who could not attend to matters of this kind was promptly given a job that better suited his ability.

Gas was reported on the record book and the foreman who countersigned the report made a special report to the management. Standing gas was nowhere allowed and things went bad with the assistant foreman when a fireboss would report "gas," in the same place twice in succession. The district mine inspector who visited this mine was the real thing—the kind worthy of the name of inspector. Several times I had the pleasure of going over the mine with him, and I fail to recall his ever missing a single working place.

In his inspection of pillars and falls, he always gave special attention to their condition. It was a sad day for the fireboss whose dates were not found at the top of all falls where they were required and showing that the places had been examined that day. Old workings were fenced off and signs posted as a warning to persons to keep out. Every detail of the state law was strictly enforced and no thought was ever given to slight any requirement of the law.

Some managers, I am aware, will argue that miners will not submit to any such rigid discipline. In the mine to which I have referred, however, it was found that the workmen accomplished more with less effort and were better satisfied under the strict discipline that prevailed. I want to say that if all mines could be handled and planned like this one, accidents would be few and disasters far between.

Pikeville, Ky. George Edwards.

Inquiries Of General Interest

Position of Water Gage When Taking Mine Readings

What Water Gage Reading Represents—Estimating Power on Air from Ventilating Pressure—Power on Air Determines Efficiency of Ventilation

IF IT is not asking too much we would appreciate seeing in *Coal Age* an explanation regarding the correct position of the water gage, as used in mining practice. My desire is to know where it should be placed, in order to give the best results and what the reading of the gage represents. Should the reading be taken in the fan drift, as some claim, or can it be taken at the mouth of the mine? This question is of much interest to us at the present time. Mine Manager.

Carlinville, Ill.

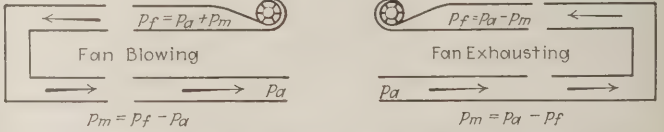
In replying to this question, the first point to make clear is the purpose of taking readings with the water gage and know what such reading represents. As has often been explained in these columns, a water-gage reading indicates the difference of pressure acting on the water in the two arms of the gage. In every circulation of air, there are always two pressures acting, the greater serving to produce and the lesser one to resist the movement of the air. The difference between these two pressures, as indicated by the water-gage reading, is the pressure producing the circulation.

Observe that when the fan is blowing air into the mine the greater pressure is that within the fan drift. This pressure is created by the action of the fan, but caused and measured by the resistance of the shafts and airways. The lesser pressure is that of the atmosphere at the discharge opening. The difference between these two pressures, or the pressure due to the fan less the atmospheric pressure, is the pressure producing the circulation against the resistance of the mine and the shafts. The reading of the water gage represents the unit of ventilating pressure, or the pressure in pounds per square foot, since each inch of water column corresponds to a pressure of 5.2 lb. per sq.ft.

Multiplying the gage reading, in inches, by 5.2 and that result again by the sectional area of the airway or fan drift, as the case may be, gives the total pressure producing the circulation. This total pressure is equal to the mine resistance and includes the shaft resistances if the reading is taken in the fan drift.

If, however, the reading is taken between the main intake and return airways, on the shaft bottom, the result represents the mine resistance only and does not include the shaft resistances, since the gage reading in that case is the difference between the intake and return pressures.

A water-gage reading taken at any point, in the mine, between an intake and return airway, represents



COMPARISON OF BLOWING AND EXHAUST METHODS

only the resistance of the airways inby from the point where the reading is taken. Thus, a reading taken at the mouth of a split or section of the mine represents only the resistance of that split or section.

On the other hand, it should be clear from the foregoing that when the fan is exhausting air from the mine, the greater pressure is that of the atmosphere acting at the intake opening of the mine or the downcast shaft, while the lesser pressure is that due to the action of the fan, decreased by the mine resistance or, in other words, the depression created by the fan

in the fan drift. In this case also, the difference of the two pressures, or the atmospheric pressure less the depression produced by the fan is the pressure producing the circulation, as indicated by the water-gage reading.

In mining practice, the purpose of taking the reading of the water gage is to ascertain the actual power on the air, which makes known the degree of efficiency of the ventilating fan, the efficiency being the ratio of the power on the air to the power applied to fan shaft. When the power applied is taken from the engine card, the result includes the combined efficiencies of the fan and engine. In order to eliminate the power absorbed in driving the engine, so as to obtain the efficiency of the fan alone, it is necessary to determine the brake horsepower of the engine and make allowance for it. The power on the air is found by multiplying the unit of ventilating pressure, which is 5.2 times the water-gage reading in inches, by the quantity of air in circulation (cu.ft. per min.), the result being the foot-pounds per minute, or the power on the air.

The accompanying diagram will assist in making clear the fact that, whether the fan is blowing or exhausting, the mine pressure including that of the shafts is always the difference between the terminal pressures, or the pressures due to the fan and the atmosphere, respectively. Also, when the fan is blowing air into the mine the greater pressure is that due to the fan; while exhausting air from the mine the greater pressure is that of the atmosphere.

Examination Questions Answered

Hoisting Engineers' Examination, Springfield, Ill., Mar. 19, 1923

(Selected Questions)

QUESTION—*What are the laws in reference to persons seeking certificates as hoisting engineers?*

ANSWER—The Illinois Mining Law (Sec. 2g) requires the applicant for a certificate of competency as hoisting engineer, to be a citizen of the United States, at least 21 years of age and to have had at least two years' experience as fireman or engineer of a hoisting plant. He must be of good repute and temperate habits and pass an examination regarding his experience in the handling of hoisting machinery and his practical and theoretical knowledge of the construction, cleaning and care of steam boilers; care and adjustment of hoisting engines; management of pumps, ropes and winding apparatus; besides proving his knowledge of the laws of Illinois relating to signals and the hoisting and lowering of men in mines.

The requirements of a permit to operate a second-motion engine, at mines employing more than ten men, are similar to the foregoing, but require only one year's experience. The application must be signed by three persons willing to testify to the good reputation and personal habits, knowledge and experience of the applicant. The permit applies only to the mine named in the certificate.

An applicant for a certificate of competency as electrical hoisting engineer must produce evidence similar to that required of a steam hoisting engineer, with the exception that the experience and knowledge of the applicant relates to the construction, care and adjustment of electrical hoisting engines, pumps, ropes and winding apparatus.

QUESTION—*What are the duties of the hoisting engineer?*

ANSWER—A hoisting engineer should be on hand a sufficient time before taking charge of his engine to enable him to examine carefully its condition and ascertain the need of oiling and adjusting any accessible parts and giving the same the needed attention. After assuming charge of his engine, the engineer must not leave his post until relieved by another engineer or other competent person. It is a hoisting engineer's duty to know and understand the system of signals in use at the mine and to answer promptly every signal given, never moving the cage except in response to a clearly understood signal. He must use every precaution to avoid accident, in the hoisting of men, taking care not to exceed the speed limit for such hoisting. An engineer must not rely on the accurate working of indicators to determine the position of the cage in the shaft or when hoisting a trip on a slope. He must watch the ropes, which should be so marked as to avoid the danger of overwinding when proper precaution is observed. An engineer must not converse with persons while he has charge of the engine, nor allow persons to loiter in the engine room to detract his attention from the safe operation of the engine.

QUESTION—*A pair of hoisting engines has cylinders 30 in. in diameter and a 60-in. stroke. If the steam pressure is 90 lb. per sq.in., how many revolutions per minute must these engines be making when generating 11,000 hp. per hour?*

ANSWER—It is wrong to speak of "horsepower per hour," estimating the power developed by an engine or pair of engines. The power developed is expressed in foot-pounds per minute, or foot-pounds per hour, but is continuous at that rate while the engine is in operation. In this case, the sectional area of a 30-in. cylinder is $0.7854 \times 30^2 = 706.86$ sq.in. Assuming a mean effective pressure of 90 lb. per sq.in., the power developed in a single cylinder, during one stroke of the engine (60 in. or 5 ft.) is $90 \times 706.86 \times 5 = 318{,}087$ lb. A pair of engines generating 11,000 hp. must develop in a single cylinder $(11{,}000 \times 33{,}000) \div 2 = 181{,}500{,}000$ ft.-lb. per min. Therefore, each cylinder of this engine must make $181{,}500{,}000 \div 318{,}087 = 570 +$ strokes per minute; or $570 \div 2 = 285$ r.p.m., assuming the given pressure is the mean effective pressure in the cylinder.

QUESTION—*Find the horsepower of an engine having two cylinders, 30 in. in diameter and a 5-ft. stroke, when making sixty strokes per minute, with an average steam cylinder pressure of 30 lb. per sq.in., and an average back pressure of 4 lb. per sq.in.*

ANSWER—In this case, the net mean effective or average cylinder pressure driving the engine is $30 - 4 = 26$ lb. per sq.in. The total force acting on the piston in a single cylinder is then $26(0.7854 \times 30^2) = 18{,}378.36$ lb. The engine making sixty strokes per minute, the piston speed is $5 \times 60 = 300$ ft. per min. At this speed, the power developed in the two cylinders is $2(18{,}378.36 \times 300) \div 33{,}000 = 83.538$ hp.



National Coal Association Plans Aggressive Program In Labor and Public Relations

Resolves in Convention to Follow Officers in Active Policy to Be Mapped Out by Committee—Salaried Head to Be Employed Soon—J. C. Brydon Chosen President

Unity and backbone are the two qualities for which the National Coal Association is now striving. At its sixth annual convention within earshot of the surf at Atlantic City, June 19-22, it made a strong effort to begin another year with a forceful policy to be carried out in a determined way under the direction of an unflinching new president John C. Brydon. Almost everything on the program sounded a warning against a continuance of the selfishness and backbiting between mining fields that has almost always marked operators' affairs. Speaker after speaker did this but to marshal the 400 men present into a solid phalanx ready to back President Brydon in a broad and active policy of relations with labor and the public.

The convention heard the stalwart declarations of both Alfred M. Ogle, retiring president, and Mr. Brydon that the association should hesitate no longer but should take an active hand in dealing with labor. It then elected Mr. Brydon and authorized him to appoint a policy committee of the directors to aid in carrying out whatever program shall become necessary. But many a member, voting with apparent firmness for more definite activities by his officers, went out of the convention wondering just exactly what those definite activities are to be. Mr. Brydon said he will select the policy committee within two weeks.

The convention authorized the directors to employ a full-time salaried president at the urgent suggestion of President Brydon, who, however, is expected to remain at the helm at least until the United States Coal Commission goes out of existence, Sept. 22. Mr. Brydon has had direct contact with the commission for months as chairman of the Bituminous Operators' Special Committee. No names of men fit to succeed Mr. Brydon were suggested but it is generally hoped that an untrammelled individual of highest standing and of deep influence can be found.

The nearest thing to a dispute on the convention floor occurred while a resolution was being adopted favoring the reporting of miners' earnings for 1920 to the Special Committee. Of course, there was opposition by men who pointed out the tremendous expense of furnishing that same data for 1921, but the resolution passed. The report of the Special Committee to the association was considered one of the most essential things on the convention program. A number of operators outside the association but who have contributed to the support of the committee's extensive and expensive work—notably a delegation from Illinois—were present but took no active part in convention events. The Illinois men heard the report, were informed as to the prospective activity of the association for the coming year and departed to think it over.

The treasurer's report showed the association to be in sound financial condition and with its normal expenses, other than those incurred in connection with the Special Committee's work, reduced. From January to June the grand total expenditures were $305,000 and receipts $376,000. Treasurer S. Pemberton Hutchinson's report showed a bank balance on June 16 of $104,000.

The new officers of the association are: President, John C. Brydon, Somerset, Pa.; Vice-Presidents, Ira Clemens, Pittsburg, Kan.; E. L. Douglass, Cincinnati; Michael Gallagher, Cleveland; Treasurer, S. Pemberton Hutchinson, Philadelphia; Executive Secretary, H. L. Gandy, Rapid City, S. D.

These directors at large were selected: Frank S. Love, of Pittsburgh, Pa.; Michael Gallagher, of Cleveland; J. B. Pauley, of Chicago (as a member from Indiana); S. Pemberton Hutchinson, of Philadelphia; and E. C. Mahan, of Knoxville. The directors at large were selected upon the recommendation of the nominations committee, which included in its membership Ira Clemens, W. M. Henderson, W. J. Sampson, E. L. Douglass, G. H. Caperton, Hugh Shirkie, T. W. Guthrie and S. L. Yerkes.

In his inaugural address Friday morning near the close of the convention Mr. Brydon minced no words. He is noted for not mincing words. After declaring that officers and directors would be expected to devote time and close attention to association affairs during the coming year he said there should be much closer contact between all fields and all groups because the National must be active, and every man in it must be alive to his responsibilities.

His three suggestions for an active program, were adopted on motion of Phil Penna, of Indiana, amended by T. W. Guthrie of the Hillman Coal & Coke Co. at the close of the address.

The first suggestion was that a policy committee be created to map out activities for the association as the need arises, that the publicity campaign be continued, that the association's bureau of coal economics be expanded so as to collect and complete masses of data on many subjects, and that a study be made to develop methods of getting the best out of employees at a fair daily wage.

His second proposal was that a "minute man" organization of operators be maintained all over the country, trained and ready at anytime to meet emergencies such



as the present situation involving relations with the U. S. Coal Commission.

The third main suggestion was that the presidency be made a full-time, salaried job. He thinks the president should be a broad-gage, capable man unhampered in his association work by any connection with divided or competing coal interests.

Mr. Brydon wound up by frankly speaking of evidences of selfishness and distrust among operator groups during the past year and said such feelings must be forgotten. His address, in more detail, appears in another column.

The convention offered an opportunity for much good fellowship, many plunges in the salt and invigorating waves and for some sober thought. At its close Mr. Ogle, the retiring president, remarked that probably the most valuable service it had performed was the awakening of the association to a willingness to face facts.

For the first time in the history of the National, an invocation was offered. The Rev. Dr. Elwood, of the Boardwalk Church, followed his prayer with a sparkling, forceful talk on the value of unity.

Harry L. Gandy, executive secretary, who succeeded J. D. A. Morrow last winter after Mr. Morrow had resigned, read an annual report summarizing much of the association's work, pointing out the need of better contact between the operators of various fields.

Then came Gray Silver, Washington representative of the American Farm Bureau Federation, advocating a panacea for all the transportation ills of the coal industry—a type of affliction which he thinks the most serious the industry has to face.

"Encourage hydro-electric development" said Mr. Silver in striking his keynote. "Use the country's coal to generate electricity. Transport current, not coal, and all the worries of car service and motive power and railroad congestion will end." Eight million farm homes are awaiting the time when cheap electricity will be available to them. The market for light and power is almost unlimited. The demand for coal to generate that current will be steady and tremendous. Your mines could produce more coal and sell it at a lower price. Your excess labor would have employment. Strikes would be fewer. There would be less chance for a continuance of misunderstanding between coal men and the public because you would be recognized as the men who help to reduce drudgery and increase happiness in homes."

Mr. Silver solemnly warned the coal men that the great and powerful farmer in this country has many troubles of his own and the coal men should take care not to add any more, lest the farmer be one of those to rise and force a remedy for the ills of the coal industry. He reminded them that the American government is a government of checks and that it is sure that if an evil that harasses the people is not corrected by those directly concerned, then the people will set up machinery to correct it themselves by government regulation.

"And it is only a step from regulation to nationalization," said he. Mr. Silver strongly urged mutual helpfulness between the coal industry and the farmers, who form, he said, the biggest single group of coal consumers.

What the Convention Did

(1) Elected J. C. Brydon, of Somerset, Pa., president.

(2) Created policy committee to lay out active program along any line that seems worth following. President Brydon to appoint members of this committee soon.

(3) Authorized officials to set up "minute-man" organization of operators all over the country to be ready for such emergencies as the one raised by U. S. Coal Commission.

(4) Authorized directors to employ full-time president on salary. Mr. Brydon to withdraw in his favor when he is chosen, possibly after U. S. Coal Commission dissolves.

(5) Heard bituminous operators' special committee's report.

(6) Resolved that earnings questionnaire for 1920 will be filled out similar to that for 1921, already supplied to Coal Commission.

(7) Heard much exhortation to unify and forget selfishness and mutual distrust.

(8) Plunged daily into Atlantic Ocean.

The National has learned some things about the art of publicity during the year, C. E. Bockus, chairman of the publicity committee, said in his report. It has learned that in order to get the attention of the people sensational things must be said. And so sensational things are being said through a publicity organization, with the result that information of many types about coal, all aimed to give the public a better understanding of the industry, is getting newspaper and magazine space never before available for the defense of coal. These sensationalisms are not untruths. They are merely facts dressed up in a style which "goes."

Mr. Bockus reported a vast distribution of material to high schools, colleges and centers of public opinion, aimed to combat the movement toward nationalization and government control. He reported that the association's weekly paper, *Coal Review*, is now practically on an earning basis.

The railroad relation committee got the convention to adopt its report opposing the Warfied car-pooling plan which provides for the pooling of railroad cars under Congressional authority. The report was read by C. H. Jenkins of Fairmont, W. Va., in the absence of E. C. Mahan, who is ill.

Vice-President Ira Clemens, of Pittsburg, Kan., took the chair at this juncture. A letter from Senator A. O. Stanley, of Kentucky, who was sorry he could not attend, was read. A cable message from J. G. Bradley, former president of the association, said: "Regret absence. Good luck."

Retiring President Ogle, in his address ending this official service, took no backward step. Instead of closing his year with a few generalities and pleasant words of thanks and commendation to his officers and the association, he declared once more his program laid down at the convention a year ago at Chicago. He wants the association to adopt

an active policy for labor and public relations, each mining district striving to handle its labor affairs in its own way and each advising and co-operating with every other district. He granted it might not be practicable for the machinery for such activity to be worked out in detail by the convention but the directors should be empowered to do it soon.

If a bureau had been at work in the spring of 1922 with wholehearted support from every operators' quarter, directing a definite program, the outcome of the strike might have been different, he declared. Unity would have saved the day. Since then the coal industry has become a political football because public and labor relations were hardly attempted. However, the brief effort at educating the public made during the strike was successful enough to prove that such work should be carried forward on a big scale.

But lack of contact between operator groups and individuals and the more serious fact that efforts of one group often were discredited by others, were criticised most severely by Mr. Ogle. However, he was not for bewailing spilled milk. He was for profiting by the lessons of the year. He was for the adoption of a method, which he did not describe, for handling the labor, which accounts for 68 per cent of the cost of coal and 98 per cent of coal's trouble. And he was for a concerted, level-best effort by operator's to prevent strikes before some outside force steps in and does some unintelligent thing.

"Protection against such difficulties as those of 1922 is demanded by an irritated public," said he. "How is this to be obtained? That, I believe, is for us to say. An opportunity far beyond anything the industry has ever had before has been put within our hands. The Coal Commission at Washington is today, we are convinced, completely anxious, in fairness and without favor, to help the industry work out its problem. It extends to the industry a helping hand.

"With all possible conviction I want to express the belief that the commission will find as a result of its studies that the surest means of serving the public will call for a minimum of legislation and a maximum of self-determination within the industry. That self-determination must, of course, to be acceptable be exercised with due regard to the interest of all parties concerned, namely the coal-mine owner, the coal-mine manager, the coal-mine worker and the coal consumer."

When Mr. Ogle had finished, the convention rose, en masse, and lustily applauded the retiring president.

The convention was remarkable in that there was no banquet. On Wednesday evening the association replaced that time-honored function with a program of vaudeville and boxing at an athletic club where Atlantic City's prize fighting is held. Both delegates and their ladies listened to the songs and skits and looked on while the meat-faced and "tin" eared athletes did their stuff in four eight-round bouts.

Thursday morning a letter from Dr. Charles W. Eliot, president emeritus of Harvard University and recognized as an authority on industrial economics, was read by Goldthwaite Dorr, of counsel for the Bituminous Operators' Special Committee. Dr. Eliot declared the need is great for order in all coal fields, for public protection against every form of monopoly, whether by labor or capital, for impartial arbitration and for incorporation of labor unions. The letter is printed on another page.

Recognizing Harry N. Taylor, former president of the association in the audience, Mr. Ogle called him to speak. After a few graceful words of appreciation Mr. Taylor declared it is pitiful for an industry to be in such condition that its product is consistently sold below the cost of production, as the product of the coal industry is sold today, according to official reports of the Department of Commerce. In more hearty co-operation, between operators lies the cure, he said.

The report of the Bituminous Operators' Special Committee was then heard. Mr. Brydon, chairman of the committee, read it to a convention of deeply interested delegates. The reading of the report was one of the outstanding events of the convention. Officially it was the report of the government relations committee of the association, but the activities of that large body were principally performed by the smaller Special Committee, which has been supplying the U. S. Coal Commission with the "broad essential facts" of the industry. The Special Committee is made up of Mr. Brydon, its chairman; Michael Gallagher, T. W. Guthrie, George B. Harrington, F. W. Lukins, R. H. Gross and E. L. Douglass.

The report traced events leading up to the Special Committee's creation and the resignations, for various reasons, of Harry N. Taylor, E. C. Mahan and J. G. Bradley. It recited the activities of counsel in developing facts, proving a case of labor monopoly against the United Mine Workers. In briefs on labor violence it was set forth to the Coal Commission that the unlawful acts of the United Mine Workers were directed not against operation but against the public and that they "afforded striking illustration of the un-American policy endorsed by the miners' union—that no member should be allowed to mine coal in the United States under peril of death." Four of these briefs were filed covering cases in Ohio, in the Consolidation Coal Co.'s properties in northeastern Kentucky, in Herrin and on the abuse of the check-off. Similar briefs on events in Indiana, Utah, Alabama, Colorado and West Virginia are to come.

Cost of living and community life studies have been made, the data to be used later. A brief on margins of profit, pointing out that no standardization of costs and profits is possible in such a competitive industry has been filed.

A special study of transportation is now in progress, local operators' associations have been encouraged to file briefs of their own cases. A large amount of both economic and statistical work has been done by staffs aiding counsel. The field work is about finished but many economic studies are now being made on: (1) Comparison of financial results of bituminous coal operation before 1916 and since; (2) effect of strikes on the price of coal; (3) effect of increasing labor costs on coal prices; (4) comparison of pay in coal and other industries; (5) profit sharing in England and English wage-regulating methods; (6) attempts that have been made to base wages on changes in the cost of living; (8) working rules imposed on men by United Mine Workers. A large legal, field, statistical and clerical force is used for all this work.

It is costing operators between $5,000,000 and $10,000,000 to answer the commission's questionnaire forms C-1 and L-1, the report estimates.

After speaking of the various questionnaires it had sent out the government relations committee remarked that lack of cohesion in the industry was a serious obstacle it had to meet. It urged "various interests of the bituminous coal industry to free their minds of suspicion each for the other and to meet each other in a spirit of friendliness, confidence and tolerance."

The committee said it at first refrained from public propaganda but after the miners had violated their promise not to propagandize, the committee was released by the Coal Commission to do likewise. So a department of public information was organized and is serving out coal publicity to all sorts of papers and magazines.

To pay the bills of all this activity an assessment of four mills per ton was levied against association members Oct. 11, 1922, for three months and repeated April 11, 1923. No further assessment is expected during the life of the Coal Commission, which ends Sept. 22, 1923.

Following this report a resolution of sorrow at the death of John J. Tierney was adopted.

Then Colonel Henry L. Stimson, of counsel for the Special Committee, spoke for 20 minutes, forcefully advising unity. He said the experience with the Coal Commission has taught operators the value of a united industry viewpoint and shown the necessity for constructive leadership in the industry. The wide divergence between union and non-union fields observed at first have turned out to be merely differences of detail, he said, advising that all the main differences be now wiped out so that the industry can correct its own ills rather than suffer the correction from without.

Three sorts of labor relations are now operative in the mines, he said. They are unionism, non-unionism and direct dealing of operator with his own men. The latter is not common, but its success, he declared, is marked. However,

no two of them should be abolished in favor of the third. That would mean industrial war. Tolerance of the other fellow's idea of proper relations is essential. Impartial arbitration is the best preventive of industrial warfare. That's the only way the people can learn the facts of a controversy. However, it is vital to operators that they unite, show their strength and stand on their legal rights, else they will have no legal rights.

Colonel Stimson warned that the troubles of the industry won't end Sept. 22, when the U. S. Coal Commission goes out of office, and operators should take a long look ahead.

A little verbal passage at arms accompanied by a faint odor of brimstone followed the appeal of Mr. Dorr, of counsel, that operators fill out from 1920 an earnings questionnaire similar to that filled out for 1921. But the decision was finally in favor of the members filling it out.

Mr. Dorr said the Coal Commission asked for 1921 earnings because that was the most recent full year previous to the strike. But being a year of depression, the figures are not showing the commission a true picture. Earnings per man are going to appear low.

Several men at once pointed out the tremendous trouble and cost of getting out such a report for 1920. Included was Charles F. Richardson, of western Kentucky. But the association leaders were for it. T. W. Guthrie pledged himself to do all in his power to get all the operators in his region of Somerset County, Pennsylvania, to supply the data. Tom W. Lewis argued for the 1920 figures. President-elect Brydon said 1920 data are essential in order that nothing may be left to commission conjecture. It was finally decided to send out a circular letter to get the 1920 information, with the hope that the response would be a lot better than the 30 per cent average response to previous questionnaires of the Special Committee.



JOHN C. BRYDON
Newly Elected President of the National Coal Association

Governor Morgan of West Virginia was invited to speak at the opening of the final day's session. He paid his respects to the many investigators who have misrepresented conditions in his state and hoped the U. S. Coal Commission would do something constructive.

A rising vote of thanks was given W. H. Cunningham and his committee on convention arrangements. The reluctant Walter was dragged into the spotlight by his loving friends, whereupon he delivered himself of the following lengthy oratorical gem: "Mister President, I'm a man of few words and not many of them. I thank you."

"A good speech," commented Ogle from the chair.

Bolshevism appeared as a real and immediate menace to America and to the coal industry during the next 45 minutes of the convention. Colonel Guy D. Goff, former general counsel to the Shipping Board and until recently assistant attorney general, made such an able case against "The Poison in a Democracy" that many a man present got a new vision of what is going on in the one-third of the world now under Red control and of the Red activities to gain the upper hand in this country.

Following Colonel Goff's address, which won an intent hearing and hearty applause, the new board of directors organized, President-elect Brydon made his address and the resolutions of the convention were adopted. Routine resolutions ratified the activities of the retiring officers, and directors, especially Retiring-President Ogle, expressed appreciation of the work done by the Bituminous Operators' Special Committee, did the usual courtesies to those who had to do with the convention, thanked the visiting speakers and changed the by-laws in a few unimportant details, one of which added an extra directorate to be filled when a paid, full-time president shall have been employed.

The final resolution provided that "the board of directors may provide for compensation to the president if the president devotes his full time to that office" and may elect from outside their number, a paid vice-president.

Directors elected by state groups and announced by the committee on nominations were as follows: Maryland, G. Marshall, Gillette; Pennsylvania, John C. Brydon and Edward Soppitt; West Virginia, C. H. Jenkins and C. C. Dickinson; northeastern Kentucky, E. L. Douglass; Missouri, F. W. Lukins; Tennessee and Georgia, L. C. Crewe; Utah and southern Wyoming, Moroni Heiner; Michigan, R. M. Randall; Ohio, S. H. Robbins, Tri-State Coal Stripping Association, W. J. Sampson.

The appointment of the following new members to the Bituminous Operators' Special Committee, which is co-operating with the U. S. Coal Commission in its investigation of the soft-coal industry, was announced on June 25, by Chairman John C. Brydon: A. M. Ogle, of Terre Haute, Ind., retiring president of the National Coal Association, and S. L. Yerkes, vice-president of the Grider Coal Sales Agency, of Birmingham, Ala., and director of the National Coal Association.

"Both Mr. Ogle and Mr. Yerkes have been invaluable in an advisory capacity since the formation of the special committee," Chairman Brydon declared. "I am gratified that circumstances have made it possible for Mr. Ogle and Mr. Yerkes to see their way clear to accept appointment to the two vacancies created some time ago and to become active special committee members. Their acceptance completes the membership of the committee, which is now composed of nine members who represent the bituminous industry well geographically.

"The work of the Special Committee is now approaching its most important period. The field work and the assembling of statistical data from the various fields within the thirty coal-producing states is virtually completed.

"It now remains to compile the facts and data which have been collected and to present them to the Coal Commission, working out from those facts suggestions and policies of how the bituminous industry can best serve the public and insure at all times a steady flow of good quality coal to the consumer at fair prices."

The complete membership of the Special Committee follows: John C. Brydon, chairman, of Somerset, Pa.; R. H. Gross, of Boston; E. L. Douglass, of Cincinnati; Michael Gallagher, of Cleveland; Tracy W. Guthrie, of Pittsburgh; George B. Harrington, of Chicago; F. W. Lukins, of Kansas City; A. M. Ogle, of Terre Haute; S. L. Yerkes, of Birmingham.

President Brydon Makes Three Proposals in Speech Of Acceptance to National Coal Association

The speech of acceptance of John C. Brydon after his election as president of the National Coal Association at the Atlantic City convention June 22, in which he proposed a policy committee to lay out an active program for the association, that a "minute-man" organization of operators be built up and that the association presiding be made a full-time salaried job, follows:

"For some months I have been serving you in the capacity of chairman of the Bituminous Operators' Special Committee. You have now elected me to the highest office within your power. In accepting that office I do so with profound appreciation of the confidence which you, by your votes, have expressed and also, I must add, with a very deep and definite realization of the responsibilities which you have placed upon me.

"The National Coal Association, created in order to unite the coal industry into a harmonious whole for helping our country win the war, is like our country in its form of organization. It is a federated body composed of distinct and separate members, each with its own local organization for dealing, in its own way, with its own local problems; but all joined together in the work of advancing the good of the entire industry.

"The history of the year just closed makes it clearly evident that our association must deal with national problems, and so, in certain broad and fundamental matters, must act for the great body of its members. No single group should, nor can, direct its policy. This policy must be national in its scope. Individual ideas regarding fundamental matters, when opposed to a majority idea in the interest of the general good, should be submerged. In matters which affect the industry as a whole, the minority should willingly subject themselves to the settled experience and convictions of the majority.

"In attempting to act for this majority, however, it is often difficult to determine what this majority's attitude is on a given question in time to take the right step at the most effective moment. The causes of this are two in number: (1) An insufficient acquaintance on the part of the national officers with the general thought of the industry, due, often, to their inability to enjoy proper frequent personal contact with the component parts of the organization; and (2) The general apathy and indifference of the various component and more or less scattered units, as to the problems of their neighbors and associates in the industry. Sometimes these local groups appear to take only a passing interest even in their own affairs.

Acceptance of Office Carries Responsibilities

"To accept an office in the national body, is to accept very genuine responsibilities. It demands from an official his most careful thought and consideration. This applies not only to the national president, vice-presidents, secretary and others in the national headquarters; it applies equally to every single director on the National Coal Association's board. Too often the duties of your directors are held lightly; too often your directors are absent from meetings. This should not and must not longer be allowed to continue.

"It is not only incumbent upon the directors to consider their responsibilities to their constituents; it is equally incumbent upon the membership of this association to see that they do. Furthermore, when the directors give their best it is up to the entire membership to assist them with its fullest co-operation. Unless we can have a board of directors who will at all times have the responsibilities of their office uppermost in their minds in the service of a body of members which is informed, alert and sympathetic, we cannot act properly on any matter of interest to the Association.

"Secretaries of local associations are oftentimes the only ones who have the time or opportunity to give their undivided thought and attention to the general conditions and needs of their districts. They are often the only contact point between one district and another. With these local secretaries the National officers should at all times aim to keep in close personal contact. In every possible way they should be helped to build up solid, substantial, successful organizations. Their interest should be ours; ours should be theirs. Hurt to one of us is harm to all.

"In order to promote this purpose more actively, it is proposed that frequent contacts be made not only with the secretaries but with the operators in the various districts by means of visits by the National officers to the local associations and by conferences of local secretaries and officials. In addition to such contacts in the field, the headquarters at Washington must at all times be kept available for the benefit and help of the local operators and secretaries. For that purpose there soon will be provided rooms in the National offices which will be considered the headquarters of any operators or secretaries who may be visiting the national capital. In these rooms will be found every possible facility for their work while in Washington. But, gentlemen, I submit that after this past year's experience, we ought to plan for still other ways to help each other and our industry.

Policy of "Encouragement" Lacking

"The third clause of the National Coal Association's certificate of incorporation says that the object of the organization is to 'the encouragement and fostering of the general welfare of the bituminous coal-mining industry of the United States.' But up to the present time the National Coal Association has had no positive, well-defined policy for carrying out this object. In spite of that, as we have seen, our organization has been officially recognized by government officials as the legitimate—and practically the sole—representative and spokesman for the entire bituminous-coal industry. The responsibility which this recognition represents came to us as the result of a great emergency in which both the country and the industry found themselves.

"Gentlemen, I submit to you that the meaning of all this is plain and unmistakable. It means that we must no longer allow our association to be the mere creature of such emergencies as may chance to come upon us. We must organize in advance of their arrival; we must try to *keep them from arriving!* It is no longer for us to choose whether we will speak authoritatively for our industry or not. Fate has made that decision for us. Fate, you might say, has forced us to comply without articles of incorporation! It has made us get under the responsibility which we then saw only dimly, but which we now see plainly.

"All this means that the time has now come when, as an "association for the encouragement and fostering of the general welfare of the bituminous coal-mining industry in the United States," we must outline a more definite, more positive, more aggressive policy of organization and action. I therefore recommend that there be added to the standing committees of the association a 'policy committee,' which shall proceed to consider and formulate the steps which should be taken. In the past the tendency of the coal operators has been to sit back and admire themselves for their probity and honesty of purpose, failing meanwhile to tell the public either what they were doing or why they were doing it.

"All of us now recognize the gratifying results recently obtained by the Bituminous Operators' Special Committee through their bureau of public information in the correction of such an unorganized and unsatisfactory situation. The public has long been misled, but it is now beginning to learn the truth. I submit that what this committee has started, the association, with the approval of its 'policy committee,' should perpetuate in the interest of our industry. We must stand ready and willing at all times to keep the public informed of the true situation in the field of bituminous coal.

We must organize to put ourselves regularly and continuously into closer contact with the public's interest and the public's mind. If we do this and if the 'policy committee' and the directors keep us doing new and worthwhile things for the improvement of our industry, every editor in the country will be glad to publish the facts. That is all we ask.

"Our bureau of coal economics has for some time been obtaining statistical information on certain subjects of decided value to the industry. The Bituminous Operators' Special Committee has learned in the course of its relations with the commission and the public that this statistical material has not covered enough of the facts to meet the needs which we now see are certain to arise. I believe that this bureau should become part of a larger department which would aim to have at all times on hand or easily available the full information, statistical or otherwise, relating to any specific matter likely to be of use either to our members or to the public's better understanding of the aim and the activities of those members.

"Such a department or bureau would help us all to do our work better. It would provide a central meeting point for discussing and exchanging experience and information concerning the biggest problems or the best practices throughout the length and breadth of the soft-coal fields of America. How can an operator get the best out of his mine, the best out of his machinery, the best out of his materials? For all such information our organization should, in ways to be recommended to the executive committee by the policy committee, make itself the clearing house—the point of central collection, digestion and dissemination. In my opinion also we should not fail to include in such information the study of the greatest problem of all—how to get the best out of our men, how to secure the utmost of an efficient, willing day's work in return for a proper day's wages. Recent experience has shown that the association may, with propriety—and, in fact, for the holding of the confidence of the public, *must*—arrange to give this matter of securing the best from our workers the thought and attention which represents the attitude of the industry as a whole.

"Only in these ways can we make sure that the association is properly fulfilling its obligations to the operators and the entire personnel of the industry and to the public. In connection with the last named I wish to make a proposal in line with the further extension of the kind of service which we have been able to perform for the government since our organization in 1917.

"It was my misfortune—or good fortune, as the case may be—to be a part of the U. S. Fuel Administration throughout all of its life and so to have a chance to observe its activities. It will be recalled by all of you that at first the practice was to exclude from this work all those who had at that time any connection whatever with the industry which they were asked to help direct. The disastrous results of this practice are inevitable; in this particular instance no semblance of order was brought about until the U. S. Fuel Administrator called to his aid the practical coal men of the country.

"Now, in view of this distressing experience, I wish to propose that this national body, here assembled, take occasion at this time to offer to the government the expert knowledge of its membership in the production and the distribution of soft coal. The acceptance of this offer would mean that, in co-operation with the proper governmental and transportation officials, we would work out in advance a nationwide plan which, in the event of any national emergency, would instantly place at the disposal of the government the nation's entire resources of soft coal, ready for efficient distribution and use.

"This plan of coal mobilization could be so comprehensive that it would apply not only to the central organization at government headquarters but even to the remotest coal-producing district in the whole United States. Its details should so definitely specify the personnel that the moment an emergency arose, every man would proceed instantly to his prearranged post, and at once begin to function for the protection of the nation's life.

"One more proposal and I am done. My experience as chairman of your Special Committee has taught me another basic fundamental truth which I want to lay before you for your most serious consideration. It is this. I believe that no man can serve this huge, vital and widely scattered industry in the capacity of its chief executive unless he is free to give it his entire attention—unless, he is a full-time man. There are many reasons for this. I will mention only one.

"Now that our association has come to represent the soft-coal industry throughout the nation, its chief executive cannot fulfill his obligations unless he thinks of the industry in terms of the whole industry, without prejudice for or against any group and regardless of his own individual interests. With our organization playing such a part in the life of the country it is manifestly unfair, either to the association or its chief, to place any man in this position of divided and competing interest.

"I recommend, therefore, to your most earnest thought and action a full-time man to be the executive head of this organization. I say to you further and in all sincerity and earnestness that in my opinion this selection should not be delayed. I shall willingly and gladly pass over to him all those responsibilities which you have thought proper to put upon me the moment such a man is found. I recommend that this convention here and now proceed to set in motion the machinery which will enable the directors to take the step I believe is proper and for the best interests of the association and the industry.

"In this as in all things, there must be confidence expressed by each of you for the other, and there must be a ready response of each for the good of all. Selfishness and distrust must be forgotten. Confidence and willingness to serve must take their place. Without this we cannot be of use to each other inside the industry, nor to our fellow citizens outside. With this we can hope to face the year ahead of us in full belief and confidence that our industry and our organization will meet and make the most of such great possibilities of nationwide service and nationwide recognition as we have never hitherto been bold enough to dream of."

Dr. Eliot Says Miners Union Should Incorporate If Peace Is to Be Had

Incorporation of unions, arbitration as a means of teaching coal facts to the public and the abolition of every form of monopoly either by labor or capital were advanced as necessary to peace in the coal industry by Dr. Charles W. Eliot, president emeritus of Harvard, in a letter written to the National Coal Association in convention June 19-22 in Atlantic City, N. J. Said he in his message:

"That part of the American people which thinks about the existing industrial warfare from the consumers' point of view and with a forward look to the general welfare is hoping that the U. S. Coal Commission will see its way to make recommendations on the following subjects:

"(1) The keeping of order in all the coal fields of the country, unionized, non-unionized, and those managed by direct negotiation between the employer and his employees, to the end that the country's supply of coal may be fully maintained, while indispensable improvements in industrial relations in the coal industry are being devised and brought into use.

"(2) The protection of the public against every form of monopoly in the coal industry, whether attempted by labor or by capital. The American people have already shown by their votes, their voluntary actions in emergencies, and through the press, that hereafter they will not have the supply of coal to the factories, households, and carriers of the country abridged, much less stopped, by any monopolistic control whatever. The reaction of the public all over the country to the police strike in Boston was instructive on this matter.

"(3) The high value toward the prevention and settlement of industrial disputes of face to face discussion between the parties before an impartial arbitrator whose decision is effectively published. It is not essential that the arbitrator should have power to enforce his decision on the disputants. It is enough that public opinion is informed through him about the nature of the dispute and the motives of the disputants. A striking illustration of the value of such published discussions occurred last year in Canada,

which has now enjoyed for many years its excellent Industrial Disputes Investigation Act. In that year not a single working hour was lost through industrial disputes of any of the railways or in any of the railway shops of the Dominion. In the same period strikes among railroad employees caused heavy loses to railroad labor and capital in the United States, caused many distresses and much loss of valuable time to the American public at large.

"(4) The incorporation of all unions which relate to the coal industry and the industries that distribute coal. In the public interest it is inexpedient that these secret societies, which collect large sums of money from their members, and use all their resources to support strikes however violent, should continue to be exempt from the usual legal processes to prevent violations of contract and enforce payment of damages. The steady resistance of all unions to incorporation should have revealed to the American public long ago the illegitimacy and dangers in a republic of their policies and aims. They possess great power, but claim exemption from responsibility for the use of that power.

"(5) The creation of industrial commissions for numerous districts or localities within which peculiar but recognizable local conditions exist, commissions with powers of public investigation and recommendation in industrial disputes. The idea of uniformity in wages, hours, conditions of work and mode of life among workmen in city and country, in cold climates and hot, in lowlands and highlands, in industries that must be continuous and in those that need not be, and in highly seasonable employments and those that are not, may fairly be said to be completely unreasonable. In practice it has proved to be pernicious. Hence the need of local or regional industrial commissions.

"(6) The inculcation among the classes or groups that carry on the industrial war of the doctrine that within the past 150 years science, art, popular education and politics have achieved so much progress as to make now possible the substitution of conference, discussion, conciliation and arbitration as means of securing human rights, for the former inevitable method as destroying property and killing or wounding adversaries.

"(7) The development of the partnership relation between the employer and his employees, as distinguished from the landlord and tenant or the master and servant relation. This partnership idea does not exclude from a mill, shop or factory methods which imply subordination, discipline, punctuality and systematic co-ordination. Far from it; but the discipline and co-ordination must be co-operative. It does exclude the sharing of losses as well as gains by all the industrial partners, because the 'hands' in most industries are not in position to meet losses of capital in the business from which they earn their livelihood. If thrifty, they are acquiring capital, but as yet have acquired but little.

"(8) The abandonment by all concerned of the policy of reducing individual, group or a community productivity as a means of promoting individual, group or community welfare and national prosperity. The success of democratic institutions depends, in the long run, on *every* citizen's doing *his* best for the common welfare. Slackers and malingerers belong in a society based on slavery, not in a society of freemen. The progress of democracy depends on the successful development in all sorts and conditions of men of personal initiative, interest in the work that yields the livelihood, joy in work loved and ambition to excel in it. Every successful industry is characterized by increased production, not by diminished. Every effective and happy human being yields a similar result."

Southwest Operators Recite Difficulties of Producing Coal in That Field

The Southwest Interstate Coal Operators' Association, representing the soft-coal industry in Missouri, Kansas, Arkansas and part of Oklahoma, reported to the U. S. Coal Commission on June 2, 1923, that oil is driving the production of their mines out of the market and the coal industry in this section is facing ruin. The mine workers are accused of interfering with operations, restricting output and otherwise making it impossible for the operators to compete with oil and with coal from other fields.

The report sets forth that "the policy and practices of the United Mine Workers of America have become insuperable obstacles to the efficient and regular production of coal in the Southwest. This policy has involved wholesale violations of contract, interference with the legitimate functions of management, maintenance of an exorbitantly high wage scale, resistance to the introduction of labor-saving machinery and safety devices, and the use of intimidation and violence to prevent any operator or worker from mining coal except under the domination of this labor monopoly."

The right to hire or discharge men, vested in the management, according to a contract with the union, has been consistently violated, according to the statement, which says:

"The utter inability of the operator, on account of interference by the United Mines Workers of America to exercise free and untrammeled management from the viewpoint of economy, good judgment, or scientific mining, has increased the cost of production at least 25 per cent in this territory."

The operators' report gave the following as some of the examples of this interference:

Refusal to allow miners to work at more than one job during an eight-hour day, thus requiring the employment of additional men to do work that could be done by one.

Dictation by union committees, which prevents miners obeying instructions of the mine foreman.

Passage of resolutions and arrogant rules by local unions, interfering with the right of management and the right to hire and discharge.

Strikes over petty disputes, which should have been settled by arbitration under the agreement, causing the shutdown of mines, and constant strikes over questions of time and pay which were provided for in the agreement.

Particular stress is laid by the operators on the hostility of the mine workers to the introduction of undercutting machines. The report further states that the rank and file of the United Mines Workers in the Southwest recognized the conditions facing the operators and are willing to give proper consideration to a readjustment in wage scales to meet these economic conditions "but are prohibited from doing so by the system of making and enforcing a national basic wage scale such as was negotiated in the last conference in New York by two and one-half states, under the name of a tri-state conference, representing a trifling per cent of the tonnage for the entire industry of the United States, and a tonnage which is not affected by oil and gas competition to any appreciable extent."

J. C. Brydon 33 Years in Coal Industry

John C. Brydon, newly elected president of the National Coal Association, was born in Bloomington, Garrett County, Md., in 1871, and began his business career in 1890, when he became mining engineer for the Davis Coal & Coke Co., one of the Davis and Elkins interests in West Virginia. He went up through the ranks to the position of general manager, which position he resigned in 1902. In that year he became general manager of the Somerset Coal Co., at Somerset, Pa., which was one of the first moves of the C. W. Watson interests into Pennsylvania representing a combination of a large number of individual operations in Somerset County, and which later became a part of the Consolidation Coal Co. Later he also took charge of the Maryland Division of what is now the Consolidation Coal Co. In 1906 he resigned to become president of the West Kentucky Coal Co., one of the subsidiaries of the North American Company, with headquarters in New York.

Resigning all salary connections with those interests, he went into business for himself in Somerset County, and organized the Quemahoning Creek Coal Co. and the Listie Coal Co. He is president of both of those companies, which operate four mines in two counties. He also is president of the Maryland Big Vein Coal Co., which he organized more recently. He is a stockholder in several West Virginia companies.

Letter by Wadleigh and Address by Parker Feature Coal Retailers' Convention at Scranton

Coal dealers from all over the country comprising the membership of the National Retail Coal Merchants' Association, gathered at Scranton on Monday, June 25, for a three-day session in their sixth annual convention. Association business and reports of committees occupied the morning sessions on Monday and Tuesday while Wednesday was devoted to a trip to the mines.

F. R. Wadleigh, Federal Fuel Distributor, who had been invited to speak before the convention, was unable to attend but wrote the following letter to Roderick Stevens, chairman of the Board, in which he explained to the retail coal dealers his purpose in making a study of community coal storage. The work was undertaken at the request of the Secretary of Commerce, Mr. Wadleigh says, "for the purpose of obtaining all facts and possibilities pertaining to the subject in general and to certain selected communities in particular.

"As there seems to have been considerable misunderstanding of the purpose in making this study, I desire to emphasize what I have previously endeavored to make clear by correspondence and conversation; namely, that the proposed study does not necessarily involve governmental ownership or operation, but is solely an effort to obtain all information bearing on the subject, together with its possibilities, so that we may know definitely whether it is worth developing, for the public benefit.

"In order to have the advice and co-operation of some of the leaders of the coal industry, I appointed an Advisory Committee of coal operators. The committee has had no meetings, the matter having been handled entirely by correspondence, as it was desired to take up, as little as possible, the time of the individual members.

"To make the necessary field investigations, I secured the services of E. A. Blake, until recently general superintendent, Eastern Division of the Norfolk & Western Ry. Co., Roanoke, Va., and of Geo. S. Pope, engineer in charge of the Government Fuel Yards, Washington, D. C. Mr. Blake is a railroad man of wide experience on coal-carrying railways and is thoroughly familiar with all problems of rail transportation of coal. Mr. Pope, in addition to being an engineer by training and experience, especially familiar with coal, has been in charge of the Government Fuel Yards at Washington since they were first put in operation.

"The places selected for a study of community coal storage were Chicago, Ill.; Detroit, Mich.; Buffalo, N. Y.; Minneapolis and St. Paul, Minn.; Worcester and Lowell, Mass.; Indianapolis, Ind., and Cleveland, Ohio.

"All of these cities were visited by Messrs. Pope and Blake and conditions at each carefully studied, with the assistance of local authorities, commercial and engineering bodies and the leading coal merchants. The field studies have now been completed and Messrs. Pope and Blake are preparing their final report, which will be sent to the advisory committee for their views and recommendations, after which the report will be placed at the disposal of the U. S. Coal Commission for use as a portion of their final report.

Discussing publicity and advertising for the coal industry, Mr. Wadleigh pointed out the prominence given to the coal question by the evidence of the past spring and winter, which, he said, "have advertised the industry to a much greater extent than had ever occurred before and have brought its problems actively before Congress and the public, no doubt to the ultimate good of the country and of the industry. One definite need of the industry in the past and today is a comprehensive scheme of co-operative publicity along lines that will increase the economical use of coal generally.

E. W. Parker, director of the Anthracite Bureau of Information, speaking on "Mining and Preparation of Anthracite" the second day of the convention, told the delegates that estimates of the life of the anthracite region at the present rate of production vary from 60 to 100 years.

"Two things are certain," he said. "One is that the peak of production has been reached, while the population of the anthracite-consuming territory is continuing to increase, which does not tend to lessen the demand. The other is that not many more years—a few decades at most—will elapse before the inevitable period of decline must begin. We are already face to face with the proposition that anthracite is becoming from year to year more and more a luxury fuel.

"There has never been a time in the history of the region," he added, "when more care and expense have been exercised in the preparation of anthracite than at the present time. I am speaking now of the responsible anthracite operators, not of the pirates who have seized upon the necessities of the public during the past winter to ship out as coal stuff shoveled into railroad cars from the old waste dumps. These sharks always get their money in advance for stuff that is absolutely worthless, or nearly so. A few years at the state rock pile is little enough for them, and I for one sincerely hope that they will be brought to book for the frauds they have practiced upon the dealers and the public."

Mr. Parker said that the members of the U. S. Coal Commission, during their recent visit to the anthracite region, were impressed with the fact that the engineering practice was all that could be desired and is far ahead of that in the bituminous fields. He said that Chairman Hammond is credited with the statement that anthracite is being produced as economically as efficient management and engineering practice can accomplish.

Labor cost rose from $1.60 per ton in 1913 to $4.05 in 1921. Engineers are busily at work devising means of burning bituminous coal without smoke for domestic use. Coke is becoming more and more of a menace to the anthracite trade, and the fuel-oil people are "as busy as dogs killing snakes" in their efforts to break into the domestic heating trade. He said it is a safe guess that the average net return for the anthracite sold in 1921 was not more than 35c. per ton, and as the average investment in an anthracite property at the present time represents about $8 to $8.50 per ton of annual output, this indicates an actual profit of barely 4 per cent on the investment. If production is to be restricted by the competition of other fuels, the cost must necessarily increase.

The news of the convention will be given in *Coal Age* next week.

Mine Workers Would Outlaw Members Who Join "Red" Organizations

The International executive board of the United Mine Workers of America, in session in the international headquarters of the organization at Indianapolis, June 21, issued instructions to all district officials to institute proceedings at once to place on trial any members who are affiliated with any of the movements seeking to undermine the strength of the union or affiliated with any of the "red" organizations.

The statement in which the instructions were embodied was issued after the board had considered a report presented by a subcommittee, which describes in detail the plans of the Nova Scotia district of the organization to affiliate with the Red International of Moscow, Russia.

It also denounces the "progressive international committee of the United Mine Workers of America," which is reported to be headed by Alexander Howat, a Kansan who has been attempting to overthrow the present régime in control of the United Mine Workers for years; William Z. Foster, Thomas Myerscough and Thomas Ray, all of the Pennsylavina district, as an organization which is attempting to gain control of the United Mine Workers' organization with the intention of overthrowing it.

Assigned-Car Practice Overthrown

The railroad practice of giving a preferential car supply to those mines which furnish railroad fuel was overthrown on June 27 by a formal opinion handed down by the Interstate Commerce Commission.

In summarizing this opinion the commission said: "The practice of the respondent in assigning private cars on systems or foreign-line cars for railroad fuel to bituminous-coal mines in excess of the ratable share contemporaneously distributed to bituminous-coal mines upon their lines which do not receive assigned cars is found for the future to be unjust and unreasonable and unduly and unreasonably prejudicial to mines not receiving assigned cars in favor of mines which are furnished such ars in excess of ratable proportions. Cars specially placed by order of the commission under provisions of paragraph 15 of Section 1 of the act may properly be treated as assigned cars and these need not be taken into account in determining the ratable distribution when order of placement so requires."

This constitutes an express victory for the National Coal Association, which took the lead in challenging this practice of the railroads. The association received important help from the United Mine Workers of America.

I. C. C. Bans Virginian Ry. Extension; Too Many Mines Now, It Holds

Because the Virginian Ry. has more coal mines on its roads than it can serve efficiently the Interstate Commerce Commission on June 25 refused that road permission to construct an extension of its lines in Wyoming County, West Virginia to serve mines being opened by the Pocahontas Fuel Co. This is considered to be the first decision of the commission under the new powers conferred by the Transportation Act to limit railroad extension for reasons other than financial.

The contention was made by the commission, it is said, that fewer mines would produce more coal, because rail equipment and facilities could be better concentrated. Another point was that during the last year there were twenty-eight weeks in which the Virginian Ry. was unable to supply more than 50 per cent of the cars needed by the mines in existence.

Work had already been started by the Virginian Ry. on the proposed branch, which was extended along the Guyandot River Valley.

No formal announcement was made by the commission besides the fact that the application had been denied, but it was indicated that the commission would, within a few days, make a full report, giving detailed reasons for its action.

The Pocahontas Fuel Co. has a 5,000-acre tract on the Guyandot River now developed by two mines on the south side. The extension asked for by the Virginian is less than half a mile in length, to cross the river and permit the opening of coal on the north side thus allowing the complete and proper development of the whole tract. There is nothing to prevent the coal company from doing at its own expense that which the Interstate Commerce Commission prohibits the railroad from doing.

President Says Coal Commission Will Bring New Understanding of Fuel Problem

President Harding told an audience at Cheyenne, Wyo., on June 25, on his trip across the country, that he is opposed to nationalizing the coal mines. "That," he declared, "would only be another step to the national paralysis which a sane America will everlastingly avoid."

Referring to the forthcoming report of the U. S. Coal Commission, the President said: "It is too early to say whether the commission will suggest plans of permanent cure which the Congress will adopt. I do know that it will bring us to a new understanding of a problem which must be solved. We shall have a publicity which will make greed impossible and point the way to solve a question which must be answered in behalf of a vital public interest.

"Meanwhile, we shall better guard against inconvenience and hardship if the consuming public will help as best it can, without expecting the government to assume all the responsibility.

"If the coal-consuming world would buy coal during the periods of scant consumption it would guard itself against price panics and dangerous shortages when consumption is at the peak. In the hope of lower prices, the buying is postponed and that very postponement is contributing to a decided price increase. There is need for some individual initiative and responsibility in preparing for the wintry days to come. There is a mistaken notion that somehow the government may wield a magic wand or strike with the iron hand, and produce cheap coal. It can do neither.

"Many mine operators, who were as much responsible for the strike as the workmen who struck, insisted that under law enforcement they could produce all the coal that was needed. The law enforcement was provided but no coal was produced."

Federal Trade Hearing on Charges Against Dock Association Drags Along

The hearing on the charges by the Federal Trade Commission against the Northwest Coal Dock Operators' Association is still under way in St. Paul. The evidence offered by the commission for the first week or more was largely documentary, consisting of letters and circulars issued by the dock association in the past, minutes and records, which are assumed by the prosecution to establish the charges made of price fixing, collusion, credit information, and steps toward monopolizing the coal business of the district.

Among the witnesses were: W. H. Groverman, for years secretary of the Northwest Coal Dock Operators' Association, who was asked to identify numerous letters and other documents; and a number of other well-known coal men.

Anthracite Miners Convene at Scranton to Prepare Wage Demands for Coming Year

Anthracite mine workers met at Scranton on Tuesday, June 26, to consider the demands they will present to the operators in the negotiations for a wage scale to replace the present one, which expires on Aug. 31 next.

Interest lies chiefly in whether the miners will renew their 1922 demands for a 20 per cent wage increase or will concentrate their effort on obtaining the check-off, which also was demanded last year. Some of the union leaders were of the opinion, it is reported, that most of the 1922 demands, none of which was obtained after a five months' strike, would be renewed. It is expected that negotiations will be opened by the miners with the operators immediately after July 4, when with the miners' demands and the report of the Coal Commission before them, progress can be made in reaching an agreement before the present one expires.

Change in Southwestern Rates Suspended

All new rate schedules filed with the Interstate Commerce Commission by Southwestern railroads previously ordered to become operative on June 30 revising freight charges in the lower Mississippi Valley and in the Southwest under decisions rendered in the Memphis-Southwestern investigation were suspended on June 22 by the Interstate Commerce Commission until Oct. 28 next.

Complaints by shippers, the commission said, have produced "sufficient showing to indicate that the suspended schedules produced increases in present rates not authorized or required by the decision." Further, the schedules contained a large number of errors and failed to conform to the commission's requirements.

The railroads concerned were instructed to confer with a shippers' committee on a second revision. General freight agents of Southwestern railroads were named on a committee to represent the carriers, and the commission asked for a report by July 20 on the possibility of reconciling differences. If the schedules can be corrected, the commission will vacate the suspension and allow new schedules to go into effect.

Harding and Daugherty Write to Coal Commission; Sequel to Capellini's Election Seen

By Paul Wooton
Washington Correspondent of *Coal Age*

Two letters of unusual importance were received by the U. S. Coal Commission last week. One was from President Harding urging the importance of an agreement being reached in the anthracite field. The other was from the Attorney General pointing out that it would be in violation our statutes if the alleged agreement exists whereby British coal diggers would not mine coal for shipment to the United States during a strike here and whereby the American union would conduct itself similarly during a strike in the British Isles.

It is apparent that the commission made no mistake in the appraisal of the value of the two propositions. The daily press attached great news value to the Attorney General's letter, but gave only incidental attention to the letter of President Harding. The President's letter undoubtedly was prompted by the election of Rinaldo Capellini to the presidency of District No. 1 of the United Mine Workers of America. This victory for the radicals among the workers in the anthracite region reaffirms the presence of a dangerous unrest among them, which had its first outbreak in the demand for nationalization. The fact that the radicals are in the saddle in District No. 1 increases greatly the difficulties which must be overcome before a settlement is reached. The President evidently caught the true significance of Mr. Capellini's election. The Coal Commission is even in a better position to know its important portent. That is why its members apparently attached so much importance to the letter from the White House and seemingly dismissed the letter from the Department of Justice with the statement that they have no information as to such a contract. Chairman Hammond stated positively that John L. Lewis on appearing before the commission, after his return from Europe, gave no intimation of having negotiated any such agreement.

A generally held opinion among coal specialists in Washington is that no such contract exists. The principal reason for believing that no such agreement was negotiated is the fact that Mr. Lewis is not in a position to control exports of coal. The coal which would move to England were the demand sufficient, is produced almost exclusively in non-union fields. The only way he could influence that movement would be to call a strike simultaneously with the British so that the non-union production would be required to meet the requirements of the domestic market, which naturally would have first call on this coal.

The report on Mr. Lewis' return that he had reached some such understanding with the British was not taken seriously by those really acquainted with the coal industry. Mr. Lewis has reached that degree of prominence that he cannot take a vacation without the comment on his visit being replete with speculation as to its purpose. If Judge Gary goes to Europe, articles are printed intimating that he is about to enter into some agreement with Mr. Stinnes or some other steel manufacturer with the idea of lessening competition. In similar fashion, when Mr. Lewis, another industrial magnate, goes abroad, there must be some sinister purpose. The real facts probably are that Mr. Lewis went to Europe on a much-deserved vacation. Naturally he saw the leaders of the British coal miners' organization. It would have been a discourtesy to them had he not done so. They may have talked a little shop, but the chances are that the matter of curtailing coal shipments during strikes was not even mentioned.

For these reasons the Coal Commission naturally may be expected to pay close attention to the imminent thing, referred to in the President's letter, and relegate for opportune consideration the rather fantastic suggestion of the Attorney General.

The importance of the report which the commission will make on anthracite has been increased many fold by the election of Mr. Capellini. When the situation was under the control of the conservative leaders, whose policies and attitude were well known from their long service, it was comparatively easy to forecast what might be expected. The general impression that there would be no strike this year in the anthracite region was based on the knowledge of the conservative policies of such men as Brennan and Kennedy. With the control wrested from their hands, there is doubt as to what the rabble in the union may demand.

Text of President Harding's Letter

The full text of the President's letter, which was addressed to Chairman Hammond, is as follows:

"In acknowledging your brief statement of the progress of the work of the Coal Commission, I wish to express again the high value I put upon the work you are doing. Though this is the season of the year when both temperature and vacation habits may tempt the average citizen to dismiss the subject of coal, the issue remains a serious one, and I therefore bespeak for the forthcoming report of your commission on the anthracite industry a most thoughtful reception. No solution of this vexing economic question can be found except as the general public thoroughly digests the facts you present and decides upon the proper action to take.

"I regret that those who serve the anthracite-consuming public as mine operators and mine workers have not already agreed upon the terms of a new contract, but with your report available on July 1 there should be no delay in reaching a speedy agreement. The public deserves prompt assurance that there will be no interruption after Aug. 31 in the flow of household coal from mine to market.

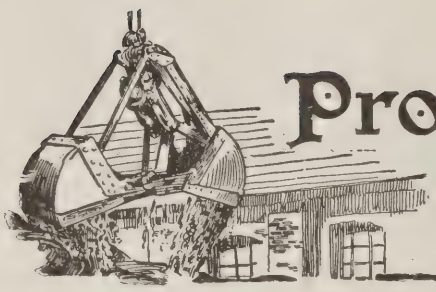
"As I believe your commission stated in an earlier report, industry and the home alike must be freed from the menace of constant interruption of their coal supply. To that end public opinion must be a well-informed public opinion, and I therefore trust that our citizens may keep up a lively interest in coal in season and out of season. The subject is a most interesting one, but it is much more; the issue is a vital one in that it affects the well-being of the whole nation, and not in a material way alone, for I know questions are before you that strike deep into the very heart of our American institutions."

The full text of Attorney General Daugherty's letter, also addressed to Mr. Hammond, is as follows:

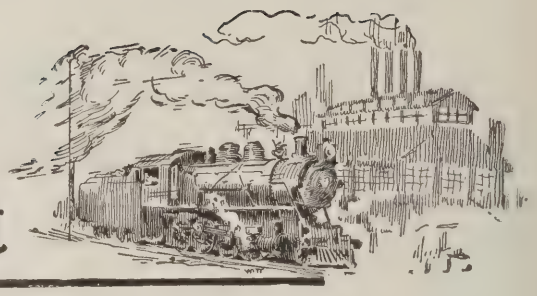
"My attention has been called by publication and otherwise to what is claimed to be a contract entered into or proposed to be entered into between certain officials of the United Mine Workers of America and others in this country with certain officials of a similar organization and others in foreign countries, represented to provide and to agree that in event a strike should be declared or in force in this country in the mining interest, no coal would be mined for shipment to this country by miners belonging to said organizations in such foreign countries during the period of a strike that might be in force in this country.

"I can hardly conceive that any person in this country would enter into such a contract, for I am satisfied that such a contract would be a violation of our laws. If coal were required for transportation purposes for use in interstate commerce in this country, any such interference with the supply of coal will be prevented by the Government of the United States promptly and forcefully.

"I shall be glad to be promptly advised as to the facts in possession of or obtainable by your commission in order that such action may be taken as is justifiable."



Production and the Market



Weekly Review

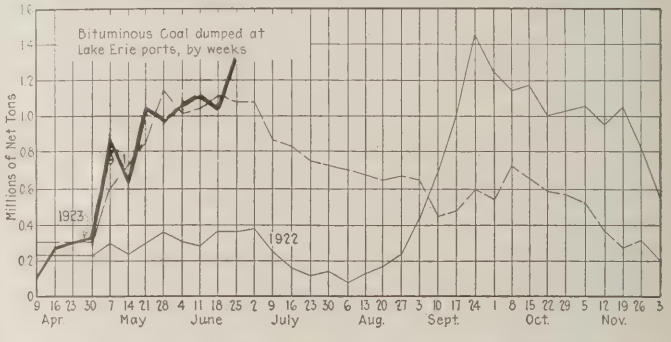
Signs are not lacking that the production of bituminous coal, which has been sustained at an average of 10,500,000 tons per week through the first half of the year, is due to fall off during July and August. Industrial revival is receiving a setback in the decreasing activity of the New England textile plants, where retrenchment in production of cotton goods has been going on quietly for the past two months. It is reported that the steel industry around Pittsburgh will suspend operations for the entire first week of July, ostensibly because of hot weather and Independence Day celebrations. In fact, however, buying of steel has not kept pace with production, and with decreasing orders on the books the steel industry is understood to welcome a week's vacation.

Production of bituminous coal at the rate of 546,000,000 tons per year is generally conceded to be well above consumption and it is well known in the trade that buyers have been taking in coal for storage in considerable quantities in the past two or three months. The movement to store coal is losing its impetus with hot weather and declining prices. Around St. Louis interest in piling up reserves has fallen off and at Chicago the large industries are now putting their money into low-priced "no-bills." In New England, buyers are cancelling orders placed last month. Buyers in this territory have been successful in beating the price down by playing Southern coals by water against Pennsylvania all-rail coal.

An ever-present prescription for active summer production—the Lake trade—also is due for an early slump. Accumulations at Lake Erie ports are now practically double normal, while the market for Eastern coals in the Northwest is being seriously challenged by all-rail coal from Illinois.

Coal Age Index of spot prices of bituminous coal at the mines for the second week in succession declined five points, standing now at 205, which corresponds to an average mine price of $2.48. The price will continue to fall so long as production is maintained at the present level, for there is not sufficient tonnage under contract to warrant operators throwing additional output on the market at prices that in a great many instances do not return cost of production. Shippers to New York Harbor have put on the brakes and accumulations at the piers are now sufficiently low to steady the price.

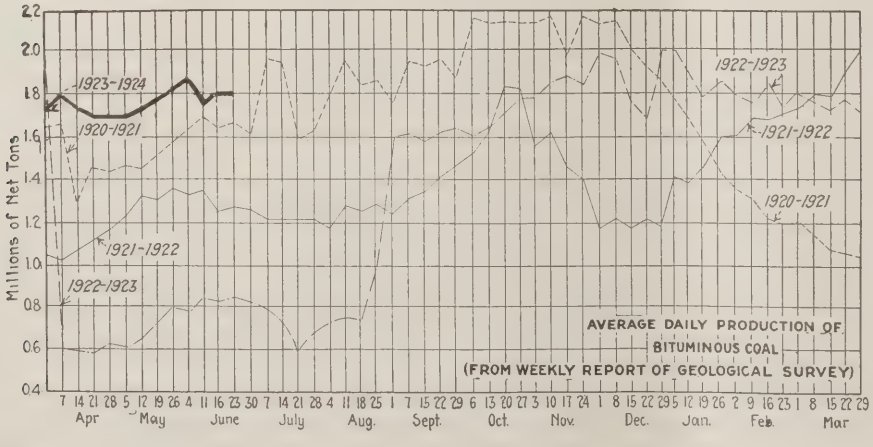
According to the Geological Survey the production of bituminous coal in the week ended June 16 was 10,775,000 net tons with approximately the same figure in the week ended June 23. The total for the six months ending with June will thus be approximately 273,000,000



net tons. Each week there is less complaint of car shortage and lack of demand has become the dominant factor limiting production, save in a strip of territory in the Appalachian fields from eastern Ohio south to Fairmont, southern West Virginia and through to eastern Kentucky and Tennessee, where the operators report demand for cars in excess of those furnished.

At Hampton Roads dumpings are steadily declining, both exports and New England shipments falling off. In consequence, the price of Pocahontas coal has been beaten down severely in the last few weeks.

Lake coal dumped in the week ended June 25 was the



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
June 2	4,616,000	10,091,000
June 9 (*b*)	5,136,000	10,676,000
June 16 (*a*)	5,013,000	10,775,000
Daily average	836,000	1,796,000
Calendar year	177,261,000	252,593,000
Daily av. cal. year	1,244,000	1,779,000
ANTHRACITE		
June 2	8,000	1,606,000
June 9	13,000	2,046,000
June 16	22,000	2,053,000
Calendar year	21,877,000	47,245,000
COKE		
June 9 (*b*)	99,000	406,000
June 16 (*a*)	106,000	390,000
Calendar year	2,993,000	9,241,000

(*a*) Subject to revision. (*b*) Revised from last report

highest recorded this year and very near the top record of any year. Cargo coal was 1,278,428 net tons and fuel coal 66,052, a total of 1,344,480, which brings the total for the season to date as over 9,253,000 tons.

The anthracite market is exceedingly active; production is at high level and distribution is keeping pace with production. Dealers are contending for coal on the one hand and competing for customers on the other.

The beehive coke market is easy because the merchant furnaces are uncertain about third- and particularly about fourth-quarter business. Both beehive and byproduct output, however, continue high.

Chicago Trading Is Stagnant

Coal continued to drag bottom in the Chicago market during the past week. Nothing was in demand except a fair volume of anthracite and smokeless for a slightly reviving domestic trade. Bituminous steam-coal consumers took what there was on the tracks at rock-bottom prices, thus relieving most mines of no-bills. However, buyers evidently consider this a market strictly belonging to them. Nobody is making any money on coal. The storage movement, which gained headway in this section only through the purchases of the Illinois Central, the Burlington and Big Four railroads and a few industrial plants, shows no sign of spreading. Northwest trade won by Illinois and Indiana shippers is proving a lifesaver for many a coal concern. However, dock operators are bidding strong to end the rail invasion of their old time territory.

Field reports from Illinois are that second-grade screenings in Williamson County have been selling down to $1.40 though that is far below the circular. But for that matter, independent operators have been undercutting the circular more than $1 on domestic sizes. Persistent reports of $3.75@$3.85 lump coal even from the association mines have spread over the Middle West. Independents sell nut and egg for $2.50@$3 and lump for $3@$3.25. But there isn't much business even at that price. Exceptional indeed is the mine that works over three days a week.

It's Warm in St. Louis

The warm wave which hit St. Louis during the week practically put an end to storage coal. It got the customer away from the thought of coal and it brought relief to the dealer because of the threat of a drivers' strike. Anthracite and smokeless for St. Louis have been practically shut

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

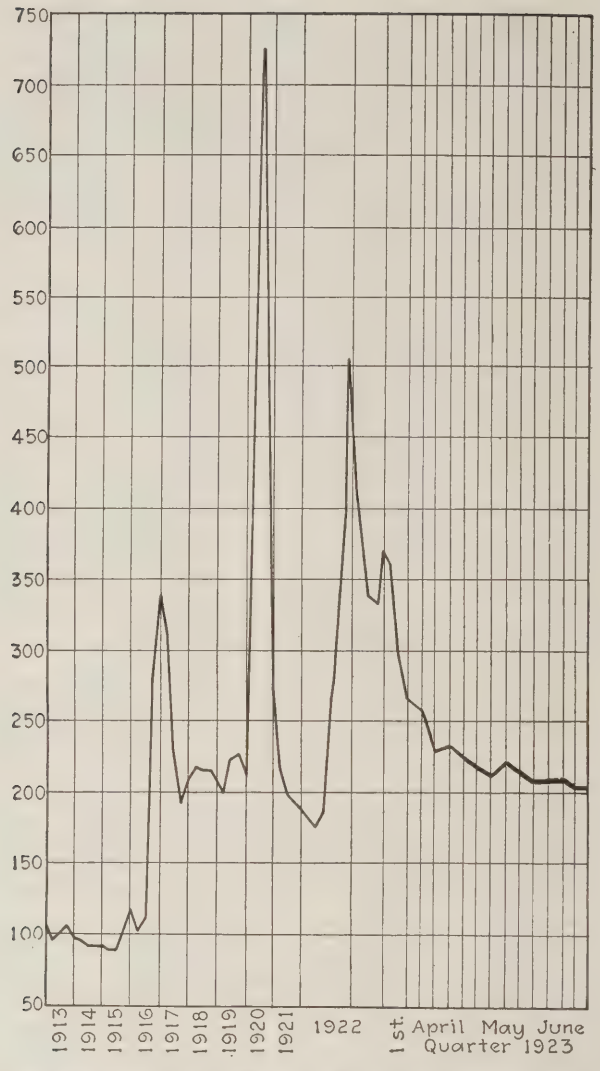
	Market Quoted	June 26 1922	June 11 1923	June 18 1923	June 25† 1923
Low-Volatile, Eastern					
Smokeless lump	Columbus	$3.65	$6.25	$6.25	$6.00@$6.25
Smokeless mine run	Columbus	3.45	4.25	3.90	*3.50@ 3.75*
Smokeless screenings	Columbus	3.35	3.60	3.60	3.50@ 3.75
Smokeless lump	Chicago	3.65	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	3.40	4.10	3.85	3.75@ 4.00
Smokeless lump	Cincinnati	3.65	6.25	6.35	*6.00*
Smokeless mine run	Cincinnati	3.45	4.10	4.25	*3.00@ 4.00*
Smokeless screenings	Cincinnati	3.15	4.00	4.10	*2.50@ 4.00*
*Smokeless mine run	Boston	6.10	6.10	5.85	*5.50@ 5.75*
Clearfield mine run	Boston	3.30	2.60	2.35	2.00@ 2.75
Cambria mine run	Boston	3.65	3.10	3.00	*2.50@ 3.25*
Somerset mine run	Boston	3.40	2.85	2.75	*2.25@ 3.00*
Pool 1 (Navy Standard)	New York	4.45	3.75	3.75	3.50@ 4.00
Pool 1 (Navy Standard)	Philadelphia	.....	3.70	3.65	3.35@ 4.00
Pool 1 (Navy Standard)	Baltimore	3.85	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	4.40	2.80	2.75	2.50@ 3.00
Pool 9 (Super. Low Vol.)	Philadelphia	4.30	2.80	2.75	**2.50@ 3.20**
Pool 9 (Super. Low Vol.)	Baltimore	3.75	2.75	2.80	*2.75*
Pool 10 (H.Gr.Low Vol.)	New York	3.95	2.50	2.35	**2.25@ 2.75**
Pool 10 (H.Gr.Low Vol.)	Philadelphia	4.00	2.25	2.20	**2.15@ 2.40**
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.75	2.25	2.45	*2.45*
Pool 11 (Low Vol.)	New York	3.75	2.00	2.00	*1.75@ 2.20*
Pool 11 (Low Vol.)	Philadelphia	3.75	1.90	1.90	1.70@ 2.10
Pool 11 (Low Vol.)	Baltimore	3.75	2.00	2.25	2.25
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.90	1.85	1.80	1.65@ 2.00
Pool 54-64 (Gas and St.)	Philadelphia	.....	2.10	1.80	*1.50@ 1.90*
Pool 54-64 (Gas and St.)	Baltimore	3.75	1.90	1.75	1.75
Pittsburgh sc'd gas	Pittsburgh	.....	2.85	2.80	2.75@ 2.90
Pittsburgh mine run (St.)	Pittsburgh	.....	2.20	2.05	2.00@ 2.10
Pittsburgh slack (Gas)	Pittsburgh	.....	1.55	1.50	1.50
Kanawha lump	Columbus	3.65	2.80	2.80	**2.75@ 3.25**
Kanawha mine run	Columbus	3.40	2.05	2.05	*1.75@ 2.00*
Kanawha screenings	Columbus	3.30	1.65	1.45	*1.25@ 1.50*
W. Va. lump	Cincinnati	3.50	3.25	3.60	*3.00@ 3.50*
W. Va. Gas mine run	Cincinnati	3.50	1.80	1.75	1.50@ 2.00
W. Va. Steam mine run	Cincinnati	3.40	1.80	1.75	1.50@ 2.00
W. Va. screenings	Cincinnati	3.15	1.35	1.25	*1.00@ 1.25*
Hocking lump	Columbus	3.65	2.60	2.75	2.50@ 3.00
Hocking mine run	Columbus	3.45	1.85	1.90	*1.75@ 2.00*
Hocking screenings	Columbus	3.45	1.35	1.20	*1.15@ 1.25*
Pitts. No. 8 lump	Cleveland	3.95	2.80	2.75	*2.15@ 3.25*
Pitts. No. 8 mine run	Cleveland	$3.90	$2.05	$1.90	*$1.85@$1.95*
Pitts. No. 8 screenings	Cleveland	3.90	1.40	1.20	**1.15@ 1.35**
Midwest					
Franklin, Ill. lump	Chicago	.....	4.05	4.05	3.75@ 4.35
Franklin, Ill. mine run	Chicago	.....	3.10	3.10	3.00@ 3.25
Franklin, Ill. screenings	Chicago	.....	1.80	1.80	1.75@ 1.85
Central, Ill. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.60	1.60	1.50@ 1.75
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	.....	1.80	1.80	1.75@ 1.85
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.55	1.55	1.50@ 1.65
Standard lump	St. Louis	.....	2.35	2.35	*2.25*
Standard mine run	St. Louis	.....	1.80	1.80	*1.75*
Standard screenings	St. Louis	.....	1.50	1.50	*1.30@ 1.40*
West Ky. lump	Louisville	4.10	2.30	2.25	2.15@ 2.35
West Ky. mine run	Louisville	4.10	1.75	1.75	1.65@ 1.85
West Ky. screenings	Louisville	4.10	1.35	1.35	*1.10@ 1.25*
West Ky. lump	Chicago	4.20	2.35	2.35	2.25@ 2.50
West Ky. mine run	Chicago	4.20	1.45	1.45	1.40@ 1.50
South and Southwest					
Big Seam lump	Birmingham	2.20	3.05	3.05	2.90@ 3.20
Big Seam mine run	Birmingham	1.95	2.05	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	1.85	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	3.65	3.25	3.25	3.00@ 3.50
S. E. Ky. mine run	Chicago	3.40	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Louisville	3.60	3.50	3.50	*3.25@ 3.50*
S. E. Ky. mine run	Louisville	3.40	2.25	2.10	2.00@ 2.25
S. E. Ky. screenings	Louisville	3.30	1.65	1.35	1.25@ 1.50
S. E. Ky. lump	Cincinnati	3.75	3.10	3.60	*3.00@ 3.50*
S. E. Ky. mine run	Cincinnati	3.35	1.65	1.75	*1.50@ 1.75*
S. E. Ky. screenings	Cincinnati	3.15	1.50	1.35	1.00@ 1.25
Kansas lump	Kansas City	5.00	4.00	4.00	3.50@ 4.50
Kansas mine run	Kansas City	4.25	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	3.05	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	June 18, 1923 Independent	June 18, 1923 Company	June 25, 1923† Independent	June 25, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.00@ 8.10	.....	7.00@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.50	8.00@ 8.35	$8.50@11.50	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@10.50	8.10@ 8.35	9.25@10.50	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	7.60@10.25	7.25@ 7.45	7.60@10.25	7.25@ 7.45
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.50	8.00@ 8.35	8.50@11.50	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@10.00	8.15@ 8.35	9.25@10.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	7.60@10.25	7.25@ 7.45	7.60@10.25	7.25@ 7.45
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@10.50	8.15@ 8.35	9.25@10.50	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	7.60@10.25	7.25@ 7.45	7.60@10.25	7.25@ 7.45
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.25@ 8.00	6.00@ 6.30	7.25@ 8.00	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.25	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	6.25@ 7.25	5.50@ 5.65	6.25@ 7.25	5.50@ 5.65
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 205, Week of June 25, 1923. Average spot price for same period, $2.49. This diagram shows the relative, not the actual prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

off with the claim that it must move eastward. Arkansas anthracite is hard to get on account of no market for the steam size. The coke situation eased up some and a little is available, but it is not being put in.

The coal that is moving best is Carterville, but not in any volume. The school coal is being put in and a little apartment house Standard, but Mt. Olive is not moving.

Kentucky Market Weaker

Further weakness was shown in some sizes over the past week, eastern Kentucky lump coal of the non-gas varieties slumping slightly, while screenings are a shade weaker. A fair movement is reported to the Lakes, which is causing weakness in screenings.

It is asserted that there is not much Lake business on the open market; it all being well pooled, or contracted with the big operators, while there is not much steel or big business reaching the open market. Byproduct buyers are not active.

General industrial business is being made up of numerous small orders, with a fair volume going to public utilities, which are meeting with a good current consumption. Railroads are giving Kentucky fields 95 to 100 per cent car supply.

Marked irregularity in the steam-coal market has taken place at the Head-of-the-Lakes and a drop of 50c. has come in all grades except screenings. The lack of demand has never been so noticeable at this time of year as it is at present, according to dock men, who report business at a virtual standstill. Strange as it may seem, in view of last year's suffering in hard coal, there is little demand for anthracite.

The Milwaukee market continues very quiet. Jobbers report absolutely no demand in the country. Prices on coal and coke are firmly maintained at the May schedule. Whatever cutting is being done in soft coal is kept well under cover. The inflow of coal by lake continues satisfactory.

At Minneapolis out of the scramble for business by all classes of all-rail and dock interests, there is developing a small amount of contract tonnage. This is proving somewhat surprising, for the rail trade has assumed that it had the dock trade beaten by better than $1 on steam coals.

Colorado Prices Stiffen

The price of bituminous coal was increased 25c. by all Colorado operators July 1. Lump coal from Walsen and Canon City is selling at $5.25 compared to the July price of $5.50. Nut coal is selling at 50c. less. No change has been noted in the price of mine run at $4 and slack at $2.50. Lump coal from Trinidad sells at $4.50 and nut at $4.25.

The cold snap of the past few days at Salt Lake City has made retailers busy filling small orders. Storage business has not increased. Production is increasing and the mines are working around three days a week.

At Kansas City with the prospect of another hike in the price of domestic grades of coal July 1, there still is no evidence of increased storage. A little threshing coal is moving more briskly as the harvest moves north. There is scarcely enough business to keep mines operating one day a week.

Slowness Pervades Ohio Markets

The trade at Columbus continues dull and quiet. Buying is at low ebb and large users, especially of steam coals, are content to buy in the open market. Lack of demand has caused many mines to close down. Railroads are good buyers. Contracting for large tonnages is not active and efforts to make renewals have not met with much success. The market at Cincinnati is slow. There is plenty of coal to be had but buyers are not in the buying mood. Demand for domestic 4-in. lump and block has fallen off. Quotations for West Virginia 2-in. lump on June 25 was $2.50@$3, as compared with $2.75@$3 the previous week, and for southeastern Kentucky 2-in. lump $2.50@$3, there being no change from the previous week's quotations. Demand for the steam coals in the Cleveland market has dwindled to a standstill. Operations at some of the mines has been curtailed because of the lack of orders, while others have been closed entirely. The retail trade is quiet. Production in the eastern Ohio No. 8 district for the week ended June 16 was 414,000 tons, a decrease of 9,000 tons from that of the preceding week.

The spot market at Pittsburgh is easy, with prices at about last April's level. While production is less than it was early in the month, it is still above that in the early part of the year, the increase being represented in the demand for lake trade.

Buying at Buffalo is slow. Consumers are in no hurry to buy.

Dullness Marks New England Market

The New England steam-coal market is settling down into old-fashioned midsummer dullness. Buyers are not interested, and in spite of declining prices there are few who will avail themselves of opportunities to stock coal for the fall and winter. Purchases made a month ago do not look so good, and in more cases than might be supposed there have been requests to suspend shipments, and even cancellations where buying had been more extended than justified by the current rate of consumption. A great many manufacturing plants are curtailing, and each day we hear new instances where textile mills have been obliged to shut down either for two or three days a week or for a period of two to three weeks together.

Pocahontas and New River grades are in ample supply at all points, with Hampton Roads prices softening almost from day to day; $5.75 per gross ton f.o.b. vessel is now an open figure for Navy Standard coals and several of the

agencies are making quiet canvasses to place output for the time being at a figure materially less. This condition naturally is being reflected at this end, where coal offered for inland delivery has now been sold well down to $7 per gross ton on cars Boston, Providence, or Portland.

Inquiry for the central Pennsylvania coals is correspondingly light. Strenuous efforts are being made to place current output, but even at well-shaded quotations there is little interest on the part of steam users. Enough tonnage was bought all-rail to show the Hampton Roads agencies that price returns are not wholly in their control.

The heavy volume of steam and gas coals that has been characteristic of the Philadelphia piers the past 60 days has now begun to decline. The pressure to get shipments forward has relaxed. There is something of a tonnage at the piers "on consignment" for which no disposition is at hand, and from rumors in the trade there are some bargains to be had in quality grades, both from Somerset and the Cambria districts.

New York Market in Better Shape

Decreased shipments to tidewater has placed the New York market in better shape. Receipts at the terminals have been reduced and there is less coal in boats. Local shippers do not look for a revival until about September. Little interest is being shown in the Philadelphia market and spot sales are limited. On the other hand, contracts are being kept in most instances. Unless custom is reversed shippers expect consumers, as in former years, to begin to lay in a little extra tonnage in July.

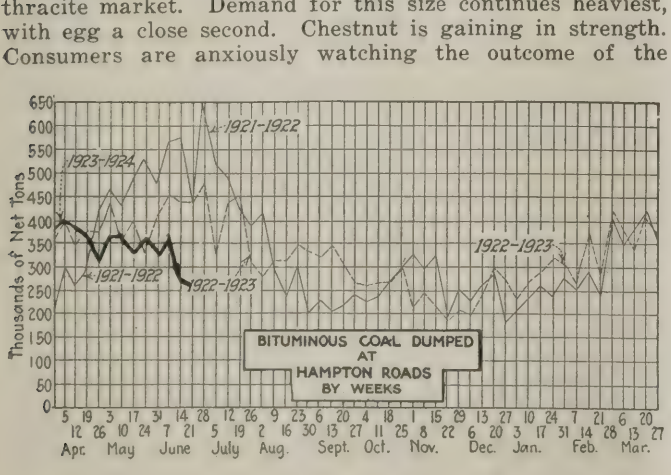
There is little activity in the soft-coal market at Baltimore, although for the first time in several years the bins of over one hundred school buildings have been filled and it is expected that fifty others will be filled by Aug. 1. Industrial-plant owners, however, seem to entertain no uneasiness as to their ability to get coal when needed.

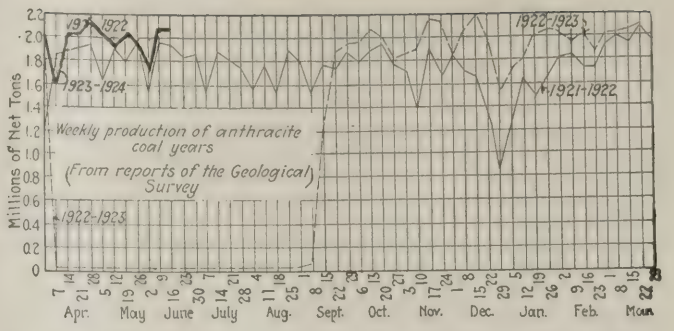
At Birmingham scarcely any new business is being taken on. Inquiry is limited and orders booked are small. Consumers are taking only enough coal for immediate requirements. Domestic business is good but operators are handicapped by the slowness of the steam-coal market.

There arrived at Duluth last week fifty-nine cargoes of coal of which five were anthracite. Only seventeen, however, are reported en route from the lower lakes, of which but two are anthracite. Stocks on the docks on June 15 were estimated at 2,100,000 tons of bituminous coal and 175,000 tons of hard coal. So far, cargo receipts at Milwaukee aggregate 239,819 tons of anthracite and 925,951 tons of soft coal, or about 44 per cent of the total amount received during the navigation season of 1922. Demand at Pittsburgh for lake coal has been poor due to the large quantities on docks and in transit. Shipments of anthracite from Buffalo for the week were reported at 93,500 tons, of which 38,600 tons went to Duluth and Superior, 19,600 tons to Chicago, 14,500 tons to Manitowoc, 11,000 tons to Milwaukee, 5,000 tons to Two Rivers, 3,000 tons to Sheboygan and 1,800 tons to Racine.

Lack of Stove Size in Anthracite Market

Lack of stove coal is the outstanding feature of the anthracite market. Demand for this size continues heaviest, with egg a close second. Chestnut is gaining in strength. Consumers are anxiously watching the outcome of the





miners' convention being held this week in Scranton. In New York and Philadelphia retail dealers are urging their customers to take in a small portion of buckwheat coal. Supplies are being received slowly at Baltimore.

"Anthracite production was well maintained during the second week of June," says the Geological survey report, "and again passed the 2,000,000-ton mark. The nine principal anthracite carriers reported loading 39,249 cars and with this as the basis the total output was estimated at 2,053,000 net tons. In addition to the tonnage shipped, this estimate includes an allowance for mine fuel, sales to the local trade, and the output from dredges and washeries.

"The cumulative production during 1923 to date, which stands at approximately 47,245,000 tons, compares favorably with the years of maximum production, and is considerably more than twice the output during the corresponding period of 1922."

Beehive Coke Output Drops 4 Per Cent

The Geological Survey in its report says: The production of beehive coke declined somewhat in the week ended June 16. Using as a basis the number of cars loaded, the total output is estimated at 390,000 net tons. Compared with the 406,000 tons produced in the week preceding, this was a decrease of nearly 4 per cent. The reduction occurred principally in Pennsylvania and Ohio.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to June 9, 1923 Inclusive	Week Ended June 9, 1923
U. S. Total	55.7	....	....	....
Somerset County	74.9	36.3	40.5	58.8
Panhandle, W. Va.	51.3	57.3	58.3	67.1
Westmoreland	58.8	65.8	59.4	80.3
Virginia	59.9	55.7	58.3	65.9
Harlan	54.8	22.1	22.4	36.4
Hazard	58.4	16.4	27.4	37.8
Pocahontas	60.0	36.6	40.2	47.3
Tug River	63.7	28.8	38.8	50.1
Logan	61.1	26.2	32.8	41.5
Cumberland-Piedmont	50.6	31.7	51.7	68.7
Winding Gulf	64.3	30.4	37.0	40.3
Kenova-Thacker	54.3	42.4	38.2	39.5
N. E. Kentucky	47.7	28.4	24.2	38.1
New River	37.9	31.6	38.4	46.1
Oklahoma	59.6	59.1	44.8	56.3
Iowa	78.4	75.9	70.0	64.8
Ohio, Eastern	46.6	40.8	42.3	69.8
Missouri	66.8	76.3	69.3	63.0
Illinois	54.5	49.9	42.2	30.2
Kansas	54.9	55.9	47.7	56.5
Indiana	53.8	37.7	46.7	40.3
Pittsburgh†	39.8	41.2	42.8	71.9
Central Pennsylvania	50.2	53.4	51.6	65.7
Fairmont	44.0	35.5	43.2	61.5
Western Kentucky	37.7	32.4	31.6	28.1
Pittsburgh*	31.9	56.1	66.2	82.6
Kanawha	13.0	15.6	25.2	36.1
Ohio, Southern	24.3	38.1	31.1	36.0

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars All Cars	Loaded Coal Cars
Week ended June 9, 1923	1,013,249	190,149
Previous week	932,041	171,248
Same week in 1922	836,208	94,673

	Surplus Cars All Cars	Coal Cars	Car Shortage	
June 7, 1923	41,106	3,528	12,978	8,926
Same date in 1922	284,189	180,831	....	....
May 31, 1923	32,443	3,953	16,277	11,392

Foreign Market And Export News

British Coal Production Declines Slightly; Welsh Situation Unsettled

Coal output of Great Britain's mines during the week ended June 9 was 5,654,000 tons, says a cable to *Coal Age*. This was 73,000 tons less than the previous week's production. Quotations for most grades for the week ended June 23 also show a decline from the previous week.

The general situation in Wales is somewhat unsettled. Prices are slightly lower and buying is of the hand-to-mouth variety. The three-shift working has come into operation at the Welsh docks, except Newport, where the decision to work extra time has been deferred temporarily. Inquiries from abroad continue to be substantial, particularly from France, Italy, Egypt, South America and the coaling depots.

The quiet tone of the north of England market continues, due to erratic exchange movements, congestion of European ports of discharge, and impending developments in the Ruhr.

Upon his return to London from the United States Sir David Llewellyn, a Welsh coal-mine operator, announced, according to a cablegram, that he had made contracts for shipping to the United States 1,000,000 tons of Welsh anthracite yearly for five years.

A cablegram from American Commercial Attaché Tower at London to F. R. Wadleigh, Federal Fuel Distributor, at Washington, dated June 20, states that the coal trade at Newcastle is reviving and that the Prime Minister had been requested to appoint a committee to investigate the coal industry. It was thought that this would satisfy the forces opposing the minimum wage bill and avoid a crisis if the bill fails to become law.

French Market Shows Little Change

Very little change is to be noted since last week in the situation of the French coal market. If anything, the industrial demand is slightly quieter than it was two or three months ago. However, mines of the Nord and Pas-de-Calais have booked for June nearly the same volume of orders as they had for May and none of them seems to have anything to dispose of for prompt delivery.

There is an extremely active demand for domestic coals, which is rather unusual at this time of the year. The strike of Belgian railwaymen—called off on June 1—which has indirectly caused some depletion of stocks of Belgian coals at Paris retail coal dealers, contributed, no doubt, to this activity.

An insufficiency of railway stock supplies is reported, as well as a rise from 20f. to 21f. 50c. in the canal freight rate on coal from Bethune to Paris.

Coals from the Saar field are coming in again on the French Eastern markets.

Prices and Dumpings Lower at Hampton Roads

Business at Hampton Roads reacted last week, to a seasonable dullness which was anticipated by shippers. The piers seemed likely to reach the low level in dumpings for the last twelve months, and gave indications that the month's movement would fall 500,000 tons below the corresponding period of last year.

Heavy movement of coal to the West by rail over the Norfolk & Western and Chesapeake & Ohio was held largely responsible for the slowing up of business, supplies on hand having dwindled to a low point. Prices were being forced steadily down, reaching the low level for the year.

The absence of contracts was one of the features of the market. Shippers did not expect any material revival of business for the next thirty days, but were prepared for the dullness which had set in.

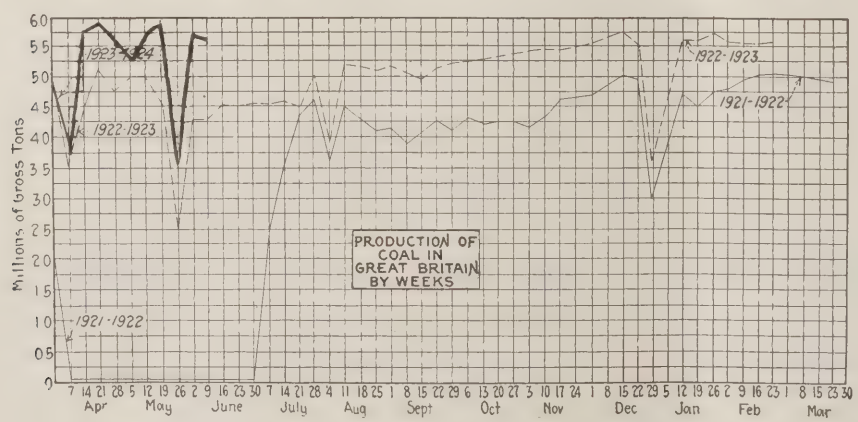
Germany Receives Heavy Coal Imports

During the first three months of 1923 there were imported into Germany 6,689,617 metric tons of coal and 115,675 tons of coke, as compared with 641,792 tons of coal and 3,235 tons of coke in 1922. Importations during the corresponding period of 1913 were 2,177,843 tons of coal and 139,996 tons of coke. Of the coal received in 1923 Great Britain furnished 2,382,687 tons, Polish Upper Silesia, 4,046,141 tons, Czechoslovakia, 119,290 ton and the Sarre district, 103,371 tons.

Since the Ruhr blockade Germany with regard to coal supply, has been divided, the occupied zones which are self supporting, and the interior which is strongly dependent upon imports.

It is estimated that the ordinary supply from the Ruhr to the interior of Germany was about 4,000,000 tons monthly, but the present situation has been relieved by business depression, running import contracts exceeding the demand.

Imports of coal by months so far this year have been: January, 1,870,127 tons, February, 1,421,832 tons and March 3,397,658 tons.



Export Clearances, Week Ended June 23, 1923

	Net Tons
FROM BALTIMORE	
For Algeria:	
Gk. SS. Ioleos	8,657
For Canada:	
Dan. SS. Berlin	3,173
For Chile:	
Br. SS. Beckenham	5,455
For Cuba:	
Am. SS. Mangore	5,591
For France:	
Fr. SS. Lorient	6,701
For Germany:	
Swed. SS. Kiruna	6,946
Jap. SS. Brazil Maru	8,700
For Italy:	
Ital. SS. Ignazio Florio	8,058
Ital. SS. Emanuel Accome	12,582
Ger. SS. Lancastrian	4,873
FROM HAMPTON ROADS	
For Brazil:	
Nor. SS. August, for Rio de Janeiro	7,492
For Cuba:	
Swed. SS. Graecia, for Havana	2,672
For West Indies:	
Nor. SS. Fram, for Barbados	4,052
Nor. SS. Thordis, for Martinique	4,000

Hampton Roads Pier Situation

N. & W. piers, Lamberts Ct.:	June 14	June 21
Cars on hand	998	1,132
Tons on hand	60,102	67,979
Tons dumped for week	88,685	70,795
Tonnage waiting	5,300	12,275
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,764	1,676
Tons on hand	100,020	93,570
Tons dumped for week	95,698	118,279
Tonnage waiting	14,888	19,981
C. & O. piers, Newport News:		
Cars on hand	1,357	2,465
Tons on hand	71,935	124,873
Tons dumped for week	68,033	47,587
Tonnage waiting	12,880	.....

Pier and Bunker Prices, Gross Tons

	June 16	June 23†
PIERS		
Pool 9, New York	$5.50@$6.00	**$5.60@$6.00**
Pool 10, New York	4.75@ 5.00	**4.75@ 5.25**
Pool 11, New York	4.00@ 4.75	*4.00@ 4.65*
Pool 9, Philadelphia	5.45@ 5.85	5.45@ 5.85
Pool 10, Philadelphia	4.55@ 5.25	**4.55@ 5.35**
Pool 11, Philadelphia	3.75@ 4.40	3.75@ 4.40
Pool 1, Hamp. Roads	5.75	*5.65*
Pools 5-6-7, Hamp. Rds	4.85	*4.75*
Pool 2, Hamp. Roads	5.65	*5.40*
BUNKERS		
Pool 9, New York	5.80@ 6.30	**5.90@ 6.30**
Pool 10, New York	5.05@ 5.30	**5.05@ 5.55**
Pool 11, New York	4.30@ 5.05	*4.30@ 4.95*
Pool 9, Philadelphia	5.85@ 6.05	5.85@ 6.05
Pool 10, Philadelphia	4.85@ 5.55	**4.85@ 5.60**
Pool 11, Philadelphia	4.00@ 4.75	4.00@ 4.75
Pool 1, Hamp. Roads	5.85	*5.75*
Pool 2, Hamp. Roads	5.65	*5.75*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	June 16	June 23†
Admiralty, large	32s.6d.	34s.@36s.
Steam smalls	26s.3d.	*25s.@26s.6d.*
Newcastle:		
Best steams	27s.@28s.	*26s.6d.*
Best gas	30s.@32s.6d.	*30s.*
Best bunkers	30s.@32s.	*26s.@30s.*

† Advances over previous week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade

ALABAMA

Extensive improvements and rehabilitation are in progress at the Townley operation of the Corona Coal Co. preparatory to reopening No. 1 mine, which has been idle for about two years. **The comany expects to begin producing coal again about July 1.**

COLORADO

The effort of Mary L. Milheim and other property owners to have the act creating the Moffat Tunnel Improvement District of Colorado declared unconstitutional failed when the U. S. Supreme Court, in an opinion read by Associate Justice Sanford, June 11, affirmed the action of the State Supreme Court of Colorado in ordering the suit dismissed. The tunnel was declared to be clearly in the public interest, although it might be, as the complainants had asserted, intended for the special benefit of the Denver & Salt Lake R.R., commonly known as "the Moffat road." The act created a special improvement district, with power to issue bonds of $6,720,000 to tunnel the Continental Divide near Denver, for a railroad and roadway. The Commissioners of the district were empowered to determine the benefits which would accrue to nearby property and to assess this property in proportion. They declared the benefits to be valued at 15 per cent of the assessed value of the property, whereupon a number of property owners joined in a suit to test the constitutionality of the act.

Railroad companies involved in the recent decision of the Colorado Public Utilities Commission lowering freight rates on coal in Colorado have appealed to the Interstate Commerce Commission, and a hearing was scheduled to be held in Omaha, Neb.

ILLINOIS

The Beatty mine at Mascoutah has been closed down for an indefinite period. Officials of the concern do not give the reasons of the shutdown.

The troubles of Mortimer B. Flynn, of Chicago, member of the firm of Pottinger, Flynn & Co., retailers, are many. He not only had trouble with the city of Chicago when a special grand jury investigated the charge that the firm had grossly overcharged the city for coal, but the Federal Government now seeks to prove that Mr. Flynn evaded income tax on an amount in excess of $400,000. Together with J. Roy Troutman, his auditor, who went to jail rather than turn over the books of the company to the grand jury last fall, he last week surrendered on a secret indictment charging conspiracy to defraud the Government.

Agents supposedly of the Great Northern Railroad have bought a tract of land near Herrin with the intention of opening a new strip mine. The land was purchased from C. C. Russel, of Herrin, and it is announced that the railroad company is now setting machinery and equipment in preparation for starting operations at once. The vein under the tract has an average thickness of seven feet.

The town of Nason, near the new mine of the Illinois Coal Co., was opened June 10 with a boom. Lots are being sold at $1,100 for business locations, while the resident lots are held at from $300 to $200. Many miners are said to be planning to move to the new town and erect houses.

Three judgments have been filed against the Star Coal & Mining Co. of Belleville. These are as follows: The Ottumwa Iron Works, $4,804.60; the First National Bank, Belleville, $1,606.25 and the First National Bank, Belleville, a second one for $6,330. Judge Crow decreed the foreclosure of two mortgages on the mine, allowed the claims of miners totaling $8,027, and also allowed various mechanics' liens. A mortgage is held by the Lake & Export Co., of Chicago, for $31,000 and another for $3,000 by the First National Bank of Belleville. Immediate sale of personal property belonging to the company has been ordered. The date for the public sale of the mine property has not yet been fixed.

An order to sell the assets of the Star Coal & Mining Co. of Freeburg, has been issued by Circuit Judge Crow of Belleville. B. S. Glenn was named as receiver. The order was issued to benefit two mortgages and claims of the miners employed at the mine. The mortgages total $35,000. The mine owned by the defunct company has not been operated for some time.

The office of the Monmouth Coal Co. at Brereton has been destroyed by fire. The loss was about $3,000.

Traveling Auditor A. T. Pace, of Herrin, has been notified of his **reappointment by the United Mine Workers of America** for a period of another two years.

INDIANA

Three suits were filed in Federal Court at Indianapolis, June 20, **against the United Mine Workers of America** for damages amounting to $10,000 each **for the death of three guards who were killed by rioters at Herrin,** Williamson County, Ill., about a year ago. The suits allege that mismanagement of the strike by the United Mine Workers and officials of the organization were responsible for the riots which resulted in the death of the guards. The suits were filed by relatives and estates of the dead men.

The Princeton Mining Co. has been incorporated at Princeton, Ind., with a capital stock of $200,000 to enter the operating field. The incorporators are J. G. Applegate, Floyd J. Biggs and Harlen L. Kays.

The Railroad Third Vein Coal Co. has been organized in Indianapolis for the purpose of prospecting in coal lands. The company has an initial stock of $20,000 and the organizers are Edwin J. Marott, L. H. Noble and J. E. Keller.

IOWA

The Board of Supervisors of Polk County, have brought **suit against the Bloomfield Coal & Mining Co. for $250,000. The coal company is accused of having mined coal under the buildings on the Polk County poor farm,** between Des Moines and Ankeny, and it is said that the buildings are settling. Cracking walls and unsteady foundations have caused serious damage to the county hospital buildings.

KANSAS

A report of 1922 tonnage in Kansas, made public June 11 by P. E. Keegan, statistical clerk in the office of the state mine inspector, shows that **the 1922 tonnage in Kansas was 510,381 less than in 1921.** The tonnage for 1922 was 3,518,243; that for 1921 was 4,028,624. To produce this tonnage last year, his report further shows, the mines of the state were worked an average of 139 days. The total number of employees of all kinds about the mines was 9,626. The report for 1921 showed that in that year 10,416 men were employed at the mines, who worked an average of 151 days.

KENTUCKY

The towboat Julius Felischman with a coal tow for the Falls Cities arrived at Louisville the last week in May from the Kanawha (W. Va.) fields, the tow going to several riverside companies in the district.

Willis M. Johnson, of the Emmett O'Neil Coal Co., reports that his company is installing a 45-ft. Barber Green coal conveyor in the local yard of the company. This company also is making coke at its yard, using the Bussey process.

The Louisville Gas & Electric Co., which operates a tipple mine at Echols, **has purchased additional property near its big generator plant on the river front at Louisville,** and has asked the city to close two small alleys which run through its property. The company is planning **to enlarge its coal-storage facilities** in Louisville so that it can store nine weeks' coal supply, instead of three weeks'. This property is below street level. This makes it possible to submerge the fuel supply in event of fire. A permit is to be requested for an overhead track across Third Street for the use of a locomotive crane. The new storage facilities will have a capacity of around 35,000 tons it is reported.

MASSACHUSETTS

The Island Creek Coal Co., Boston, which earned more than $26 a share on its outstanding common stock in 1922 as compared with about $20.50 in 1921, and nearly $69 a share on the preferred against about $55 in 1921, **will have disbursed $32 in cash dividends in the past eighteen months with a payment of the $2 regular dividend and $3 extra on the common on July 2.** The policy of the company of late is such as to indicate that it will distribute in dividends substantially its entire earnings. The preferred stock is $16, cumulative with par of $1, and the common, of which there is outstanding 118,802 shares, also has par of $1. At the annual meeting of stockholders on April 11 last it was voted to permit directors of the company to purchase outstanding preferred stock at not exceeding $105 a share for cancellation.

MINNESOTA

The franchise which was granted **for a central heating plant in Duluth was revoked** by negative action of the City Council May 21. The franchise provided that work must start in one year. When the time limit expired on May 20 the City Council declined to extend the time limit. The council's action was by a four to one vote. The heating plant would have cost in the neighborhood of $1,000,000 and would have served the central portion of the city.

T. F. Walker, for many years employed by the **C. Reiss Coal Co.,** at the company's dock at Ashland, Wis., **has been made manager to succeed Martin Schrank, resigned.** Mr. Schrank was manager of the docks at Ashland for 23 years. The announcement of the appointment was made by Peter Reiss, president.

A jury in the Marion Circuit Court at Minneapolis May 21 awarded to the Panhandle Coal Co. and the Linton-Summit Coal Co. **a judgment for $13,938.03 against the Indiana Railways & Light Co.** of Kokomo for coal bought by the latter concern under a contract made in 1920 when the federal government's rule of assigning privilege cars to the public utilities was in effect.

MISSOURI

The Powhatan Coal Co. is developing a new acreage near Huntsville in anticipation of a good fall demand.

The National Steel Rail Co. has moved to new offices, suite 1006-9 Planters Building, St. Louis.

NEW MEXICO

Under the terms of a deal just consummated **Charleston (W. Va.) capitalists have control of over 500,000 acres of coal and timber land in New Mexico,** the deal involving the sale of 116 000 acres of land of the Jemez Land Co. of Albuquerque to G. A. Porter and associates. The tract just acquired is 15 miles long and 12 miles wide, a large portion of the tract being heavily timbered. Others interested with Mr. Porter are W. M. Williamson, of the Citizens National Bank; W. A. MacCorkle, Citizens National Bank, Frank Porter; Isaac Loewenstein, president of the Charleston National Bank; G. H. Caperton, coal operator; Angus MacDonald, H. M. Bertolet of the New River and Pocahontas Consolidated Coal Co. and Sol May. It is understood that the vein of coal is 16 feet in thickness and of about the same quality as West Virginia coal.

NEW YORK

The Deepwater Coal & Iron Corp., New York City, has increased its capital stock from $12,000,000 to $30,000,000.

An offering of 160,000 shares of new common stock of Burns Brothers, which was authorized by stockholders at a special meeting held June 14, is expected to be made soon. Details of the offering, it is understood, are now being arranged. The stockholders approved an issue of 500,000 shares of new common stock. Part of this will be used to exchange for the stock now outstanding. Of the balance it was originally intended that only 25,000 shares would be sold, but this amount has been increased to 160,000 shares.

Osman E. Swartz, of Fairmont, W. Va., has been appointed to succeed the late Stuart W. Walker as **chief counsel for the Consolidation Coal Co.**, with headquarters in New York City. His appointment will become effective Aug. 1. For several years Mr. Swartz has been a member of the legal staff of the Monongahela West Penn Public Service Co. He was at one time a member of the law firm headed by John W. Davis, former Solicitor General of the United States.

C. L. Couch, Erie County Fuel Administrator during the emergency, reports to the state that he is well pleased with the co-operation received from the local men and press. He states that by the use of coke, soft coal and other substitutes the fuel office was able to keep the price of anthracite from advancing. Investigation was made of 4,500 alleged illegal deliveries and 339,895 tons of domestic sizes of anthracite were delivered, responding in all to 140,000 emergency orders and receiving as many as 4,250 applications in one day for coal. No real distress was experienced anywhere.

Dividends declared and awaiting payment, as reported currently in *The Annalist* include the following coal companies:

Company	Rate	Per	Payable	Books Close
Burns Bros. pf....	1¾	Q	July 2	June 26
Consol. Coal, St. Louis	1½	Q	July 1	June 20
American Co.....	1	Q	Aug. 1	July 11
Dominion Coal, pf..	1½	Q	Aug. 1	July 12
Island Creek Coal.	2	Q	July 2	June 22
Island Creek Coal.	3 ex.	Q	July 2	June 22
Island Creek Coal pf	1½	Q	July 2	June 22
Westmoreland Coal	1	Q	July 2	June 28

F. M. Feiker, formerly vice-president of the McGraw-Hill Company, Inc., and more recently on leave of absence as special agent to the Department of Commerce at Washington, will be associated after his return from Washington, **with the staff of the Society for Electrical Development**, 522 Fifth Avenue, New York City. As a result of the appointment of Mr. Feiker the various branches of the electrical industry served by the society will obtain the benefit of his broad experience and background, for he will be available to act as a special counsellor to engineers, manufacturers, central stations, jobbers, contractor-dealers and publishers, and his special training and wide knowledge in the engineering publishing and public relations fields of many industries qualify him eminently for such consulting work. Mr. Feiker will retain a consulting relation to the McGraw-Hill Company, Inc., and will continue in a similar capacity his relation to the problems of personnel and organization of the Department of Commerce at Washington.

OHIO

The Columbia Coal Corporation, of Philadelphia, Pa., has contracted with the Roberts & Schaefer Co. for Marcus screen and loading machinery for its new tipple at Salineville.

The Bitzel Coal Co., of Canton, chartered with a capital of $10,000 by E. M. Bitzel, Ben V. Marconi, Micheal Rinaldi, Nick Seavelli and Earl Kopf.

John A. Morris, district manager of the Car Service Division of the American Railway Association, **has come out with an urgent demand that pooling arrangements be entered into at the lakes** in order to remove the congestion that is cluttering the free movement of empty and loaded cars. June 9 Mr. Morris issued the following statement: "Lake boats require 5,000 to 10,000 tons of coal for a cargo and there are many shippers who have been sending as low as three or four cars to the lake ports where they are sidetracked and held for a further accumulation for the same consignee because, without a pooling arrangement, coal cannot be mixed in transport. Unless coal operators get together and reduce the number of consignees indications are that the free movement of lake coal will be held up all season. Already lines have been forced to use embargoes which will remain in force until the congestion is relieved."

PENNSYLVANIA

The Western Electric Co., Inc., supply department, Philadelphia, has moved the business formerly conducted at Eleventh and York Streets to its new building, 910 Cherry Street.

The Buck Coal & Supply Co., McKees, Rocks, has been incorporated. Its capital stock is given as $5,000 and Charles M. Ellis, McKees Rocks, is treasurer and one of the incorporators, the others being John B. Beck, New Castle, R. D. 2, and David Beck, Coraopolis, R. D. 1. The purpose of the company is mining, dredging for coal and other minerals.

J. C. H. Lubken, formerly general superintendent of the coal-mining operations of the Cambria Steel Co. at Johnstown, Slickville and Washington County, has opened offices in Johnstown, where he will practice consulting mining engineering, make appraisals and prepare engineer's reports on bituminous-coal properties.

Announcement was made on June 13 of the merger of the **Erie Coal Mining Co. and the Argentine Coal Mining Co.**, involving property valued at $1,500,000. The companies own five operating mines and a large acreage of coal land in the Butler district. Edward Sophitt, of Butler, and Charles Hosford, Jr., of Butler, have been named chairman and president, respectively.

The following **coal companies were incorporated** recently at the State Department, Harrisburg: **Navy Coal Co.**, Philadelphia, acquiring coal and coal lands and operating them; capital stock, $5,000; Harry E. Bird, 15th and Market Streets, Philadelphia, treasurer; incorporators, John Barnes, Haverford; Harry E. Bird and E. L. Clarke, Cheltenham. **The Pittston Coal Sales Co., Inc.**, buying and selling and dealing in coal, Pittston; incorporators, James F. O'Boyle, Charles M. O'Boyle and M. J. Mulhill, West Pittston. **Wills Coal Co.**, Uniontown, mining and preparing coal for the market; $50,000; Thorn J. McClernan, Uniontown; incorporators, Thorn J. McClernan, Harold W. Semans and W. Clark McClernan, Uniontown. **Suffolk Anthracite Collieries Co.**, Scranton, mining, buying, selling and dealing in coal; $10,000; incorporators, H. W. Reichards, Scranton, treasurer; J. E. Crass, Jr., and R. H. Meech, Scranton. **Calumet Coal Co.**, Pittsburgh, mining and preparing coal for the market; $5,000; incorporators, J. D. C. Miller, 213 North Elizabeth Street, Pittsburgh, treasurer; C. F. Keifer, Pittsburgh, and David E. Meigs, Swissvale.

Governor Pinchot has announced but one hearing on the bills he had left with him when the Legislature adjourned June 14. This will be held July 9 on the Davis-Fowler mine-cave commission measures.

Dan Rastelli, Washington County coal miner, on June 15 **was found guilty of murder in the first degree** in connection with the slaying of J. Ross Denny, mine paymaster, in a $20,000 hold-up in December. Orlando Fabbri and John Burchianti, two others tried with Rastelli, were acquitted.

The Blanchard Coal Co., operating mines at Spruce, Pa., and near Zanesville, Ohio, has inaugurated an airplane service between the Pittsburgh office and the mines for the purpose of preventing shutdowns through delays in obtaining machinery parts in case of breakdowns.

Somerset County authorities and state troopers are conducting a rigid investigation of a **mysterious dynamiting at Jerome** May 31, when a double frame dwelling house, owned by the Hillman Coal & Coke Co., was badly wrecked. Several occupants of the building, including an infant, were badly shaken up and suffered minor injuries. The report of the explosion was heard for miles and many windows were broken in other houses nearby. The dwelling was so badly damaged that it will be necessary to rebuild the entire structure.

The one-mile tunnel being driven from Catawissa Valley into Green Mountain, near Girard Manor, to drain the Green Mountain workings of the Lehigh & Wilkes-Barre Coal Co., is **expected to be completed** by the latter part of July or early in August. The water from the workings will flow into Catawissa Creek and it is expected this will make minable extensive veins of coal.

A verdict of not guilty was returned in court at Ebensburg, Cambria County in the case **against Owen J. Flanagan**, mine foreman, charged with involuntary manslaughter **in connection with the explosion in the Riley mine at Spangler** last November, when 77 men lost their lives. The case against Superintendent William Young was not prosecuted. Judge John E. Evans presided at the trial.

State charters were issued at Harrisburg recently to the following coal companies: **Allied Mining Companies**, mining coal and clay; Clearfield, capital, $50,000; treasurer, Nena Jones Mahaffey. Incorporators: D. W. Walker, Nena Jones and J. Karl Vinson, Mahaffey. **Standard Coal Corporation**, Canonsburg, $100,000; R. P. McClennan, Irwin. The company will engage in mining and preparing coal for the market. Incorporators: R. P. McClennan and Fred E. Silvues, Irwin and James C. Greer, McKeesport.

Carl Scholz, vice-president of the Raleigh-Wyoming Coal Co., of Charleston, W. Va., in an address before the Engineers' Club at Philadelphia on June 12 declared that complete unionization of every coal field in the United States as a solution of the whole coal problem for which the miners' officials still are clamoring would be a calamity. He prposed the following solution: "Eliminate the interruptions of production and transportation, and the coal business will take care of itself, as it did for so many years when it grew so steadily and tremendously and aided in making this country the largest producer, not only of coal, but of other commodities depending upon the utilization of coal; make the union where it continues its activities responsible for the action of its officers and members; give the men the right to work that has been granted them by the Constitution; let them think of their families and home affairs, rather than to be influenced by the stranger, who has other motives in his mind, and the vexing question will be settled."

Auditor General Samuel S. Lewis announced at Harrisburg June 20 that he **has started an examination of the books and operating officials of some of the anthracite companies in order to check up values of coal** as reported to him for tax purposes and to standardize the work of making reports under the law. There is a marked difference between values returned in the anthracite reports and the receipts shown in the capital stock tax reports, he said. The Auditor General said that if the representatives of his department now in the anthracite fields are denied access to the books and records or should essential information be withheld he will have subpoenas issued.

The Workmen's Compensation Board, which has been unable to function recently owing to the fact that Paul W. Houck, acting chairman, was the only member, **now consists of two members**, and Governor Pinchot in appointing the second announced that a third, who will be chairman, will soon be named. Benjamin Jarrett, of Farrell, recently tendered his resignation as a member of the board, effective as of July 1, but as his term expired with the end of the session of the State Senate, he automatically went out of office June 14, the date of the close of the Legislature. Harry A. Mackey, Philadelphia, chairman of the board for some years, resigned last January. Governor Pinchot this week named Commissinoer Houck and John L. Morrison, an editor of Greenville, as members of the board, their terms to run to the close of the next session of the Senate.

TENNESSEE

Resolutions calling upon officials of District No. 19 United Mine Workers to petition the International executive board of the union **to take necessary steps for the calling of a strike in all the non-union mines** of that district, were adopted June 1 at a meeting of union delegates in a conference held at Middlesboro.

TEXAS

The Standard Coal Co., of San Antonio, has filed an amendment to its charter decreasing the capital stock from $500,000 to $300,000.

The O. K. Lignite Co., of Garrison, has been organized to mine and market Texas lignite. The company owns considerable lignite lands near Garrison, in central Texas, and will develop this property. The company is capitalized at $60,000, and the incorporators are C. W. Osborne, Dr. R. B. Little and D. H. Roherer.

The Anderson County Coal Co., of Palestine, **has sold its holdings of Texas lignite land** in Anderson County **to the Ligol Chemical Co.**, of Houston. J. W. Crotty, of Houston, president of the chemical company, says his company will establish a large chemical plant in Anderson County and will extract chemicals from the output of the mines to be opened on the land his company has purchased.

WEST VIRGINIA

The Pond Creek Pocahontas Coal Co., in which those formerly owning the Pond Creek Coal Co., acquired by Henry Ford and his associates, are interested, has begun the active work of **developing about 3,000**

acres of coal land in McDowell County. The contract for sinking two shafts for the company has been awarded to Major Don H. Blanks, formerly of Fairmont, but now connected with a large contracting firm in Greensburg, Pa.

Organization of the **Crab Orchard Smokeless Coal Co.** presages development of additional coal territory in the Winding Gulf region on quite an extensive scale, since this company has an authorized capital stock of $200,000. Beckley, in the heart of the Gulf field, will be the headquarters for the new company, in which the following people are largely interested: L. C. Lilly, W. M. Hackworth, W. W. Hume, Ashton File, all of Beckley, and P. B. Rodgers, of Crab Orchard.

With the purchase of all the outstanding stock of the **Morgantown Coal Co.**, ranking as one of the oldest wholesale coal concerns in Morgantown, by M. L. Taylor and R. Hugh Jarvis, the company **has been reorganized** and will immediately re-enter the active competitive field, having ceased operations more than a year ago. In the reorganization Mr. Taylor has been elected president, Hugh Jarvis vice-president, and Harry C. Owens, secretary. Not only does the company plan to re-enter the whole coal trade, but it also proposes to operate mines.

In severing his connection with the Pond Creek Coal Company, which was recently bought by the Fordson Coal Co., **H. M. Ernst**, who has been for a number of years assistant general manager of the company, **has become identified with the Island Creek Pocahontas Coal Co.**, of which T. B. Davis, of New York, is president. Other officers in the company are J. D. Francis, of Huntington, vice-president; A. R. Beisel, of Logan, general manager. The Pond Creek Coal Co. formerly was owned by Mr. Davis and his associates, who operate the Island Creek Coal Co. in the Logan field. Mr. Ernst will have charge of the development of about 3,000 acres of coal land in McDowell County, near Coalwood. A contract has already been awarded for the sinking of two shafts.

An office has been opened by the Peoria Coal Co. in the Deveny Building at Fairmont, Charles McKivett having been appointed as local manager. Thomas Love and others are interested in the Peoria company.

The National Gas Coal Co., of Pittsburgh, Pa., has been authorized **to surrender its charter** and discontinue its corporate existence in West Virginia. **The Deep Hollow Coal Co.**, of Coalburg, has been authorized **to decrease its caiptal stock** from $50,000 to $10,000.

There has been organized under the laws of West Virginia **the Pawva Coal Co.**, which as its name implies will engage in the coal business in Pennsylvania and West Virginia. Headquarters of the new enterprise are at 712 First National Bank building, Pittsburgh, Pa. The company is capitalized at 1,000 shares without par value. Active in organizing this company were: Samuel A. Taylor, J. M. Taylor, George Paull, of Pittsburgh, Pa.; Charles F. Taylor and Denny I. Campfield, of Clarksburg.

Safety meetings were held at the southern West Virginia, Virginia and Kentucky **operations of the Consolidation Coal Co.** during the latter part of May. In all more than a thousand miners attended the meetings, which were held at Coalwood, Six and Coretta, W. Va.; at Alfredton and Coaldam, Va., and at Anchor and Warren, Ky. Joseph W. Reed, director, and Robert J. Lauder, assistant director of the safety department of the company conducted the meetings. Among the speakers were: R. M. Lambie, chief of the West Virginia Department of Mines; Franklin K. Day, general manager of the Pocahontas-New River Division of the company; R. F. Cole, assistant general superintendent, and Mr. Brandt, general outside foreman, all of Coalwood.

Men prominent in operating circles in Winding Gulf territory have organized a coal-mining supply company with a view to engaging in business on a large scale. The new company is capitalized at $300,000. The principal office will be at Beckley, in the heart of the Winding Gulf field. Among those identified with the new concern are: Ernest Chilson, an official of the Raleigh Coal & Coke Co., of Raleigh; Thomas H. Wickham, Winding Gulf operator; Joseph A. Groft, Daniel Boone and Ashton File, of Beckley. The new concern will be known as the Daniel Boone Mining Machine Co.

UTAH

The Utah Fuel Co. has been allowed $299,755 with interest for nearly five years by the I. C. C. in connection with its claim of excessive **charges against the railroads during the Federal administration.** The overcharges cover a period from June 25 to Nov. 19, 1918, and involved 7,123 cars of slack switched at the company's property at Sunnyside. It was ruled that a charge of $2.50 per car would have been reasonable, whereas $6.69 was actually made.

WISCONSIN

The Consolidation Coal Co., which has heretofore carried on its operations in the Milwaukee field through the Milwaukee-Western Fuel Co., **has opened an office at 843 South Canal St., Milwaukee.**

WASHINGTON, D. C.

The Midland Coal Co. lost its claim for $20,395 by the termination of a government contract on which it was to furnish coal to Camp Funston three years ago. The company claimed this amount on 20,000 tons of coal which the government did not take as the camp was abandoned and the Controller General of the Treasury Department ruled that the government had a right to cancel the contract and disallowed the claim.

CANADA

Drilling operations in the Chelmsford Basin, a short distance northwest of Sudbury, Ont., have **revealed the presence of a seam of coal about 6 ft. thick** at a depth of 342 ft. Investigations of the coal deposits in this region are being carried on by the British & Colonial Coal Mines, Limited.

J. W. MacMahon has been appointed Canadian representative for the Bertha-Consumers Co. of Pittsburgh, with headquarters at 614 Grosvenor Avenue, Westmount, Montreal, Quebec. Mr. MacMahon was formerly assistant purchasing agent for the Canadian Explosives Co. of Montreal.

The Dominion Coal Co. has completed its new shaft at O'Neil's Point, near Bridgeport, C. B. It will be known as Dominion No. 1, and is 670 feet deep. The work of sinking the shaft was begun last November. It has a concrete rim of 30 to 40 ft. down to sea level and the timbering, which is of hard pine, was done in 36-ft. sections.

Coal operators of the Province of Alberta, and others interested in the business in western Canada, **will hold a conference in Winnipeg this month** to discuss the matter of the shipment of domestic coal from Alberta to Ontario. The governments of each of the prairie provinces will be represented and the chief dealers of Ontario will attend. Sir Henry Thornton, president of the C. N. R., is expected to be present.

Net profits of the Crow's Nest Pass Coal Co. for 1922 were $213,959, as compared with $341,938 for the previous year. Add to this the actual balance brought forward from the previous year of $84,857, and, allowing for taxes, the sum left for appropriations was $192,957. The company paid $372,690 in dividends, leaving a debit balance of $94,874 to be carried forward and be provided for in 1923. The decrease in profits is attributed to the five months' strike at the mines. The company's current assets were $1,190,000 and current liabilities, $395,768.

Recently a number of miners have come from Scotland and have obtained employment in the Scotia pits and the Glace Bay coal fields. The arrival of the miners, it is thought, will to some extent offset the emigration of Nova Scotia miners to the United States. There also are many Italians filtering into Cape Breton and seeking work in the mines of the British Empire Steel Corporation.

Sabotage at the coal mines in the Grand Lake districts is alleged in connection with fires that destroyed a shaft house at one of the mines and also two C. P. R. freight cars standing on the tracks. According to reports the trouble started at the Avon Coal Co.'s mines following the dismissal of two miners, and it was said that the difficulties are the reason for the visit there of E. McG. Quirk, of the federal department of Labor, Ottawa, who has been called in to make an investigation of conditions.

Thomas Graham, general superintendent of the Canadian Collieries (D), Ltd., **was elected president of the British Columbia division of the Canadian Institute of Mining and Metallurgy** at the annual meeting held May 14 at Vancouver. He is succeeding F. W. Guernsey, who asked to be relieved of office and who was tendered a dinner. H. Mortimer Lamb, the secretary, in submitting his report suggested the establishment of a branch of the Institute at Stewart, Portland Canal. Amendments to the Professional Engineers' Act of British Columbia have been considered, but it was not thought well to touch that act at present. The standardization of examinations for coal-mine managers' certificates throughout the Dominion of Canada was a proposal upon which the parent body will be asked to act.

Association Activities

Officers elected by the Southwest Interstate Coal Operators' Association at the annual meeting in Kansas City, June 12, are as follows: Charles F. Spencer, Midway Coal Co., Pittsburg, Kan., president; George J. L. Wulff, Western Coal & Mining Co., St. Louis, Mo., vice-president at large; C. N. Fish, Home Riverside Coal Co., Leavenworth, Kan., secretary; George Manuel, Kansas City, Mo., assistant secretary; John M. Young, Greenwood Coal Co., Pittsburg, Kan., vice-president for Kansas; Isadore Pickering, Pickering Coal Co., Richmond, Mo., vice-president for Missouri; M. M. McWilliams, Clark-McWilliams Coal Co., Clarksville, Ark., vice-president for Arkansas; J. R. Crowe, Crowe Coal Co., Henryetta, Okla., vice-president for Oklahoma; W. L. A. Johnson, Kansas City, Mo., general commissioner; George Richardson, Pittsburg, Kan., commissioner, and Bernard Harrigan, Pittsburg, Kan., assistant commissioner of District 14; P. R. Stewart, Fort Smith, Ark., commissioner, and Joe Johnson, Henryetta, Okla., assistant commissioner of district 21 directors for Kansas, John A. Sargent, Central Coal & Coke Co., Kansas City, Mo.; Joseph Fletcher, Jackson Walker Coal & Mining Co., Pittsburg; W. C. Shank, Crowe Coal Co., Pittsburg, and Ira Clemens, Clemens Coal Co., Pittsburg; directors for Missouri, F. R. Atwill, Mercantile Coal Co., Richmond; C. J. Baxter, Big Creek Coal Co., Kirksville; E. J. McGrew, McGrew Coal Co., Lexington; directors for Oklahoma, J. R. Crowe, Henryetta; J. C. Reid, Cameron Coal Co., Williams; R. E. Lee, Rock Island Coal & Mining Co., Chicago; directors for Arkansas, M. M. McWilliams, Clarksville; R. A. Young, Greenwood, and J. G. Puterbaugh, McAlester Fuel Co., McAlester.

The Texas Retail Coal Dealers' Association at its annual convention held at Galveston on June 11 and 12 adopted resolutions advocating graduated seasonal-regional coal freight rates; to impress upon the public, individuals and corporations, the advisability of purchasing coal in the summer; to obtain the assistance of the U. S. Bureau of Domestic and Foreign Relations in a publicity campaign setting forth figures in relation to purchasing coal in the summer; to obtain repairs on cars before loading with coal; to obtain revocation of the order for loading to 10 per cent above marked capacity, issued by railroads and obeyed by mines; for strict observance by mines of the rule governing size of coals; for better preparation and prevention of slack being loaded with domestic or fancy sizes and for weighing of coal at point of destination or point nearest in line of transit. The association also went on record in favor of the buying of coal based on the price in effect at date of shipment, instead of date of purchase. The fulfillment of all contracts upon price at time which orders are accepted also was advocated. Elijah Cole, of Houston, was elected president; Harvey S. Trewitt, Dallas, first vice-president; William N. Martin, Vernon, second vice-president, and Clarence R. Goldmann, Dallas, was re-elected secretary. The executive committee is composed of the following: Charles Fowler, Galveston, chairman; Lee M. Pool, Greenville; Tillman Bibb, Fort Worth; L. M. Bushnell, Waco, and the officers of the association.

Obituary

Francis Lockhart, 48 years old, formerly of Pittsburgh and Somerset, Pa., died June 17, in Fellsmere, Fla. Mr. Lockhart was formerly secretary of the Somerset County Coal Operators' Association, Somerset, Pa. He leaves his widow, Mrs. Ethel B. Lockhart of Pittsburgh; one sister, Mrs. George T. McCarty, and one brother, Floyd Lockhart.

Trade Literature

Sanation of Impaired Structures and Subterranean Waterproofing by Weber Intrusion Methods. Weber Engineering Corp., Singer Building, New York City. Pp. 8; 4 x 9 in. Especially applicable in safeguarding the excavation while driving mine shafts and in protecting the shaft from the contamination of the sulphur, alkalies and other impurities in the ground water.

Wood Pipe. Continental Pipe Mfg. Co., Seattle, Wash. Catalog No. 18. Pp. 248; 6 x 9 in.; illustrated. This well-arranged and profusely illustrated book describes Continental wire-wound wood pipe, continuous stave wood pipe and creowood flume.

Uniflow Improved Return Tubular Boilers. Lebanon Boiler Works, Philadelphia, Pa. Bulletin 23-A. Pp. 23 ; 3 x 6 in. ; illustrated. This little book describes the advantages and savings of the "Uniflow" boilers.

American Airtight Door. The Conveyors' Corporation of America, Chicago, Ill. Folder describing an airtight door, largely used in ash pits and boiler settings, made in five sizes: 15x16, 18x18, 22x26, 24x24 and 24x36 in. The door is strong and substantially built of cast iron. When closed and locked it is airtight.

Publications Received

"Strikes and Lockouts, 1922," is the title of an article in the June number of the *Labor Review*, giving statistics as to the number of strikes in each of the years from 1916 to 1922 inclusive for the country as a whole and by states, the principal causes of the strikes, the number of persons involved, the duration of such strikes and other interesting data. A tabulation is given as to the number of disputes in certain specified occupations for the years mentioned. It shows that in the occupation of coal mining there were 373 disputes in 1916; in 1917, 355; in 1918, 162; in 1919, 148; in 1920, 161; in 1921, 81, and in 1922, 440. While the number of strikes reported for 1922 was less than that for any of the six years preceding, the number of strikers exceeded those in each of the other years with but one exception, because of the coal and rail strikes of last year. The coal strikes involved about 600,000 men and the rail strike about 400,000 men.

The Department of the Interior announces the issuance of Technical Paper 333, **"Permissible Explosive, Mining Equipment and Apparatus Approved Prior to Jan. 1, 1923,"** by the Bureau of Mines. It contains a table giving the brand names of all explosives now considered as permissible for use in dusty and gaseous coal mines, tested by the Bureau of Mines prior to Jan. 1, 1923. The list includes a total of 154 permissible explosives. In addition to permissible explosives, Technical Paper 133 includes lists of permissible explosion-proof coal drilling and short-wall mining equipment, permissible electric lamps, permissible flame safety lamps, permissible methane indicators, single-shot blasting units, storage-battery locomotives, mine-rescue breathing apparatus, and gas masks. Technical Paper 333 may be obtained from the Department of the Interior, Bureau of Mines, Washington, D. C.

Traffic News

Questions involved in the case of the **Colorado & New Mexico Coal Operators' Association versus the Denver & Rio Grande** will be discussed at an Interstate Commerce Commission hearing in Denver on Sept. 10. Commissioner Hall will attend the hearing.

Only twice within the history of the Chesapeake & Ohio R.R. have the monthly coal loadings on that road been as large as they were **during the month of May, 1923, when over 3,000,000 tons was handled by the road.**

The Chesapeake & Ohio Railway Co. has been authorized by the Interstate Commerce Commission **to assume liability for $371,000 worth of Elkhorn Piney Coal Mining Co. car trust certificates.**

The New York Central R.R. has been authorized by the Interstate Commerce Commission to issue equipment trust certificates in the amount of $17,340,000 to be dated June 1, 1923, proceeds of which will be used in the purchase of additional new equipment.

Combination rates on bituminous coal over the Baltimore & Ohio and Pennsylvania from mines on the Baltimore & Ohio in West Virginia to Trenton, N. J., have been found not to be unreasonable. The Interstate Commerce Commission has denied a plea for the establishment of joint rates on such movement.

Revised freight rates on shipments within Colorado went into effect June 19, over the protests of the railroad companies. The changes are many, **providing reductions of from 10 to 25 per cent.** These are rate changes ordered by the Colorado Public Utilities Comission and have no relation to the sweeping changes in coal rates between Rocky Mountain states and the West and Northwest, issued at Washington by the I.C.C. June 22 to become effective in ninety days.

A new railroad being constructed by the Haskell interests from Caspar, Wyo., to Miles City, Mont., will make accessible extensive coal deposits. This line of railroad, while only 330 miles in length, is of unusual significance, since it furnishes a connection between the Union Pacific, the Northwestern, the Chicago, Burlington & Quincy, the Northern Pacific and the Chicago, Milwaukee & St. Paul. No such similar tie exists, except 600 miles away toward the east.

The New York, Ontario & Western R.R., according to its annual report, **in 1922 carried over its lines coal valued at $3,652,-149.15,** as compared with $5,498,964.11 in 1921. It holds $2,400,000 worth of first mortgage bonds of the Elk Hill Coal & Iron Co. and $1,153,000 first mortgage bonds of the Scranton Coal Co. John B. Kerr, president, says in his report that the net loss in gross earnings from coal transportation due to the strike was over $1,800,000 as compared with the preceding year, while the net loss in gross and net earnings by rate reductions on traffic was over $300,000. Coal consumed during the year was 16,926 tons of anthracite and 278,040 tons of bituminous, compared with 38,900 tons of anthracite and 250,843 tons of bituminous in 1921. The cost of fuel per engine mile was 40.93c. in 1922 as compared with 36.96c. in 1921.

A total of 9,876 new freight cars were placed in service by railroads between May 15 and June 1, according to the Car Service Division of the American Railway Association. This brought the total number of new freight cars installed in service from Jan. 1, 1923, to June 1, to 65,660. Of the new cars placed in service during the first five months this year, 26,806 were coal cars. The railroads on June 1 also had on order 107,079 new freight cars, deliveries of which are being made daily. A total of 161 new locomotives also were placed in service from May 15 to June 1, which brought the total installed from Jan. 1, 1923, to June 1, to 1,697. The railroads also had 2,041 new locomotives on order June 1.

Rates on fine coal from producing points in Illinois, Indiana and western Kentucky to Sioux Falls, S. D., have been found by the Interstate Commerce Commission to be unduly prejudicial to Sioux Falls and unduly preferential to Sioux City. The rates on fine coal, the cmomission finds, should not exceed the contemporaneous rates to Sioux City by a greater percentage than the rates on lump coal to Sioux Falls exceed rates on lump coal to Sioux City from the same points of origin. Commissioner McChord dissented from the opinion of the majority on the ground that the lower value of fine coal and the lower terminal expenses incident to the movement to Sioux Falls do not justify the conclusions reached by the majority.

The Northern States Power Co., a large consumer of coal in the Northwest, intervening in the Northwestern Coal Dock Operators' Association case, **urges that nothing be done to break up fair competition among those who sell coal in the Northwest.** The power company advises the Interstate Commerce Commission that the inability of the Northwestern docks to move a full tonnage of coal during recent years has been due almost entirely to abnormal conditions rather than to any freight-rate discrimination. The present freight rate adjustment is fairly equitable in providing a basis for active competition, the power company declares. During the year just ended, it says, the docks, with a limited tonnage of high-price coal, were not in a position to compete with southern Illinois upon any reasonable freight-rate adjustment. The power company urges that no ket by the dock operators under normal conrate advances be recommended until operations under normal conditions over a representative period be tried out. To have a rate adjustment which would have enabled the docks to compete during abnormal times would mean the entire control of the market. The power company is careful to point out that the Lake Superior docks constitute a valuable reservoir for the storage of a large summer movement of coal and that they are a great protection and convenience, but that sight must not be lost of the value of southern Illinois in maintaining competitive conditions.

Freight-car performance statistics for April, compiled by the Bureau of Railway Economics, show that the average daily movement per freight car during that month was **the greatest for any month since the autumn of 1920** when freight traffic was especially heavy. The daily average for the month was 28 miles, an increase of one mile over that for March, 6 7/10 miles over the average for April last year and 7 4/10 miles over the average for the same month in 1921. Compilations show that the average load per car in April was 27.6 tons. This was three-tenths of a ton less than the average for March, but an increase of 3 1/5 tons over the average for April last year. Except for April, 1918, when the average was 29.8 tons, and April, 1920, when it was 28.6 tons, the average for April this year was the heaviest for any April since tabulations of these records began in 1917.

Coming Meetings

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the **International Safety and First-Aid Meet.** Secretary, Benedict Shubart, Denver, Colo.

Iron and Steel Exposition at Buffalo, N. Y., Sept. 24-28. Association of Iron and Steel Electrical Engineers, Empire Building, Pittsburgh, Pa.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

International First-Aid and Mine Rescue meet will be held Aug. 27-29, at Salt Lake City, Utah.

The American Institute of Mining and Metallurgical Engineers has accepted the invitation extended by the Ministers of Mines of Ontario and Quebec and by the Canadian Institute of Mining and Metallurgy to hold its autumn meeting in Canada. The meeting lill start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary, F. F. Sharpless, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Ninth National Exposition of Chemical Industries at the Grand Central Palace, New York City, week of Sept. 17. Manager, Charles F. Roth, Grand Central Palace, New York City.

Mine Inspectors' Institute of America will hold its 13th annual meeting July 10-12 at Pittsburgh, Kan. Secretary, J. W. Paul, 4800 Forbes St., Pittsburgh, Pa.

Ontario Mining Association will hold its annual meeting July 5 at Kirkland Lake, Ont., Can. Secretary, B. Neilly, Toronto, Ont., Can.

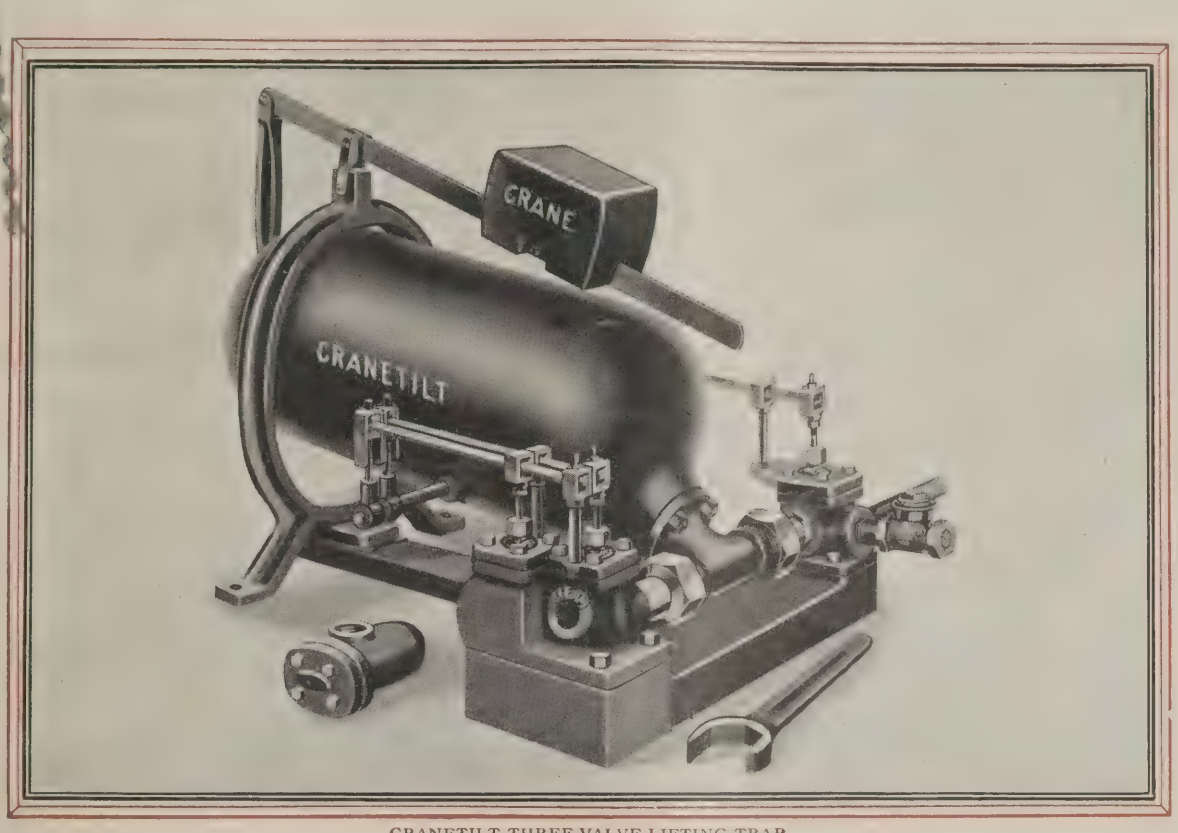
New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.

Our Biggest Government Mine, see p.p. 1037-1041

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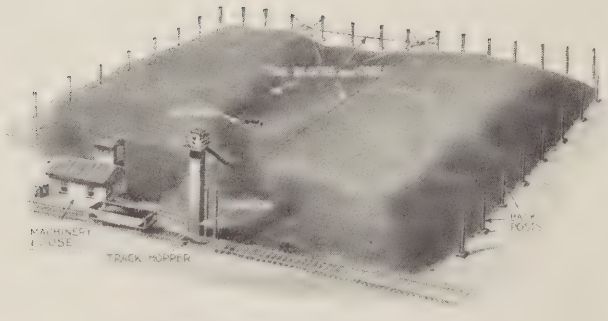
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COAL AGE

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It Seems Quite Likely

that a few years from now we shall not be using any raw coal under boilers, but every large mine operation will have its own coal-distilling plant and will sell coke, gas and byproducts instead of coal, or perhaps will generate electric power at the mines with the surplus gas. Consequently what is being done at the coke and byproduct plant of the Cambria Steel Co. will be interesting to all our readers, and next week *Coal Age* will publish a story on the subject as written by G. A. Richardson.

Extinction of a Mine Fire

Shallow mine fires last for months and years. They often get entirely beyond restraint. The danger of a shallow mine fire is in its partly going out. It cools down and draws in air, and the air sets it going again. But if the draught were only incombustible gas, the product of an earlier combustion, the fire would not revive. This was proved at a big fire in a coke-region mine. One wonders, if it had been tried earlier, whether it might not have saved Carbondale from its continuous pall of smoke and the Lehigh Coal & Navigation Co. from a million dollars of expenditure at the Summit Hill fire. Instead of a great excavation costing an immense sum of money a giant "soda" might serve to extinguish the Red Ash fire.

Dynamic Braking

Mr. Gealy in next week's issue will have an article on electric braking and its place in the operation of mine transportation, especially where a locomotive makes many stops.

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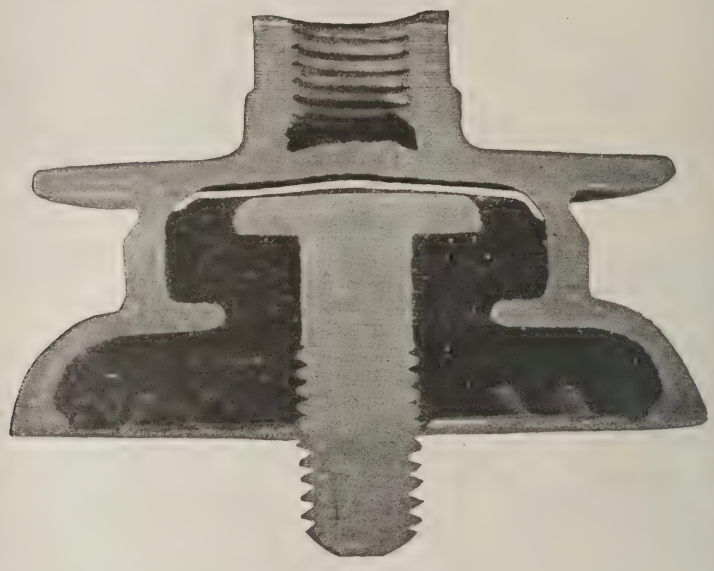
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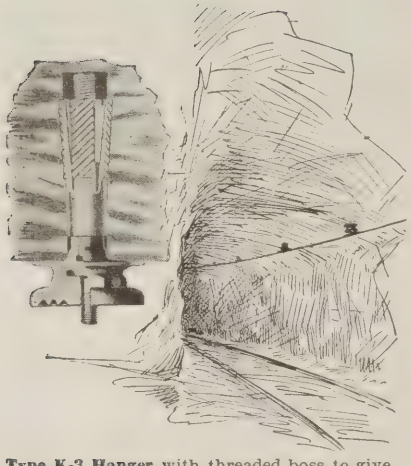
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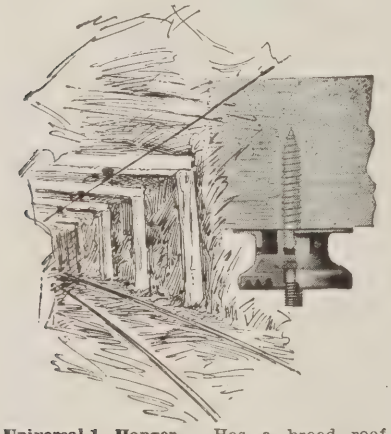
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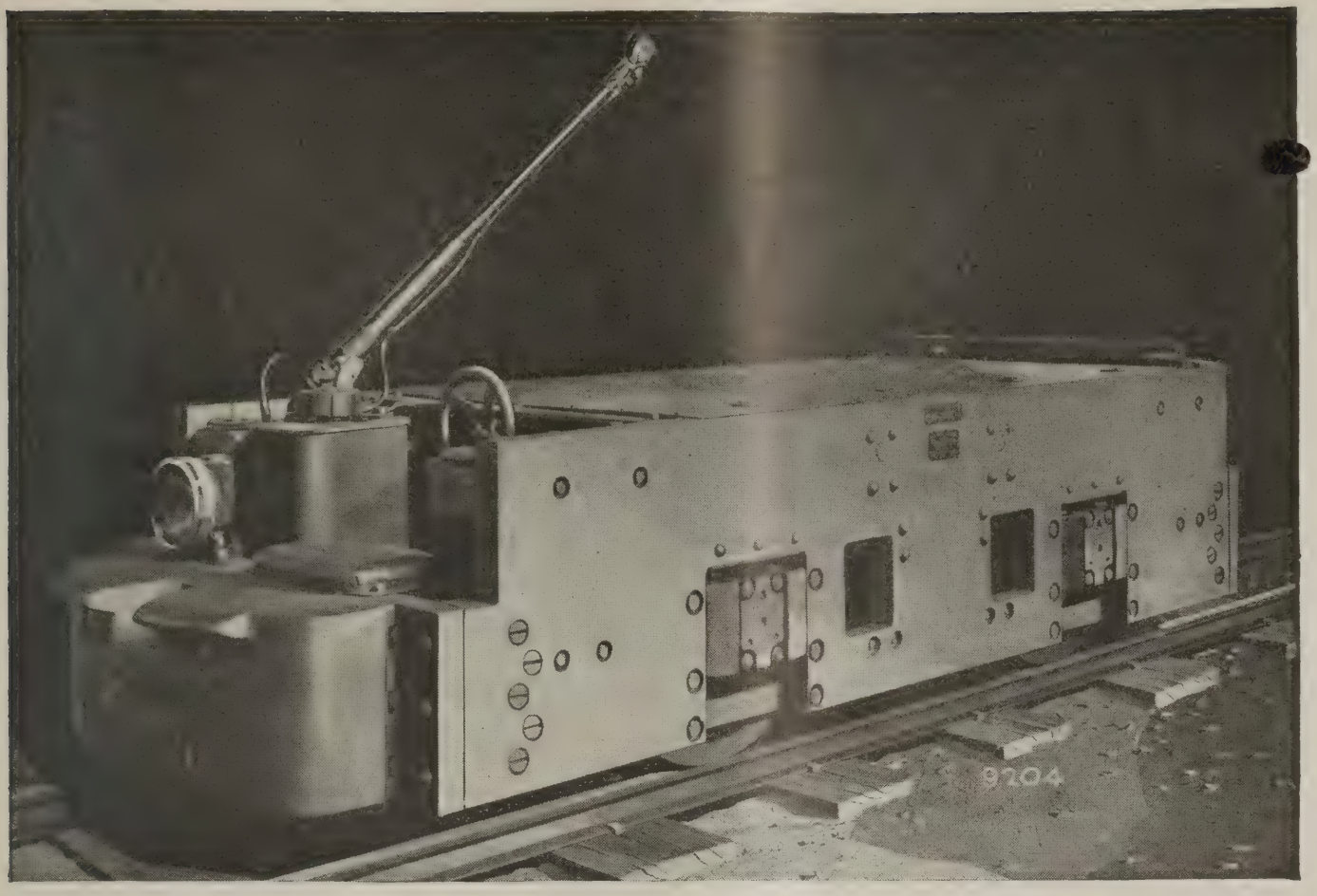
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. . . I was running a mine hoist, at one of the large shaft mines here in Nanticoke. The company had a creosoting plant at one of their other mines and had sent over two flat cars loaded with mine timber that had been treated with creosote. . . .

When I came out in the evening, ready for the night-shift, I observed the small locomotive coming up the track. Just then a signal for lowering men called me to the throttle. . . .

Returning to the doorway, a few minutes later, what was my surprise to behold a volume of smoke coming from the pile of timber. Evidently, the fire had caught from a spark or hot coal falling from the engine. Without seeing it, one would hardly believe the volume of dense smoke that was given off from the burning pile. It resembled the discharge from two big locomotives pulling a heavy trip of cars up a mountain grade.

The alarm was quickly given, but water appeared to have no effect to extinguish the fire. . . .

The following morning, the mine superintendent was early on hand to view the place. I remarked to him that had the timber been ignited in the mine, not a man or animal inside of the burning section would have been able to escape through the dense volumes of smoke produced by the burning timber. He agreed with me and put himself on record then and there against the use of creosoted timber in the mine.

In closing, allow me to suggest that the use of the "Cement-Gun" and the coating of mine timbers with "Gunite" is of far greater practical value as a preservative of timber and is not a menace to the safety of the mine. I hope this brief account may be of some value in averting disaster.

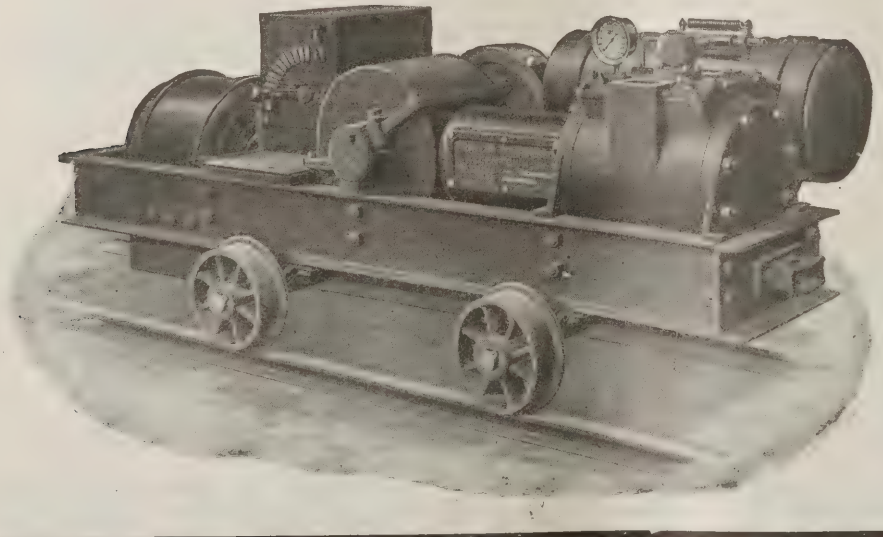
Nanticoke, Pa. W. A. BARRETT.

See Coal Age, May 24, Page 862 for entire letter

Read the story—it carries its own moral! Now let us tell you more about the use of "GUNITE," applied by the "Cement-Gun"

And ask us about this Compressor.

This one is the Traylor motor-driven MINE TYPE. No kicks or quakes. Runs so free from vibration it needs no blocking on the rails. For any pneumatic work. Straight line. Slow speed. Worm gears. Two sizes—9 x 8 and 13 x 8. Bulletin 104.



Cement-Gun Co., Inc.

Allentown, Pa.

New York Pittsburgh Chicago
Laredo, Texas Los Angeles Seattle

Agents in Eastern Canada:
General Supply Co. of Canada
356 Sparks St., Ottawa

Foreign Agency:
International Cement-Gun Co.,
Zeist, Holland

"The Waugh Way Wins"



A A

WHEN Dun or Bradstreet report "AA" on a man's financial strength, you have no hesitancy about dealing with him.

Likewise, before doing business with a scraper hoist, you wisely investigate *its* mechanical rating.

The new Model 300 Turbro Waughoist is in the "AA" Class. Here are the figures:

Air pressure recommended at hoist, 50 lbs.
Average horsepower developed at 50-lbs. pressure, 10 hp.
Maximum horsepower developed at 50-lbs. pressure, 13.5 hp.
Rope speed, 1600-lb. rope-pull—50-lbs. pressure, 295 ft. per min.
Rope speed, 1800-lb. rope-pull—50-lbs. pressure, 235 ft. per min.
Rope speed, 2000-lb. rope-pull—50-lbs. pressure, 178 ft. per min.
Rope speed, 2200-lb. rope-pull—50-lbs. pressure, 118 ft. per min.

Before buying a hoist for scraping, lifting, or pulling, compare the ratings. We'll be glad to send you our new 300 bulletin. Ask the nearest Waugh branch office for a copy today.

THE Denver Rock Drill Manufacturing Co.

Denver, Colorado

Rock Drills, Drill Steel Sharpeners and Hole Punchers, Portable Hoists

San Francisco, Scranton, El Paso, St. Louis, Seattle, Duluth, Joplin, Wallace, Salt Lake City, Pittsburgh, Lima, Santiago, Butte, New York, Houghton, Birmingham, Melbourne, Mexico City, Pottsville

Canadian Rock Drill Company, Limited

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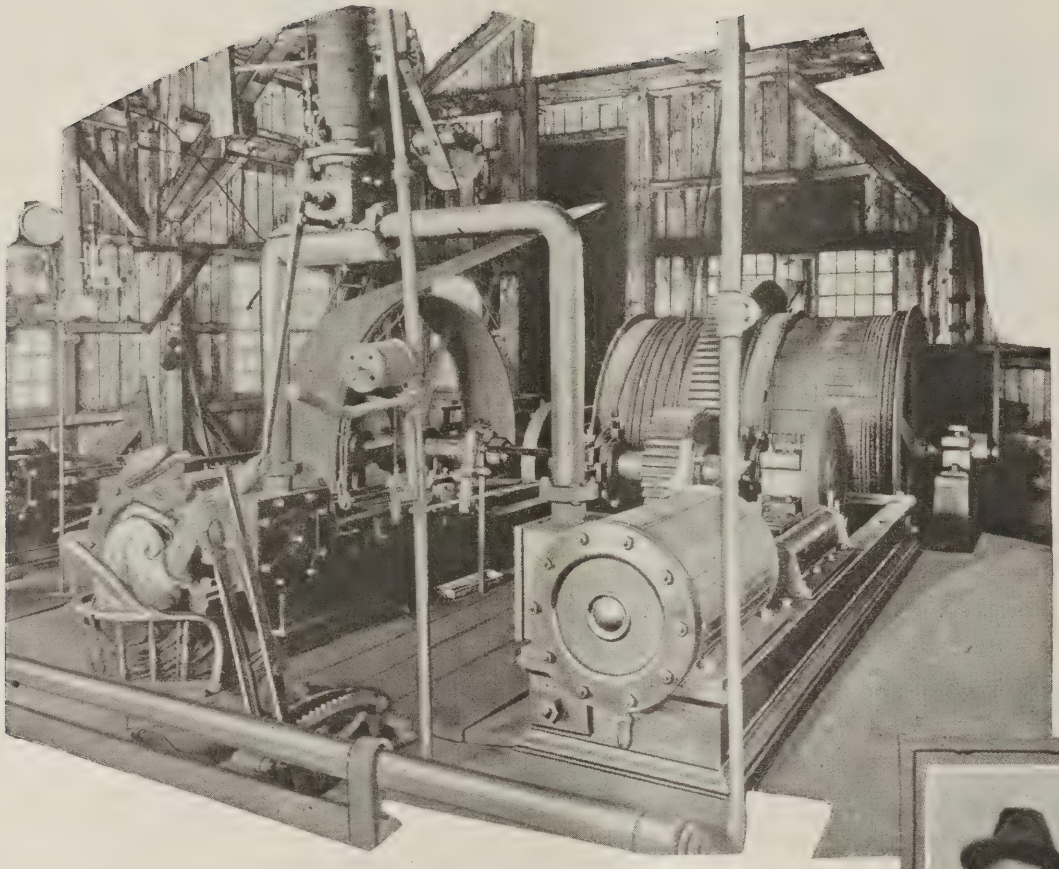
The Denver Rock Drill & Machinery Company, Limited

Sole Agents in South Africa and Rhodesia

Southern Life Building, Johannesburg, Transvaal, South Africa.

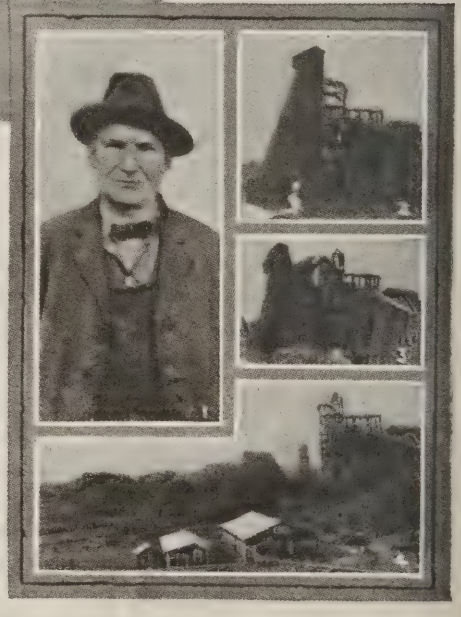
Andrews & George Company, Sole Agents in Japan, Tokyo, Japan

Tom Langan



12,000,000 tons of material hoisted

cage travel— 13½ times around the globe



No. 1. Thomas Langan, Hoisting Engineer, Seneca Colliery. No. 2. The breaker tower just before operations were stopped. No. 3. How the tower was razed by dynamiting its foundations. No. 4. Dust arising from fallen tower.

and his Veteran Vulcan— Team-mates for 33 years!

June 18th, 1888, when the old Seneca Breaker of the Lehigh Valley Coal Company first started to operate, Tom Langan, Hoist Engineer, was put in charge of a steam-operated Vulcan.

Tom and his Vulcan stayed on the job, continuously for 33 years—up until the old breaker was razed.

Still good for more service

The fact that the original Vulcan Hoist, with practically all parts intact as installed, were still good for more service when the breaker was shut down, speaks well for both the equipment and the efficient care of the operator.

The original crank pin, wrist pin and crosshead shoe brasses were still in use when operations stopped. The cylinders were never rebored and were in fine condition after 33 years' continuous service.

Cage travel—13½ times around the Globe

The tonnage handled by this Vulcan during its 33-year service was approximately 8,500,000 tons of coal; and about 12,000,000 tons of total material, including boiler fuel and refuse—or 6,000,000 hoists. Figuring 225 feet of travel of the cage per hoist, the cages traveled 340,000 miles—about 13½ times around the earth.

Thus the story of Vulcan equipment made over 33 years ago.

We've been bettering our Hoists ever since

Ever since this Veteran Vulcan Hoist was installed, we have been bettering the material and design of both our steam and electric Hoisting Equipment. From the standpoint of durability, ease and speed of operation—and safety — the modern Vulcan is — needless to say—unsurpassed.

Small wonder that the demand for Vulcan Hoisting Equipment has been steadily increasing in mines throughout the country.

Get in touch with us

A complete description of Vulcan Hoists or other equipment, with a list of enthusiastic users, will be sent you by return mail.

VULCAN IRON WORKS
Established 1849
1730 Main Street, Wilkes-Barre, Pa.

Other Vulcan Equipment

Steam Locomotives	Corliss Engines
Gasoline Locomotives	Coal Crushers and Rolls
Rotary Kilns, Dryers, Coolers and Roasters	Gray Iron Castings
	Open Hearth Steel Castings
Mine Ventilating Fans	Gears, Moulded and Cut Teeth
Cages and Skips	
Sheave Wheels	Special Machinery

VULCAN OF WILKES-BARRE HOISTS



The Shriek of Araby

Out of the warm dark portal of the mine and into the blinding sunlight emerged Foreman Hodges, blinking his eyes while knocking the carbide from his lamp with one hand and shaking his cap with the other to dislodge a piece of fungus gathered from the wet timbers just inside.

He hailed the Superintendent beneath the tipple where the last car of the day was being topped preparatory to being sent down the siding to compose a part of the "out" train in the morning.

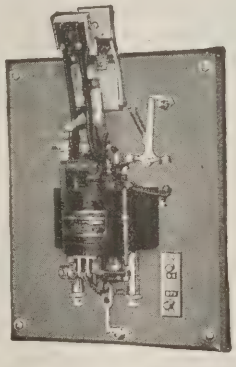
"I ran into the machine runners going on this A.M.," he began, "and they sure climbed my hide for a fare-you-well.

"That cutter, Tony Araby, knows too much for the rest of them. Got 'em all steamed up to perfection. The boys were mad, that's all."

"How was that Hodges", the Boss queried.

"Well, you know those fellows are on a yardage basis and get to work just as soon in the evening as they can. Try to get all their places cut and then 'partie' for home 'toot sweet.' We don't keep anyone in the substation at night and when the breaker pops they take turns walking outside and putting it back in.

"Appears like last night was a mean one on all hands. So much time was lost that they didn't get out until time for the loaders to come out this morning, and then none had all his rooms cut.



The Circuit Breaker with Brains

"Tony is wise, though—older and been around a bit more—and knows how the trouble can be corrected. He tells the others and the whole gang sand-bags me this morning.

"Araby led the cheers and shrieks though, for the rest of the bunch and they practically issued an ultimatum that if something wasn't done shortly, they were going where they could get their work done and make some faster jack.

"Really a bad situation, 'Chief,' " the foreman continued.

"Araby is the best cutter on the job and I'd hate to see him leave. He isn't asking for anything unreasonable, either. What is his profit is ours also, and that doesn't include a muchly needed better voltage at the machines.

"Says we ought to have automatic reclosing circuit breakers inside so that when one of them threw an overload or 'short' on the line it wouldn't effect the rest, too."

"Hodges," cut in the Super, "sorry to interrupt your account, but you tell Tony and his crowd that I had a representative of the Automatic Reclosing Circuit Breaker Co. here today going over our layout, and I've placed an order for eight of them.

"The only mistake we made was in not listening to the shrieks of Araby months ago. Tony's all right."

THE AUTOMATIC RECLOSING CIRCUIT BREAKER CO.

COLUMBUS, OHIO, U. S. A.

DISTRICT SALES OFFICES:

PITTSBURGH: 223 Oliver Bldg.
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Get Preferred Attention—Mention Coal Age in Writing Advertisers

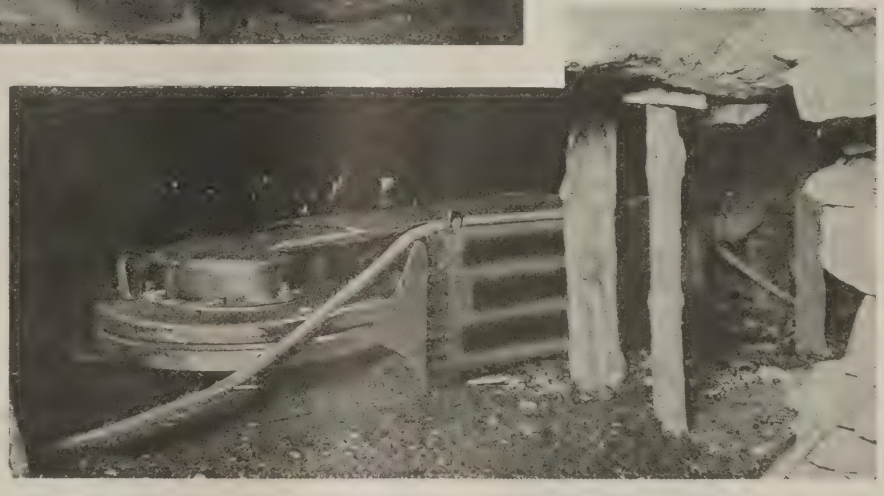
Cut Your Coal With



Alternating Current Ironclads

One of 48 Sullivan A.C. "Ironclads" owned by Nokomis Coal Co., Illinois.

Below, Sullivan Longwall Ironclad, A.C. type, La Salle County Carbon Coal Co., La Salle, Ill.



Are You Opening a Mine?

Don't wait for a power plant—

Hook a transformer to the nearest transmission line, wire your entries as they advance and start production at once with one or two Sullivan "A.C." Ironclad Mining Machines. They are fast and handy for entries and narrow work.

When your direct current plant is in, save it for haulage and keep on cutting coal with A.C. Ironclads. This method will obviate low voltage at the machines, which often results when the same feed wires are used to supply cutters and locomotives.

Where difficult cutting is encountered, A.C. Ironclads will get out the tonnage when other types stall and stop working. A.C. Ironclads are built for room and pillar and for longwall mining. They will cut in either direction, can be equipped with cutter bars up to 10 feet (for room mining), and possess all other mechanical advantages of the direct-current Ironclads.

Ask for "Ironclad" Catalogue No. 79-DC

DOMESTIC SALES OFFICES

Birmingham, Boston, Butte, Claremont, N. H., Cleveland, Dallas, Denver, Duluth, El Paso, Huntington, W. Va., Joplin, Juneau, Knoxville, New York, Pittsburgh, St. Louis, Salt Lake, San Francisco Spokane.

COMPRESSORS AIR LIFT DIAMOND DRILLS SHARPENERS FORGES
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134 So. Michigan Ave. Chicago.

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Getting the best price for your coal

Do you know that you can eliminate your coal breakage by use of a Webster Loading Boom?

Webster Loading Booms lay (not drop) the coal in the railroad cars, thus insuring a better grade which demands the highest market price.

The horizontal section of the boom in the tipple house is designed to permit thorough picking while the lump travels away from the screens. The Boom Hoist is of rugged construction, permitting of continuous and dependable service.

Let Webster Engineers give you the benefit of their experience.

WEBSTER EQUIPMENT FOR THE COAL TIPPLE

Car Dumps, Car Hauls, Car Retarders, Screens, Feeders, Loading Booms, Picking Tables, Crushers, Weigh Baskets, All Types of Elevators, Conveyors, Etc.

THE WEBSTER MFG. COMPANY

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Edison Safety Lamps

Greater Average Illumination
More Even Distribution of Light

More than 200,000 Edison Electric Safety Mine Lamps in more than 1,000 mines are proving that they are

Safe—Powerful—Dependable—Economical

A miner wearing an Edison Safety Mine Lamp can get more work done—he does not have to stop every few hours to fix his lamp.

The sturdy construction of the Edison Battery—All-Steel with steel-preserving Alkaline solution—explains why the Edison Mine Lamp has ruggedness, long life and dependability.

Bulletin 300 will tell you how Edison Mine Lamps will handle safely and successfully your mine lighting problem. Your copy on request.

Edison Safety Mine Lamps are distributed by

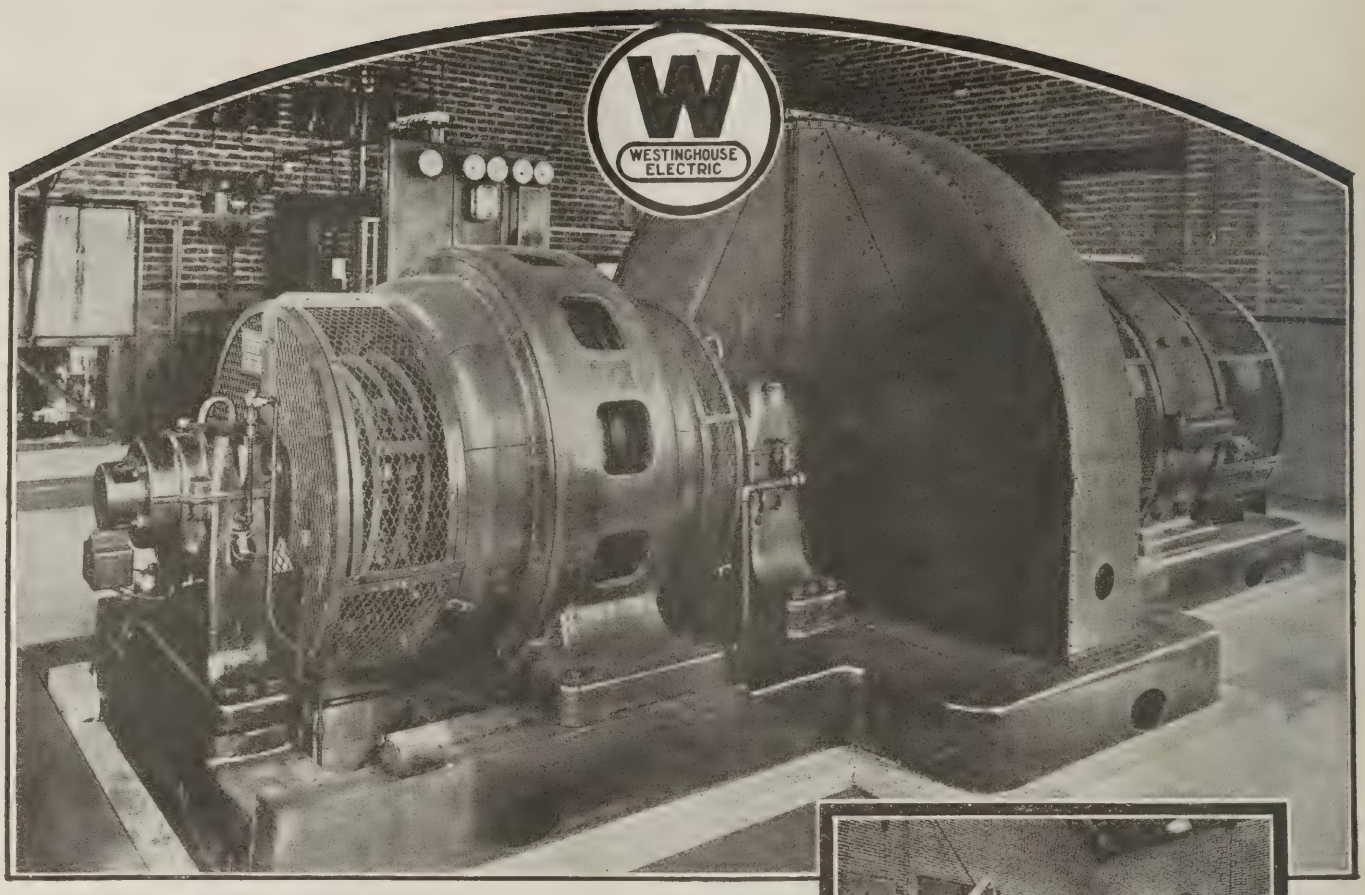
Mine Safety Appliances Co.
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EDISON Safety Mine Lamp



The battery used in this lamp has the same rugged strength as the Edison batteries used in Mine Locomotives.

Edison Storage Battery Co. **Orange, N. J.**



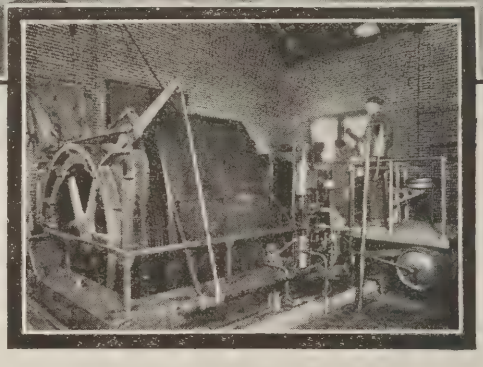
Standardized

It takes years of experience to enable a manufacturer to standardize his equipment—and particularly the electrical equipment employed under the varying requirements of mine hoist service.

This Westinghouse has been able to do, so that today—as a result of many years' experience in design and application—you are enabled to take advantage of the benefits of standardization in Westinghouse mine hoist equipment.

The qualities chiefly sought for by Westinghouse engineers in this standardization have been, first, reliability, and second, economy of operation.

This is attested to by the hundreds of successful Westinghouse installations throughout the mining fields.



800 hp. Westinghouse
Flywheel Hoisting Equipment,
Pittsburgh Terminal Coal Co.

Westinghouse
Electric & Manufacturing Company
East Pittsburgh, Pa.
Sales Offices in All Principal
American Cities

Westinghouse

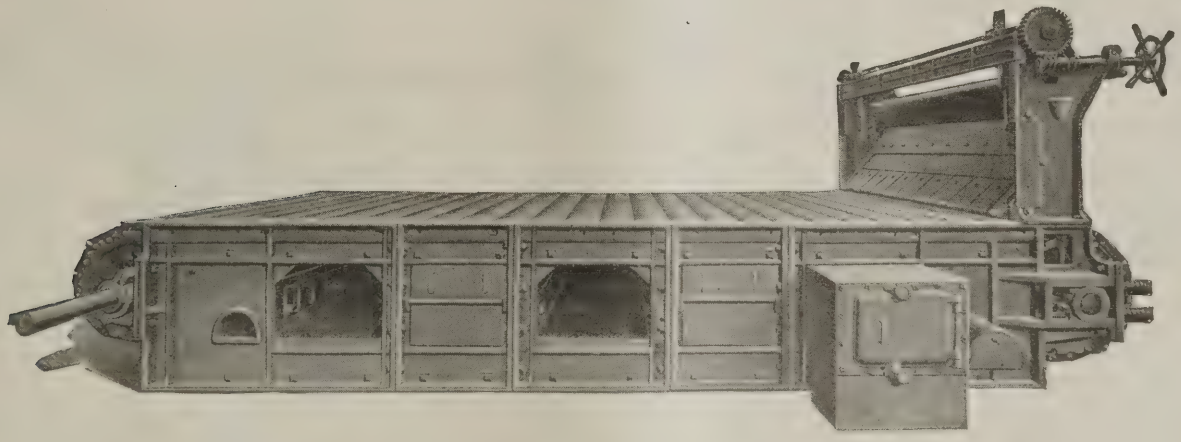
A WIDER FUEL MARKET

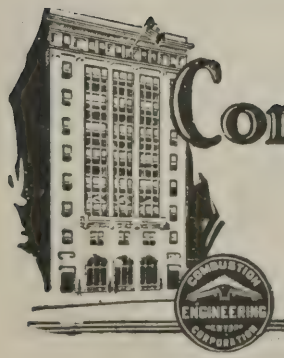
COXE STOKERS

Are burning coals today that a few years ago were classed as refuse.

This has increased the fuel market of hundreds of plants. It has resulted in greatly reduced coal bills.

The record of Coxe Stoker performance is of interest and value to anyone considering stoker equipment. We will be glad to mail Bulletin C. B. 1 showing the result of 26 tests with bituminous coals.





INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

Combustion Engineering Corporation

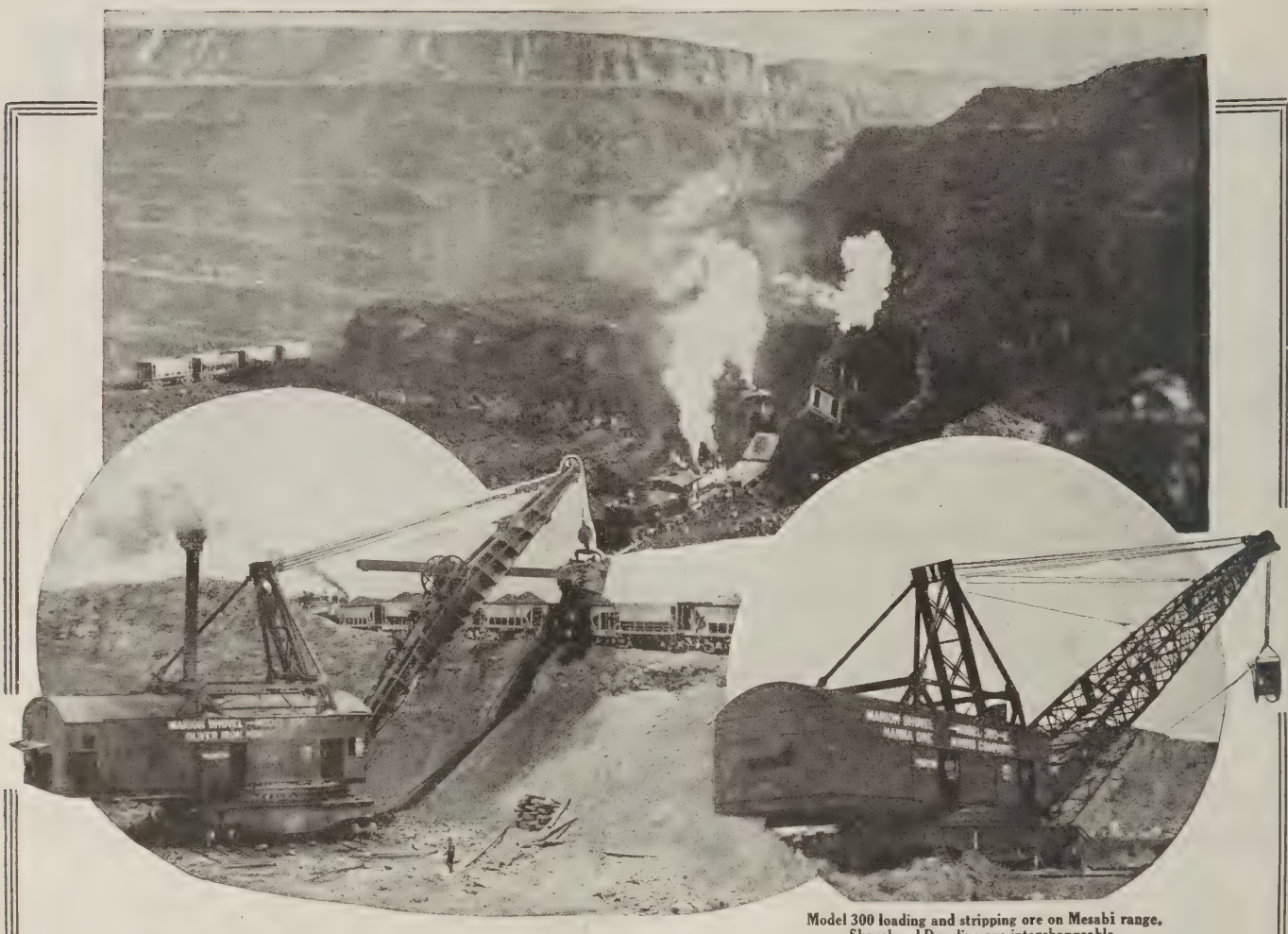
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Offices in Principal Cities Throughout the World

Frederick Multiple Retort Stokers
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Self-Contained Stokers

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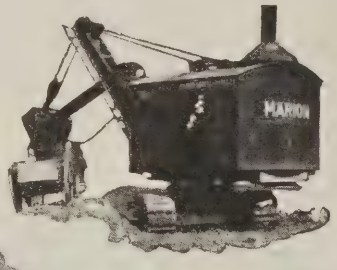
Model 300 loading and stripping ore on Mesabi range.
Shovel and Dragline are interchangeable.

"Marions" Show the Way

FOR more than a third of a century Marion Shovels have been a dominant factor in mining, quarrying and excavating. They have definitely and accurately pointed the way to better methods, quicker work, larger production and greater profits. They have truly kept pace with all the requirements of the industry.

As pioneer and leader, the dependable Marion always wins. Large "Marion" Revolving Shovels and Draglines remove the overburden and handle "big-scale" digging and loading. Railway-type Shovels—now furnished with crawler trucks—take care of work in close quarters or where "high-speed" loading is required. Smaller Marions of full revolving type have wide adaptability for general utility work, handling most any kind of stripping, loading or grading.

Illustrations show typical types of latest Marion models. Our new designs provide for steam, gasoline or electric power, with optional mountings suited to all classes of excavating work. Bulletins are available on each type.



Small Revolving Shovel on Crawler Trucks.
Readily convertible into dragline, clamshell or orangepeel excavator.



Railroad-type Marion on Crawler Trucks.
Easily moved—fewer men required—no planking, ties or rails to handle.

277

The Marion Steam Shovel Company
Marion Ohio.

Marion Crawler Trucks Make Hard Going Easy





Boyer Pneumatic Chipping and Calking Hammer — for machine and boiler shop service. A handy tool in connection with mine car repairs.



Little Giant Air Drill —the pace setter in reaming nut-and-bolt tightening, etc.



Litte Giant Portable Electric Drill — for rapid drilling, reaming, etc.

CP's
contribution to lower machine shop costs

With a Little Giant Electric Drill and a Drilling Stand you can combine them into a high speed drill press in thirty seconds. They can be disassembled in the same period of time; the drill is then ready for use as a portable tool where required. It is economical to take the drill to the job and expensive to take the job to the drill.

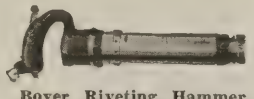
Little Giant Air Drills literally punch holes through the hardest of steel. They will drill one and a half to two and a half inches per minute, depending upon the size of the drill being used.

Boyer Riveting Hammers drive rivets at a cost of three to five cents each. It costs from fifty cents to a dollar to cut out a loose rivet. The majority of Boyer driven rivets are perfectly driven. One or two less rivets to cut out daily pays for a Boyer in thirty to sixty days.

Think it over and let us assist you in lowering your machine shop and repair costs.

Chicago Pneumatic Tool Company

Chicago Pneumatic Building · 6 East 44th Street · New York



Boyer Riveting Hammer —world's standard.



Little Giant Electric Portable Grinder for metal surfacing, grinding, buffing and cleaning prior to painting.



Little Giant Electric Hammer Drill—drills in concrete or soft stone, etc. Used quite extensively for chipping gray iron castings.

*Sales and *Service Branches all over the World*

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BOYER PNEUMATIC HAMMERS··LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS··VACUUM PUMPS··PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES ROCK DRILLS ·· COAL DRILLS

CHICAGO PNEUMATIC

Depend upon *that Name*

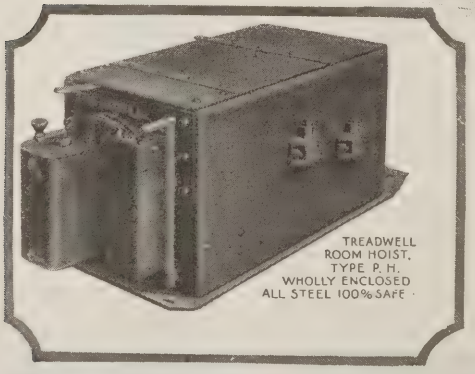
Treadwell

Steam and Electric Hoists

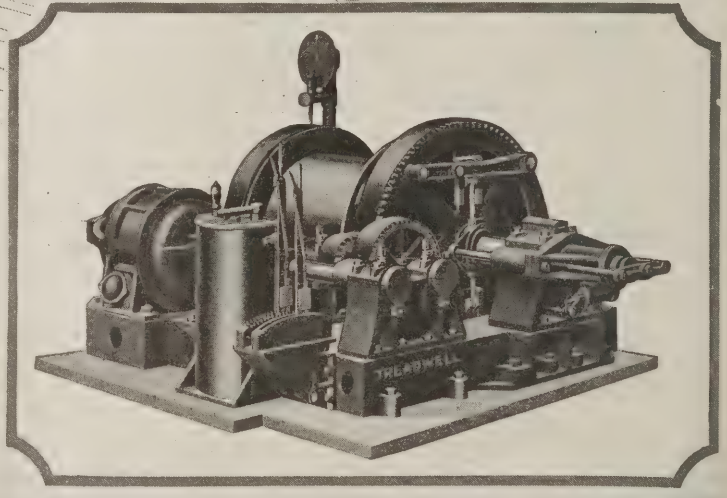


The basic features underlying the design of the TREADWELL "BETTER GRADE" MINE HOISTS are: utmost simplicity—making same easy to erect and adjust — correct distribution of metal — producing a balanced mechanism and ability of all members to resist strain; and mechanical dependability.

There is a TREADWELL HOIST for every condition. Let us advise you on your next installation, or on methods of bettering your present equipment.



TREADWELL
ROOM HOIST,
TYPE P. H.
WHOLLY ENCLOSED
ALL STEEL 100% SAFE



Treadwell Engineering Company

ROLLING MILL MACHINERY — PIPE MACHINES — ELECTRIC STEEL CASTINGS

Easton, Pennsylvania, U.S.A.





This up-to-date Mine in Kentucky is only one of many which have reduced production costs through the use of "AUTOMATIC" mine cars

When the engineers were told to construct a modern plant with modern equipment they naturally specified

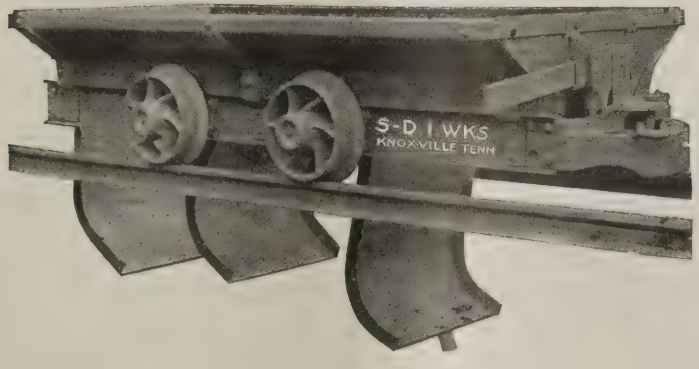
S&D GRIFFITH AUTOMATIC DROP BOTTOM CARS

Do you suppose, after two years operation, that the mine owners are satisfied? Well, they are equipping their second mine with "AUTOMATICS" and putting the savings into their pockets.

Actual figures are available to prove the decided economy in the use of automatic bottom dumping cars.

Literature and prices on request

SANFORD-DAY IRON WORKS
Knoxville, Tennessee
Makers of Cars and Whitney Wheels



Roller Bearing News

We sometimes see 'Paradise' coal advertised. Didn't know coal would be needed there.

5,064 of the 7,088 coal mines operating in 1921 were using animal haulage. All of them should have used Hyatt equipped mine cars, many of them did.

The offices of the New River Coal Operators' Association, formerly located at Charleston, W. Va., have been moved to Mount Hope, W. Va., and the office of the secretary and traffic manager consolidated, with S. C. Higgins, formerly traffic manager of the association, being made secretary and traffic manager, succeeding T. L. Lewis as secretary. (*Black Diamond.*)

"Ladees and gentl'm'n, begin to pack your duds for the biggest and grandest show of mining equipment and methods ever held, will surely be held, rain or shine, next September 24th to 29th in the beautiful city of Milwaukee. Good exhibits, good fellows, good golf, good dancing, good speeches, good auto rides, in fact, everything good will make the next meeting of the American Mining Congress the most gorgeous and wondrous display ever held under one roof."

"Friends, Romans and countrymen — my mine cars are equipped with Hyatt bearings, I have low haulage costs, have forgotten that there is such a thing as ever having to grease mine cars, my men are happier because the cars are easy to push and my production is getting better and better every day," is what a modern Mark Anthony of the coal industry would likely be moved to say.

Now that the weather is better and storms on the ocean milder, it is a great temptation to many fellows to start up a boat line to the Bahamas. Business must be good for everybody seems to be thirsty and while the goods go down the prices go up.

Our friend 'Rod' Neekamp has again been elected secretary of the Northeast Ky. Coal Association. Those Kentucky colonels sure do wear fine sombreros and when you talk about running a bang, up-to-date coal association—they do it.

Those business statistics in Coal Age sure are hot stuff. They keep a fellow all pepped up and he knows what is what now, before he used to be in the dark.

There is one thing a mining man is never ashamed of and that is that his mine cars are equipped with Hyatt bearings. He swells up with pride when he tells how good they are.

Donk Bros. Coal & Coke Co. is erecting one of the largest tipples in the state of Illinois at Mine No. 4, near Edwardsville, Ill. The airshaft has been hoisting coal for two years and now the main shaft is about ready. The tipple will be wide enough for six tracks and will have a capacity of 6,000 to 8,000 tons of coal daily. It will be 85 ft. in height. The company also will install one 750-kw. and one 1,000-kw. turbine generator. Electric current will be supplied to the mine at Maryville as well as No. 4 mine. (*Coal Age.*)

And speaking of the Bahamas, back in the old days whenever you wanted two fingers of anything refreshing you called for it by name and weren't satisfied until you got it. Whenever you want mine cars equipped with Hyatt bearings, call them that, don't just say roller bearings. Get what you want.

The assigned car problem continues to prove very perplexing and this subject is worthy of earnest study by all who are affiliated with the coal mining industry.

The coal carrying capacity of the Pennsylvania Railroad System, has, in the last few months, been increased by what is equivalent to the addition of 2308 new coal cars to the service.

Roller Bearing News

Some weeks ago a friend of ours who sells Hyatt equipped mine car trucks went to a mine and saw an old fellow greasing plain bearing wheels. Most of the grease went on the ground. He asked the old man how much he got an hour and was told 80 cents for a ten hour day, making $8.00. "But," the old man said, "I ain't worth it, mister, and I know it, and I would be willing to work for half as much if the cost of living would come down!" Which shows that occasionally we run across one of the mine workers who are of the old school and they, as a rule, fare worse than those who are more modern.

Every mining man who fails to send his operating, purchasing, and general supervisory heads to the Milwaukee meeting and exhibition of the best and latest equipment—September 24th to 29th—of the American Mining Congress will miss a grand opportunity to have his officials observe and hear the most recent developments in the mining world.

Not so long ago a mining man down in Eastern Kentucky told one of our fellows that the only trouble with Hyatt bearings is that they won't grease the wheels they are put in. We guess that Hyatts have done so much for him that he thinks they should cure all of his troubles just like a patent medicine. He shouldn't kick—he only has to grease them three times a year. Some snap!

Back 'befo' de war' the city of Milwaukee was famous for its sparkling brews. Now we seem to just recall that it's a beautiful city on the bank of a big lake with "water, water everywhere, and not a drop to drink."

Of course, we can't say for sure, but we are afraid that if some operators ever stopped to figure how much money they could have saved by using Hyatt equipped mine cars instead of the old-fashioned kind, the kind that run hard, that they would worry themselves to death. A word to the wise is sufficient.

The lake coal trade is running full tilt and the Northwest is getting lots of coal. General business is good up there in the summer resort country.

The Monogah Fuel Company having recently acquired a large tract of land adjacent to its present mine at Kuhn's Run, in the Marion County field of West Virginia, has completed plans for the installation of a plant with a daily capacity of 1,500 to 2,000 tons a day. The more the merrier.

Mine Operator: My Hyatt equipped cars are sure salubrious.

Another One: Say do you know what salubrious means. It means healthful.

First One: That's what I mean. They save so much money in the way of power, gouged out wheels, repairs to locomotives, and stuff like that, that they put joy into your life and if they do that they must be *healthful* cars.

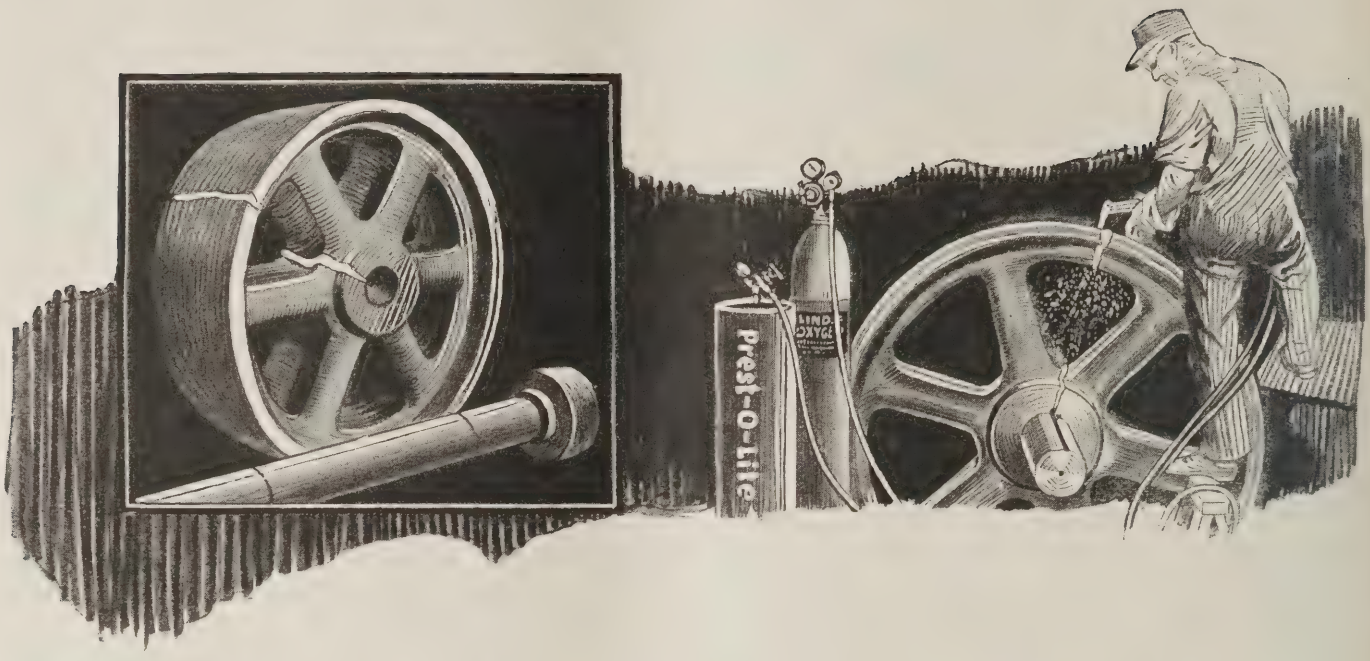
Shaker screen equipment of the most modern type was recently installed at the Eureka Mine of the Consumers' Fuel Company, Randall, W. Va.

It is reported that many mining districts are suffering because of the shortage of labor of the common class due to the immigration bars which are still with us.

Indiana people have organized the Erwin Block Coal Company which has a capital stock of $150,000 for the purpose of operating in Southern West Virginia.

The Bell and Zoller Mining Company holds—at the time of going to press—the world's record for production of coal from one shaft in any single month. Hyatt equipped cars have been adopted as their standard.

You better ask almost any of the reputable mine car manufacturers to furnish you with Hyatt bearing trucks for your old or new cars.



A Triumph in Cast Iron Cutting

Here was a case that made the plant engineer scratch his head.

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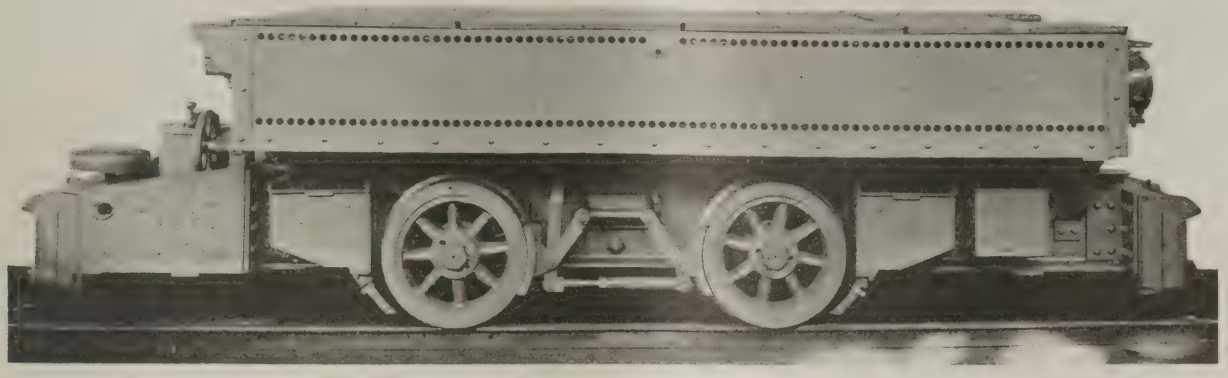
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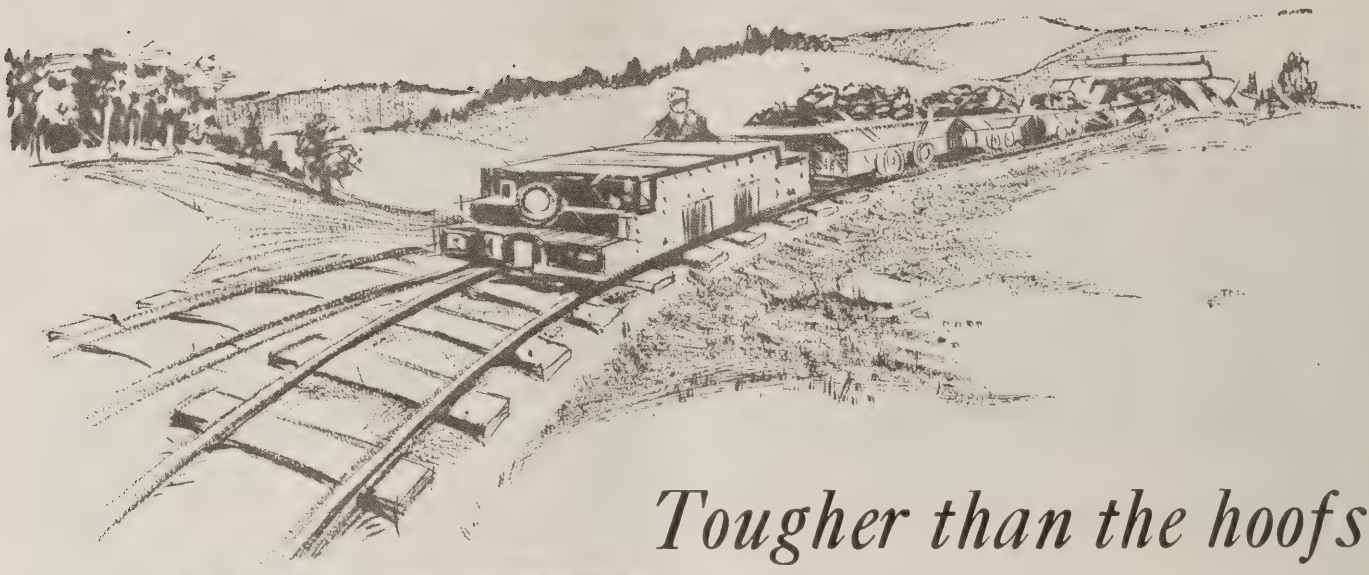
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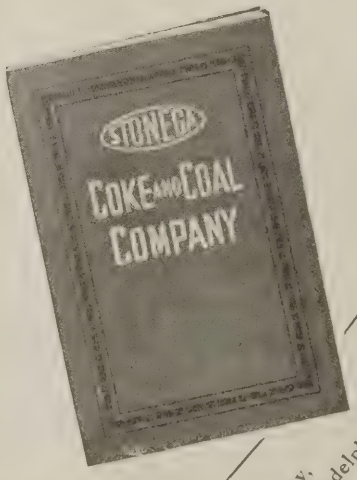
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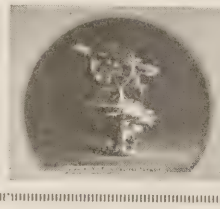
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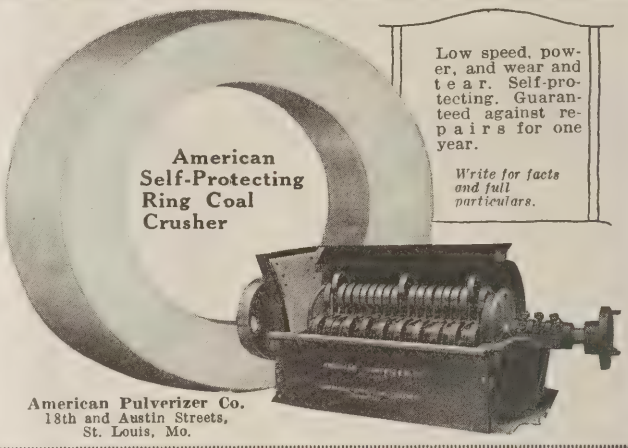
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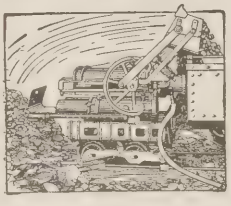
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We have rail located near you

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823 Horse Power
Operated Less Than 90 Days

30—Class M-30 823 H.P. Babcock and Wilcox Stirling Water Tube Boilers, 200 lbs. pressure. Drums double riveted, double strap butt joint. Complete with Westinghouse Stokers, Forced Draft Fans, Vulcan Soot Blowers and all accessories. Inspection invited.

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120-kw., 250 v., D.C., Keystone (Burke), 3 Brg. Generator, belted to Skinner Steam Engine with switchboard.
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1—CE-7 A.C. Sullivan shortwall machine, 220 v., 3 ph., 60 cy, complete. Used only 8 months.
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Motor Generator Sets
Rotary Converters
Mine Locomotives
Mining Machines
Generators
Motors

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New and Relaying

Frogs and Switches
Track Equipment

We ship what you buy.

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1—16 ton, 42 in. gauge Davenport Locomotive.
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1—16 x 30 Litchfield Hoisting Engine.
1—13 x 15 Skinner High-Speed Engine.

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25 lb. to 100 lb.

Large stock on hand with plenty empty cars to insure immediate shipment.
Steel Mine Props.
Splice bars, angle bars, bolts and spikes.
Shipments from our Madison, Illinois, plant, St. Louis district.

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400 TONS

NEW 25 LB. RAILS

at less than Mill price

STACKED READY FOR IMMEDIATE LOADING—ALSO

Tons		*Tons*	
150 Relay	30 lb.	500 Relay	60 lb.
200 Relay	35 lb.	1000 Relay	70 lb.
250 Relay	40 lb.	1000 Relay	75 lb.
300 Relay	45 lb.	400 Relay	80 lb.
200 Relay	50 lb.	300 Relay	90 lb.
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Large Stock New 12-16 and 20 Lb.

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Spikes, Frogs, Switches, Angle and Splice Bars.

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600 tons 60's—200 tons 70's
1500 tons 75's—2000 tons 90's

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Bucyrus 14-B Steam Shovel, traction, ¾ yd., revolving.
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RAILS

Complete stock, al' section Relaying Rails. Get in touch with us by 'phone or wire for your requirements.

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is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable *demand* for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

Are *you* using the Searchlight Section

FOR SALE

D. C. ENGINE DRIVEN SETS

ATTRACTIVE PRICE FOR QUICK SALE

1—Buckeye Engine, 18¾ x 18¾, direct connected to General Electric Co.'s generator, Type MP, Class 8-165-240, Form A-2, volts 250/275, generator No. 25826.

1—Buckeye Engine, 18¾ x 18, direct connected to General Electric Co.'s generator, Type MP, Class 8-165-240, Form L, volts 250/275, generator No. 31345.

1—Buckeye Engine, 18¾ x 18¾, direct connected to General Electric Co.'s generator, Type MP, Class 6-165-240, Form R, volts 250/275, generator No. 159425.

1—22 x 36 x 42 cross-compound vertical Corliss Engine, made by Filer-Stowell Co., Milwaukee, Wis., direct connected to General Electric Co.'s 525 kw., 525/575 volt, 100 r.p.m., generator No. 31209.

2—Allis-Chalmers 26 x 36 Corliss horizontal Engines, direct connected to Allis-Chalmers 500 kw., 550/575 volt, 125 r.p.m., generators Nos. 38316 and 38382.

The switchboard equipment for these generators will consist of generator panels only, which includes circuit breaker, ammeter and switches.

Filer-Stowell Engine and Generator available about July 1st, 1923. Allis-Chalmers Units available about August 10th, 1923. All of the above equipment is now in operation in the Pittsburgh district. Address T. S. Duncan, P. O. Box 940, Pittsburgh, Pa.

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MOTOR DRIVEN PUMPS

8 in. Alberger 2-stage Centrifugal Pump, 75 hp., D.C. or A.C. motor.
6 in. Lawrence Cent. Motor to suit.
4 in. McGowan 2-stage Centrifugal Pump with motor.
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MOTOR DRIVEN HOISTS

Clyde Iron Works Friction Drum, 16 x 20 in., 5 in. Flange, 40 hp., 250 v. D.C. motor.
Clyde Iron Works Friction Drum, 16 x 20 in., 5 in. Flanges, 25 hp., 250 v. D.C. motor.
Lambert Friction Drum, 38 x 42, 5 in. Flanges, 40 hp., 250 v., D.C. motor.
Clyde Iron Works Friction Drum, 16 x 20 in., 5 in. Flanges, 30 hp., 3 ph., 60 cy., A.C. motor.
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250 Volt

DIRECT CONNECTED UNITS

Kw.	*Generator*	*Engine*
500	Wghse.	Parsons Turbine.
400	Gen. Elec.	Ridgway side crank.
300	Cr. Wheeler.	Watts-Campbell-Corliss.
300	Ridgway.	Ridgway side crank.
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200	Wghse.	Skinner.
200	Gen. Elec.	Erie 4 Valve.
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150	Gen. Elec.	Skinner.
120	Gen. Elec.	Harrisburg side crank.
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Entire Plant, Buildings, Machinery and Equipment

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200-kw., dir. conn., D.C. generating unit; 110-v. motors; hundreds of steam pumps, boiler tubes, pipe, steam engines, coal crusher, coal conveyors, fans, pulleys, hangers, shafting, belting.

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7—300 hp., B & W. 200 lb.
4—150 hp., P. Return Tubular.

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Practically New

1—220 kw., G. E. 250/275 v.
1—330 kw., G. E. 250/275 v.
Both with 11000/6600 v., 3 ph. Transformers. 2300 v. coils can be furnished.

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We offer only our own material.

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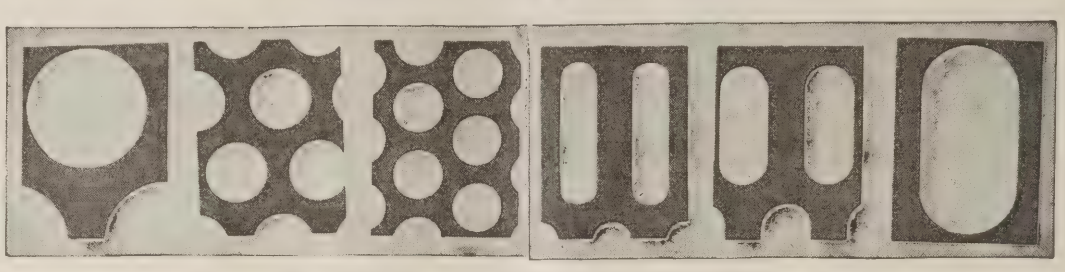
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For Ore Concentration and Coal Washing

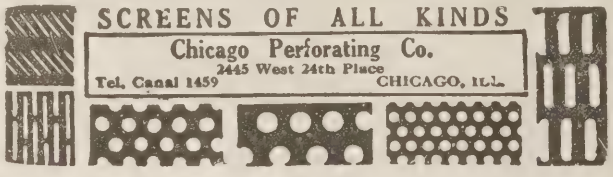
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who are using Simplex Rivetless Chain operative on double flanged sprockets specify no other, as this driving principle has proven a saving of fully 20% over inside drive and riveted types. THERE'S A REASON. Write for details. Made 6 and 9-in. pitch.

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Loaders for Coal, Ore, Salt, etc.

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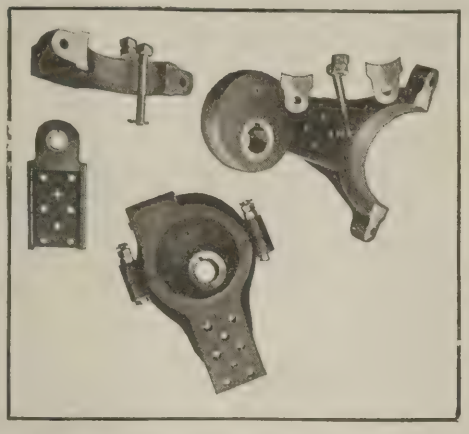
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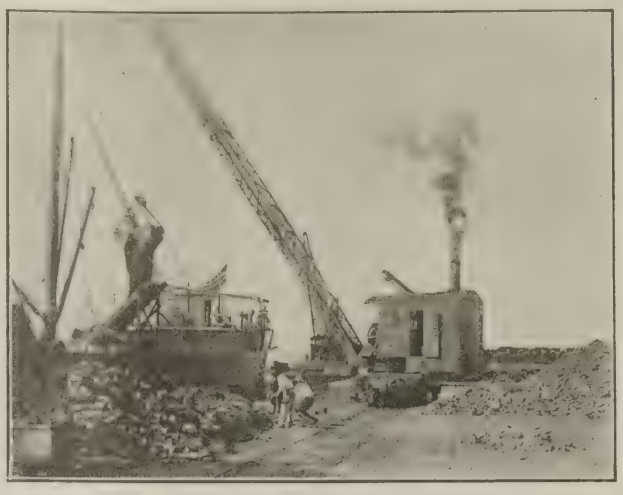


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Is They Do So Many Different Jobs—

With bucket—loading, unloading, reclaiming and storing of coal, sand, and gravel—switching cars—loading trucks—making heavy lifts with hook and block.

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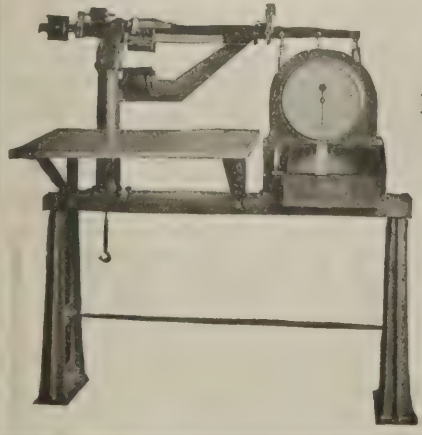
1873 BUILDERS OF CRANES FOR 50 YEARS **1923**

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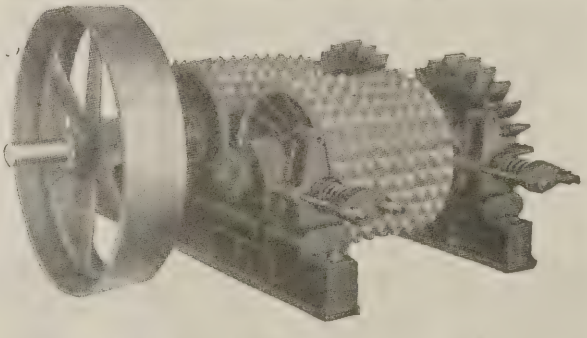
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Scottdale Coal Crushers, developed by years of service in coal fields and power plants, present each vital feature a crusher must have—sturdy, dependable construction, simplicity of design, and efficiency of performance.

Unusual quality of materials, heavy duty construction absolute simplicity, make continuous and dependable performance a certainty with Scottdale Crushers.

Marion quality is built into every one of them. There is a Scottdale Crusher for any requirement from 24 to 240 tons capacity. Send for bulletins.

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This tower is built of heavy structural shapes thoroughly laced and riveted together by the most modern scientific engineering methods. It is built for steel or wood tanks in capacities from 15,000 gallons upward.

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"STANDARD" and "JUNIOR" Shaking Screens, Conveyors, Car Hauls, Steel Tipples, etc.

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A Rust and Corrosion-Proof Building Material for Permanent Roofs, Siding and Trim

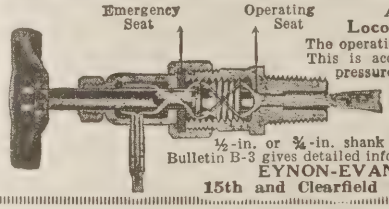
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Pipe Specialists for 48 years
Abendroth & Root Mfg. Co.
Works: Newburgh, N. Y.
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Ace High Among Locomotive Gauge Cocks

The operating seat is renewed not reground. This is accomplished with cock under full pressure and at a few cents cost. Railroad and industrial locomotives have been equipped for years, and users never go back to simple types. Your order for ½-in. or ¾-in. shank cocks will be filled from stock. Bulletin B-3 gives detailed information.

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for every coal handling requirement

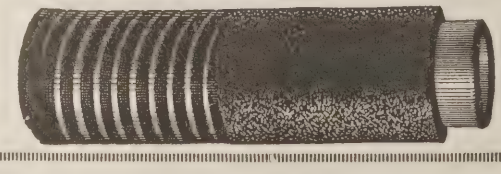
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WE-FU-GO AND SCAIFE WATER

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
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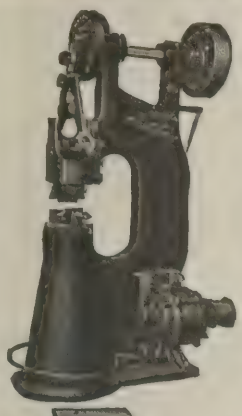
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Motor or Belt Driven
25, 50, 100, 250, 500 and 1000 lb. Models

Are used by more than 1100 American mines.

Will pay for themselves every month of steady work for twenty years or more.

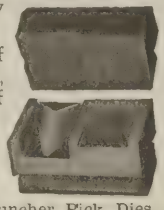
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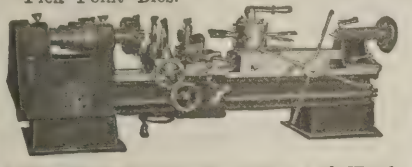
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Dies made for many forging purposes.

One man with any of the dies shown here, will do the work of seven the old way.

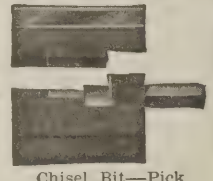


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All Little Giant Products are sold on 30 days' trial and guaranteed FOREVER against defective material and workmanship.

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It's a HAUSER-STANDER!

—for long economical service

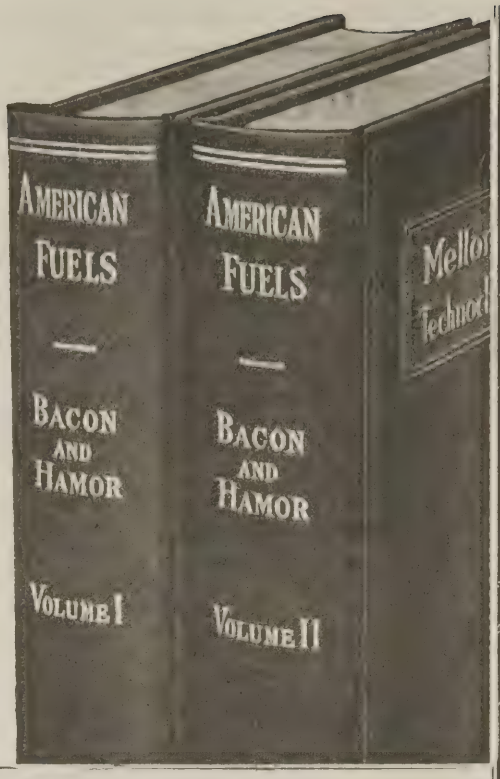
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Every coal company should have a set of this work



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American Fuels

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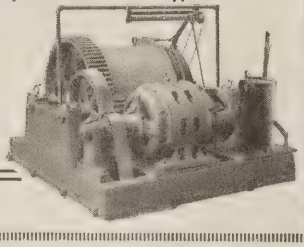
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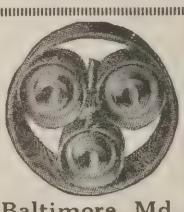
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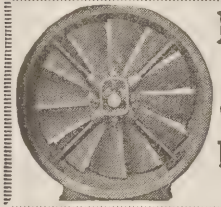
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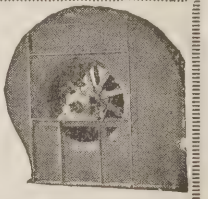
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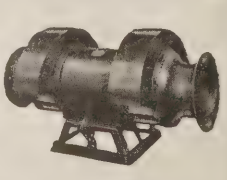
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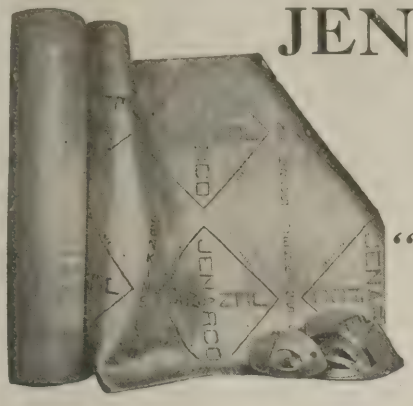
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Fig. 897

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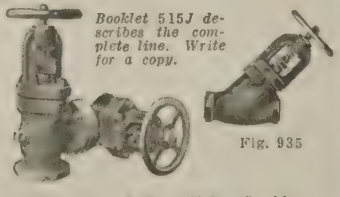


Fig. 935

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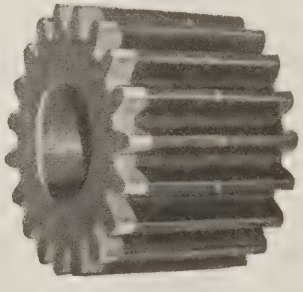
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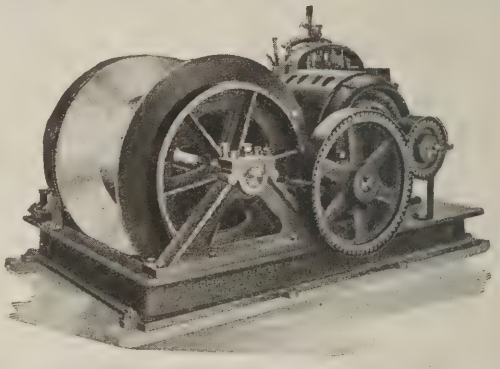
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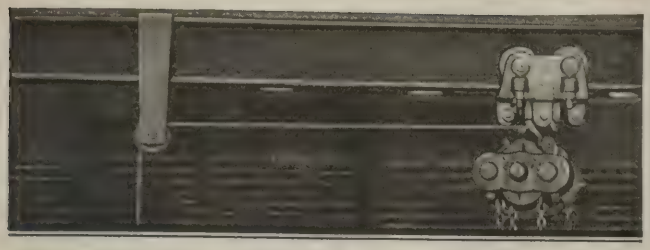
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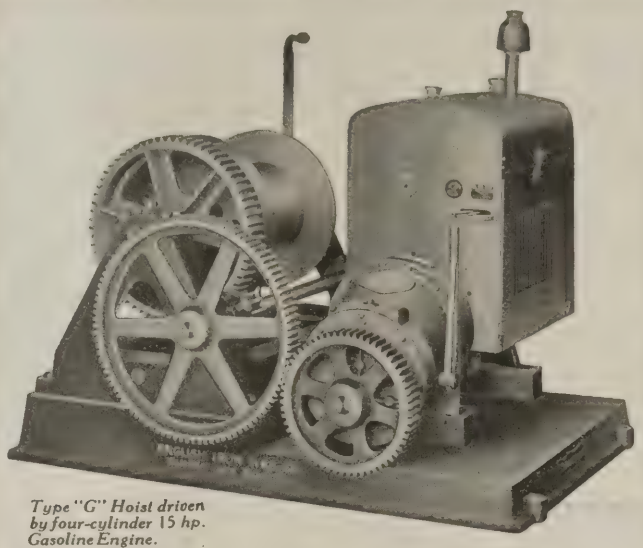
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Type "G" Hoist driven by four-cylinder 15 hp. Gasoline Engine.

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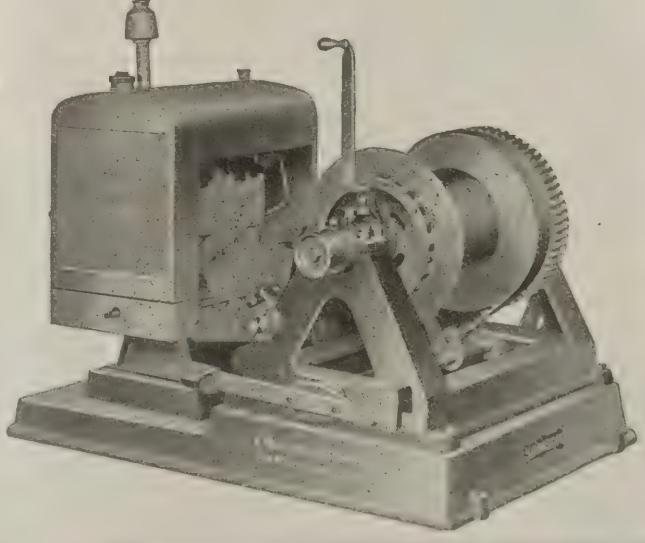
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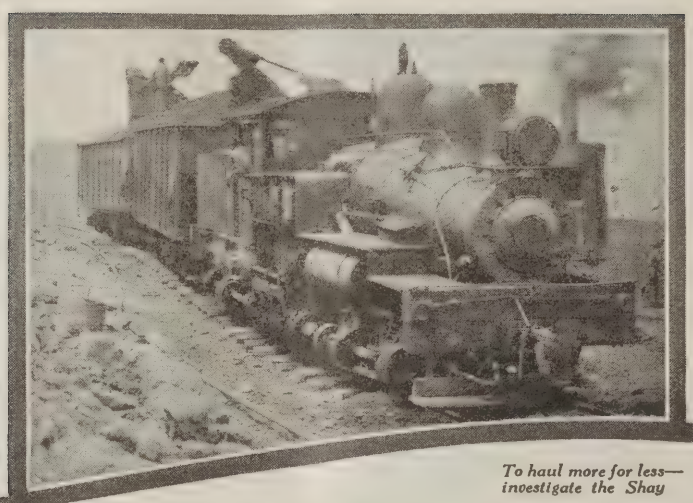
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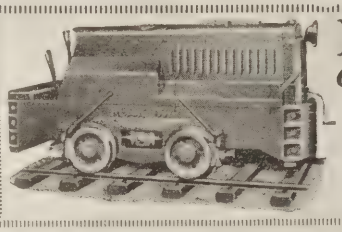
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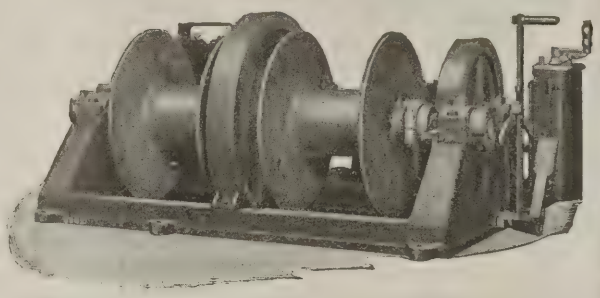


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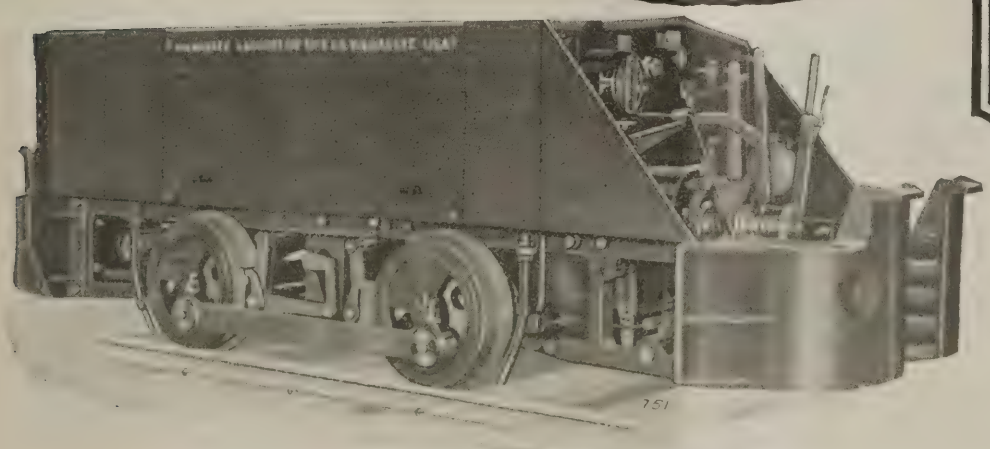
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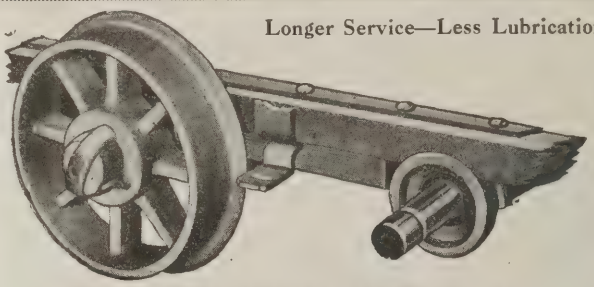
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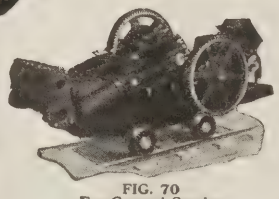


FIG. 70
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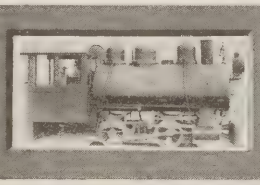
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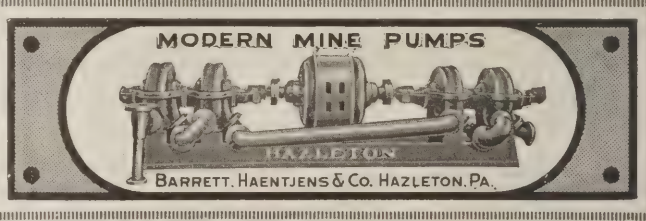
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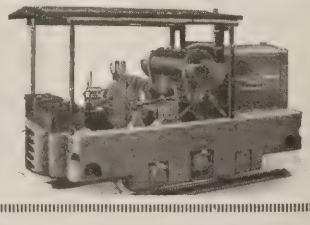
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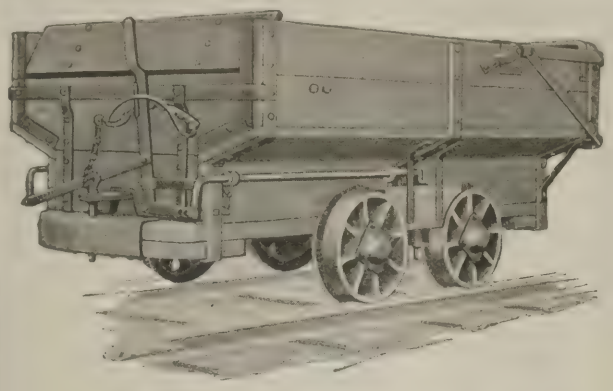
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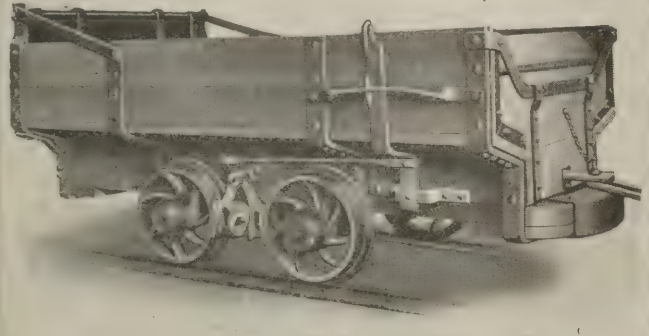
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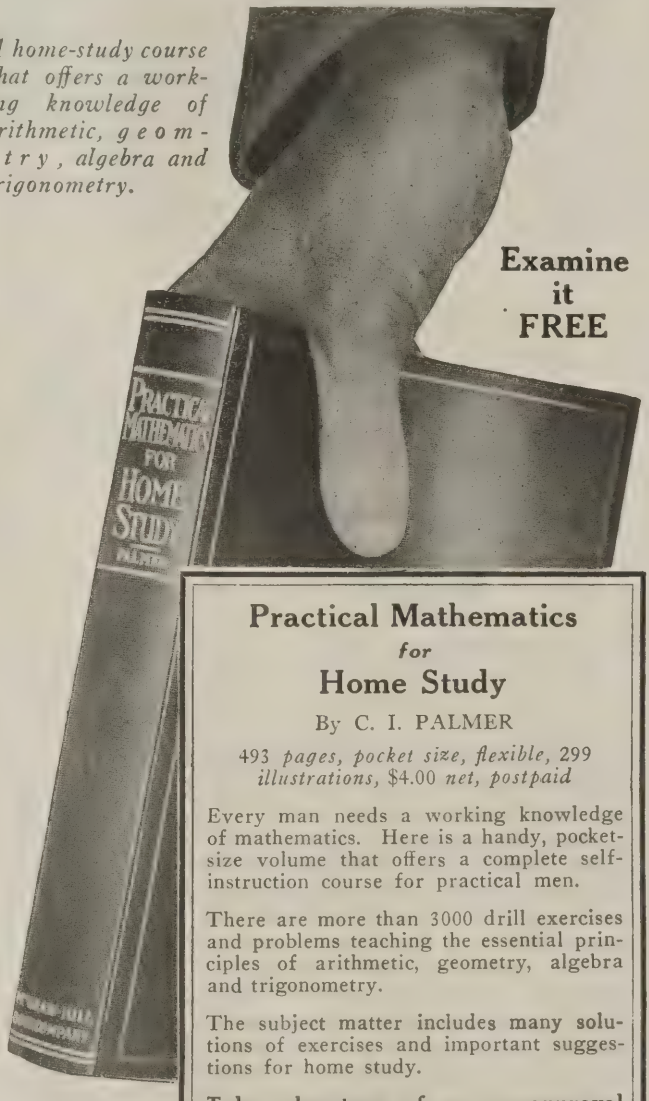
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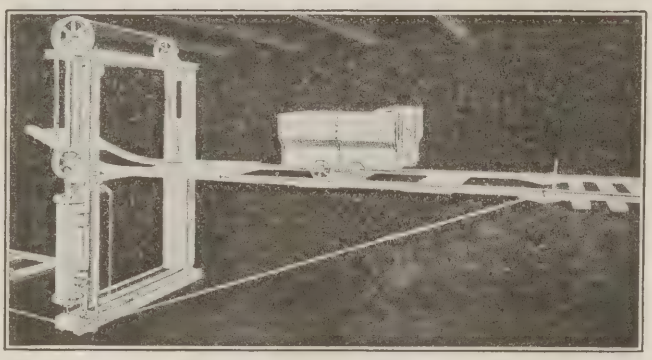
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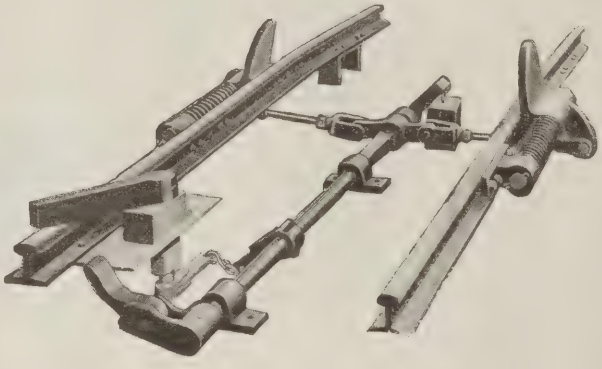


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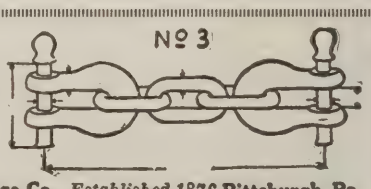
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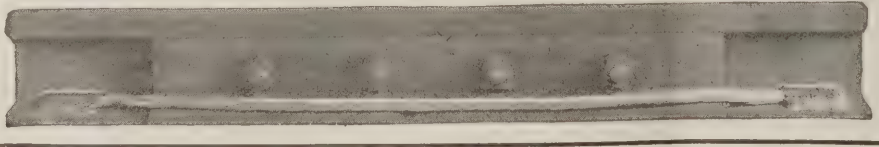
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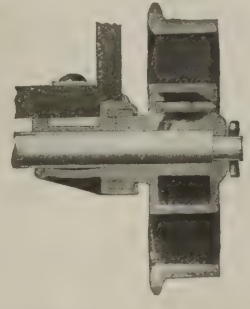
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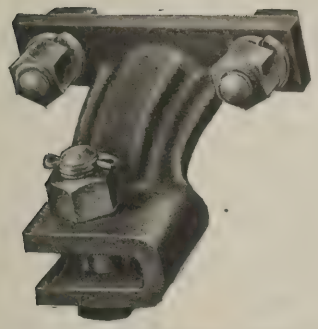
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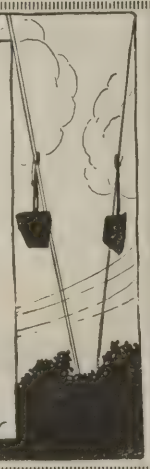
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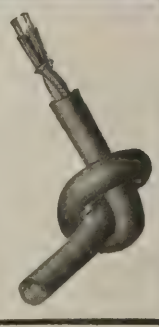
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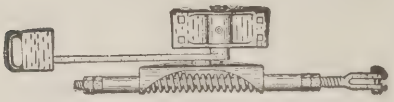
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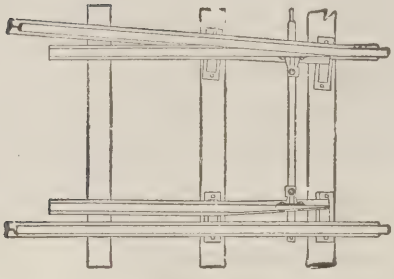
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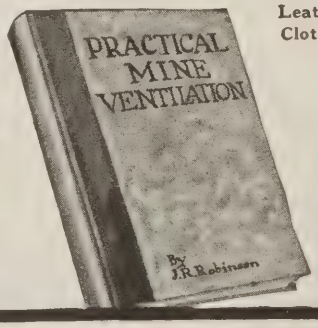
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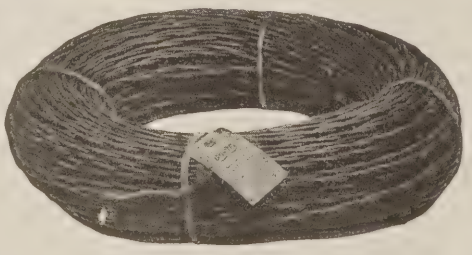
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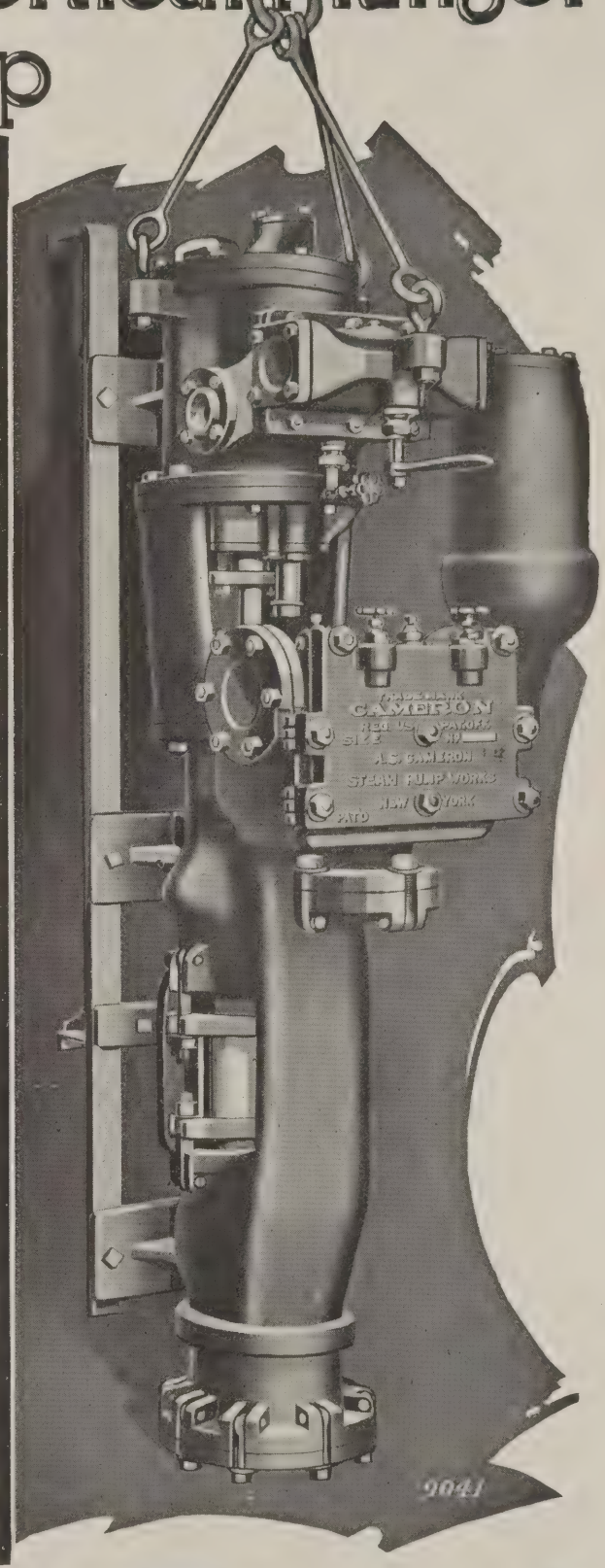
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It requires less space in the shaft than any other pump. There are no exposed parts liable to breakage from blasts or collisions with the side walls. No wearing parts in the water end, except the packing in the stuffing boxes which can be adjusted from the outside.

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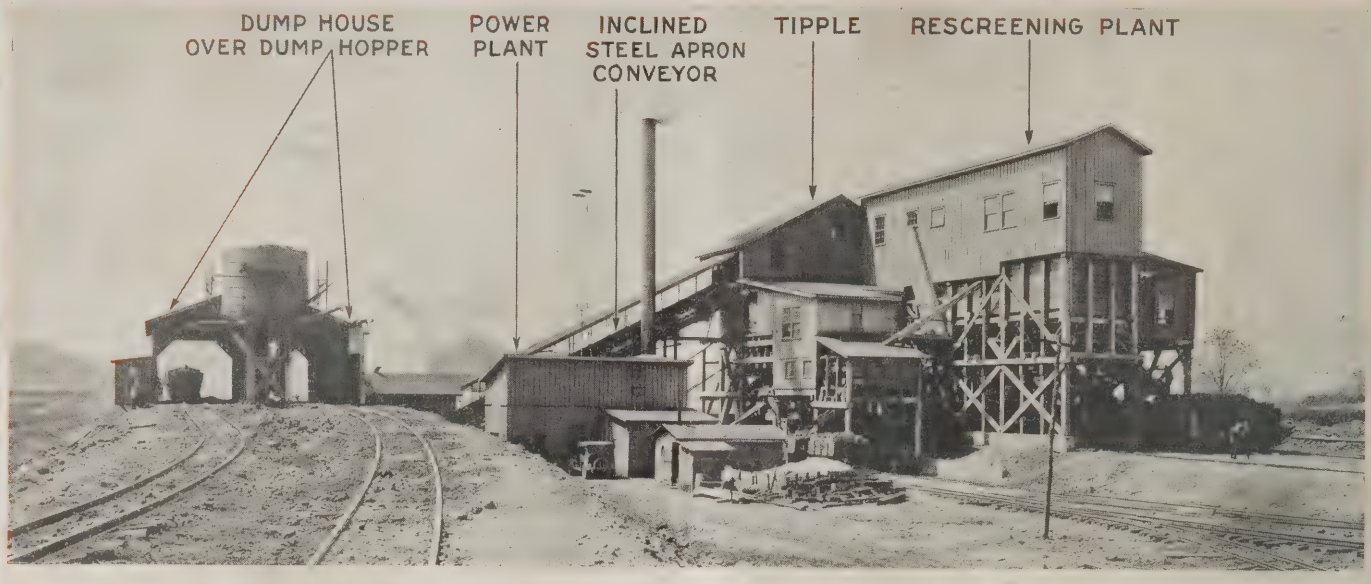
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General view of operation showing tipple, power house and rescreening plant.

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There are five tracks beneath the tipple so that lump, egg, nut, screenings and crushed coal can be loaded all at one time. Loading booms are provided for the lump and egg, while for the nut and screenings, loading chutes are provided.

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1278

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Pittsburgh	335 Fifth Ave.	Cleveland	329 Rockefeller Bldg.	San Francisco	168 Second St.	New Orleans,	C. O. Hinz, 504 Carondelet Bldg
St. Louis	Central Nat'l Bank Bldg.	Detroit	4210 Woodward Bldg.	Los Angeles	163 N. Los Angeles St.	Birmingham, Ala.,	
Buffalo	745 Ellicott Square	Kansas City, Mo.	306 Elmhurst Bldg.	Denver,	Lindrooth, Shubart & Co., Boston Bldg.		S. L. Morrow, 720 Brown-Marx Bldg.

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